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REBECA FROÉS DE ASSIS

**TRANSPORTATION AND SLUM GENTRIFICATION IN LATIN AMERICA:
FIGHTING TO STAY, BUT MISSING THE GAINS?**

FORTALEZA

2026

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Thesis submitted to the Graduate Program in Transportation Engineering of the Federal University of Ceará, as a partial requirement for obtaining the degree of Doctor (PhD) in Transportation Engineering. Research Area: Planning and Operation of Transportation Systems.

Supervisor: Professor Dr. Carlos Felipe Grangeiro Loureiro

Co-supervisor: Professor Dr. Clarissa F. Sampaio Freitas

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*To all the communities resisting along the LRT
route in Fortaleza, Brazil.
May your voices rise above the trains.*

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inside me, showing me that engaging with real people is what I care about most. I hope I never forget that as I become the kind of researcher I aspire to be.

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“(...) individuals' basic rights and liberties should never be violated or sacrificed on the grounds of improving the accessibility levels of others” (Pereira *et al.*, 2016, p. 15).

RESUMO

O tema da gentrificação induzida pelos transportes (GIT) tem recebido gradual atenção acadêmica, principalmente em cidades norte-americanas. Esse recorte geográfico reflete a dominância da perspectiva global-nortista através da qual o fenômeno da gentrificação tem sido interpretado. Contudo, a formação de um ponto de inflexão vem sendo observada nas últimas décadas, em resposta à emergente defesa por uma “geografia de gentrificação”. Consequentemente, diferentes pesquisadores têm começado a situar esse fenômeno em cidades de países em desenvolvimento, incorporando explicações locais ao debate. Seguindo esses esforços recentes, este trabalho enquadra a discussão da GIT na América Latina através dos três manuscritos que compõem esta tese. Para isso, primeiro, uma revisão sistematizada da literatura foi realizada, gerando como principal produto um modelo conceitual que retrata como a pobreza e a informalidade moldam a manifestação da GIT na América Latina. Em seguida, uma investigação empírica foi conduzida em Fortaleza, Brasil, revelando que o assentamento informal analisado começou a atrair residentes ligeiramente mais ricos depois da implementação do sistema de veículo leve sobre trilhos (VLT), especialmente mediante arranjos informais de aluguel. Esse primeiro estudo de caso também mostrou que, até a presente data, expulsões induzidas pelo mercado ainda não acontecem na comunidade. Esses resultados foram obtidos através da comparação visual e longitudinal de imagens do Google Street View, uma análise que foi seguida pela realização de uma oficina participativa na comunidade, a fim de levantar explicações locais para as mudanças observadas no ambiente construído. Os achados desse segundo manuscrito mostram que a GIT latino-americana desafia a definição usual dos gentrificadores enquanto indivíduos de classe média ou alta, além de revelarem que a gentrificação em assentamentos informais está frequentemente associada a processos regionais de reestruturação urbana. Tais descobertas levaram à uma mudança no foco analítico desta tese, deslocando a discussão desde a ameaça da segregação involuntária para as penalizações que são impostas aos moradores de longa-data. Por essa razão, uma abordagem qualitativa (baseada no *process tracing method*) foi conduzida para explorar o papel que esse fenômeno desempenha em mudar as práticas de mobilidade dos antigos moradores, à medida em que se observa uma transformação excludente do uso do solo na região e, em contrapartida, esses indivíduos passam a alcançar com mais rapidez destinos mais distantes através do VLT, pelo menos, em teoria. No geral, os resultados desse terceiro manuscrito reforçam a importância de que percepções e experiências relacionadas à gentrificação sejam exploradas em contextos de investimentos de transporte público. Esse

estudo de caso também mostra que incrementos na acessibilidade objetivamente calculada podem ser insuficientes não só para garantir a participação em atividades como para mudar práticas de mobilidade em alinhamento com a expectativa do alcance de objetivos sustentáveis. Isso porque muitos moradores de longa-data reportaram, primeiro, a existência de uma incompatibilidade de ordem econômica em relação às oportunidades nas proximidades de suas residências, assim como a necessidade de realizar viagens mais longas para alcançar destinos mais compatíveis, com quase nenhuma menção ao uso do VLT. em certa medida, os achados desta tese não só enquadram o GIT como um caso distinto de exclusão social relacionado aos transportes (TRSE, em inglês), mas também suportam a distinção entre acessibilidade percebida e suficiência percebida quanto às oportunidades, uma vez que os moradores reportam avaliações positivas quanto ao número e diversidade de atividades no bairro, mesmo diante de suas dificuldades de participação. De forma geral, o caso do VLT de Fortaleza pode fornecer aos planejadores urbanos e tomadores de decisão reflexões pertinentes orientadas à ação, ajudando a mover a discussão da oferta de recursos de transporte para a noção de um desenvolvimento orientado aos transportes inclusivo. Como rebatimento para a prática, destaca-se a importância de que as externalidades impostas a comunidades locais sejam componentes centrais dos esforços de avaliação *ex-ante* de projetos de transportes, dando origem à elaboração de medidas mitigatórias, sempre que possível. Com frequência, isso significará incluir medidas proativas de mistura social, congelamento de aluguéis e incentivo ao empreendedorismo local, a fim de impedir o desdobramento da gentrificação como um caso distinto de TRSE.

Keywords: gentrificação induzida pelos transportes; América Latina; assentamentos informais; melhorias de acessibilidade; gentrificação percebida; acessibilidade percebida.

ABSTRACT

Transport-induced gentrification (TIG) has received increasing scholarly attention, particularly in North American cities. This geographical focus reflects the dominance of a Global North perspective through which gentrification has long been interpreted. However, recent decades have marked a turning point, as growing advocacy for a “geography of gentrification” has emerged. Consequently, scholars have begun to situate this phenomenon in cities across low- and middle-income countries, incorporating place-based explanations into the debate. Following in the footsteps of these efforts, this three-manuscript thesis frames the discussion of TIG in Latin America. To this end, I first conduct a Systematic Literature Review and, as a result, develop a conceptual framework that shows how TIG is shaped by the profound informality and poverty inherent in the region. Second, an investigation empirically grounded in Fortaleza (Brazil) showed that an informal settlement began welcoming slightly more affluent residents after a Light Rail Transit (LRT) was implemented, mostly relying on informal rental arrangements. This first case study also showed that, to date, market-driven displacement has not occurred in the community. These findings relied on a visual comparison of Google Street View images, followed by a participatory workshop aimed at providing place-based explanations for the changes in the built environment. The findings of this second manuscript show that TIG in Latin America poses challenges to the usual definition of gentrifiers as middle- or high-income individuals. Furthermore, they show that gentrification in informal settlements is often associated with regional processes of urban restructuring. These outcomes led to a turning point in the research as the analytical focus was shifted from displacement to the burdens imposed on incumbents. In this sense, I conducted a qualitative approach (using the process tracing method) to explore the role TIG plays in changing incumbents’ mobility practices as the local retail composition changes and incumbents are theoretically allowed to go farther and faster using the LRT. In general, findings of the third manuscript reinforce that it is essential to explore how individuals perceive and experience gentrification within the context of transit developments. This case study also shows that improving objective accessibility may be insufficient not only to enhance activity participation but also to shift the mobility practices of residents in ways that align with the expectation of achieving sustainability-related goals. That is because many low-income incumbents reported both an inability to engage in nearby opportunities and a need for travelling longer to achieve suitable ones, with hardly any mention of the LRT. To some extent, the findings of this thesis not only frames TIG as a distinctive case of

transport-related social exclusion (TRSE) but also support the distinction between perceived accessibility and perceived sufficiency of opportunities, since even when the respondents reported their inability to engage in the nearby activities, they frequently expressed a positive assessment regarding the number and diversity of activities in the neighborhood. Overall, findings regarding the Fortaleza's LRT may provide urban planners and decision-makers with actionable insights, helping to move the discussion from the supply of transportation resources to inclusive transit-oriented development. As policy takeaways, I note that the extent to which local communities are affected by mass transit systems should not only be part of *ex-ante* assessments but must also be mitigated in advance. Ultimately, this may require proactive measures to guarantee social mixing, maintain affordable rental prices, and foster local entrepreneurship, to prevent the unfolding of gentrification as a distinct kind of TRSE.

Keywords: transport-induced gentrification; Latin America; informal settlements; accessibility improvements; perceived gentrification and accessibility.

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LIST OF ABBREVIATIONS

ACP	Population Concentration Areas
IBGE	Brazilian Institute of Geography and Statistics
GSV	Google Street View
IPEA	Brazilian Institute for Applied Economic Research
LRT	Light Rail Transit
LUTI	Land-Use and Transport Interactions
TRSE	Transport-related Social Exclusion
TIG	Transport-induced Gentrification
TOD	Transport-oriented Development
SLR	Systematic Literature Review
VMT	Vehicle Miles Traveled

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1 INTRODUCTION

1.1 Background

Over the past years, transport-induced gentrification has received increasing scholarly attention (Kahn, 2007; R  rat and Lees, 2011; Lin and Chung, 2017; Nilsson and Delmelle, 2018; Baker and Lee, 2019; Chapple and Loukaitou-Sideris, 2019; He *et al.*, 2021; Huang *et al.*, 2026). A substantial body of work has explored the relationship between gentrification and transit-oriented development (TOD), particularly in North American cities (see Padeiro *et al.*, 2019). To some extent, this geographical focus reflects the dominance of a Global North perspective through which gentrification has long been interpreted. However, recent decades have marked a turning point, as growing advocacy for a *geography of gentrification* has emerged (Lees, 2012). Consequently, scholars have begun to situate this phenomenon in cities across low- and middle-income countries (L  pez-Morales, 2015; Cumming, 2015; Janoschka and Sequera, 2016; Gonzalez, 2016; Bin, 2017; Rivadulla and Bocarejo, 2014; L  pez-Morales, 2016), incorporating place-based explanations into the debate.

Building on this geographical gap, and recognizing the role transport systems play in reshaping cities across Latin America (Rufino *et al.*, 2021), this doctoral research frames the discussion of Transport-Induced Gentrification (hereafter referred to as TIG) in the region. Due to their deep socio-spatial inequalities and recent transportation policies, Latin American cities notably offer a valuable lens through which we can see, sometimes in exaggerated form, processes and patterns that are likely to undermine the idea of *inclusive transit-oriented development* (see Ling *et al.*, 2026). After all, fair transportation policies should prioritize vulnerable groups and thereby mitigate morally arbitrary disadvantages that systematically reduce their accessibility levels (Pereira *et al.*, 2016), i.e., the ease of achieving their desired destinations and urban opportunities, a concept commonly defined as accessibility (Martens *et al.*, 2012; Van Wee and Geurs, 2011).

Ultimately, one could rephrase the statement above by saying that fair transportation policies are meant to prevent any Transport-Related Social Exclusion (TRSE), i.e., a situation where individuals lose their abilities to connect with the opportunities they need to fully participate in society (Church *et al.*, 2000; Lucas, 2012). Drawing on this concept, in this research, I frame TIG as a distinct type of TRSE. First, because displaced people are expected to relocate to more disadvantaged neighborhoods as the result of housing

affordability challenges (see Khaleel and Hanlon, 2026). Second, because the gentrification phenomenon tends to reshape the local supply of activities in ways that may no longer align with the needs and abilities of long-term residents (see Zukin, 1990; Zukin *et al.*, 2015).

That said, fully understanding how TIG manifests and its consequences seems crucial for providing urban planners and decision-makers with actionable insights aimed at preventing policies and projects from failing to benefit those who are most in need of them. In this sense, a broader police takeaway from this doctoral research lies in the association between transportation, urban development (particularly in work-class neighborhoods), outcomes, and the socio-spatial constraints under which urban planners operate. Ultimately, this debate is also likely to help advance planning theory, as much of it has long focused on what planners do with little reference to this association (Fainstein, 2010). The same applies to transportation planning (which I rather refer to as accessibility planning or “right to the city” planning), reinforcing the need for assessments covering the long-term social effects on local populations and communities (Lucas, 2012).

1.2 Research Questions

The concept of gentrification was first coined by Glass (1964) in the early 1960s and, for decades, remained framed within a Global North perspective, being applied just to a handful of cities, starting with mid-1960s London. Consequently, cases of *blanqueamiento* in neighborhoods across Latin America would hardly be labeled as gentrification until very recently. The same applies to informal settlements where housing arrangements have enabled new forms of landlordism. However, as mentioned earlier, this has begun to change as many scholars have begun to incorporate regional specificities into gentrification theorization (see for example the special issue introduced by Jover and Lerena Rongvaux, 2024). Notably, these efforts seek to avoid reproducing inadequate explanations of spatial consumption and production, and consequently they reinforce the argument that gentrification unfolds in distinct ways, depending on the context in which it manifests (Robinson, 2015). As Shimbo and Rufino (2019) remind us, this aligns with broader debates regarding the financialization of the economy and society.

Drawing on this understanding, this research began with an initial question that later gave rise to additional inquiries: *How can we represent the unfolding of TIG in Latin American cities?* This question also reflects my personal concern with the overly vague definitions assigned to gentrification in the transportation field, where the phenomenon has

often been equated with displacement. This simplicity and lack of clarity are both well-documented in Zuk *et al.* (2018) and Padeiro *et al.* (2019) since, at the core of gentrification theory, this complex and longitudinal phenomenon is defined as a distinct kind of transformation in working-class neighborhoods that necessarily involves the influx of more affluent individuals through “some form of collective social action” (Smith, 1996, p. 65).

As a result of this representation effort, my initial findings show that TIG is largely shaped by the profound informality and poverty inherent in Latin American cities. To some extent, this aligns with the significant number of papers that associate gentrification in Latin America with processes of dispossession, especially considering the removal of low-income communities near urban projects (Anguelovski *et al.*, 2019; López-Morales *et al.*, 2021). After all, struggles involving land ownership in this region often create room for massive evictions and dispossessions of the urban poor (Angotti, 2013). However, I note that studies on informal rental markets (Baqai and Ward, 2020; Stiphany *et al.*, 2024) have provided a solid foundation for the debate on *slum gentrification* (Ascensão, 2018) and residential displacement, as they shift the focus from self-construction to rental services, and consequently to *housing management* (Rolnik *et al.*, 2021). Considering this, I pose the second research question as follows: *What can we tell about slum gentrification and displacement as TIG unfolds in informal settlements?*

I particularly wonder, first, whether market-driven displacement can occur in contexts of informal urban development and, second, whether the profiles of gentrifiers in such scenarios challenge the usual definition of medium- or high-income individuals. Upon completing my first case study (see Chapters Outline – Section 1.5), I found no evidence of TIG resulting in market-driven displacement. Nonetheless, I observed that the ability of long-term residents to stay was sustained by informal housing arrangements, particularly involving those who were evicted from their homes during State-led interventions. This finding prompted a turning point in this doctoral research: rather than focusing on the threat of displacement, I shifted the analytical lens to the burdens imposed on incumbents, i.e., those residents who keep trying to stay in their neighborhoods, even if it means paying higher rents or doubling up (Chapple 2014; Freeman, 2006).

In this regard, Huang *et al.* (2026) argue that it is essential to explore how individuals perceive and experience gentrification within the context of transit developments. This is mainly because most studies on the relationship between transportation and gentrification rely on aggregate analyses that often fail to capture individual perceptions and lived experiences (Youngbloom *et al.*, 2023). This aligns closely with the growing consensus

that different people hold distinct perceptions of accessibility levels, which are heavily shaped by personal circumstances, such as gender, income and time budgets (Pot *et al.*, 2021; Negm. *et al.*, 2025; De Vos *et al.*, 2025). Drawing on this subjective dimension, transportation studies have recently turned their attention toward how travel performance and life satisfaction are shaped by individuals' perceptions of the built environment and transport systems (Farber and Páez, 2011; Delmelle *et al.*, 2013; De Vos and Witlox, 2017; Chaloux *et al.*, 2019, Tiznado-Aitken *et al.*, 2020). Following in the footsteps of these investigations, my final research question is posed as follows: *How does TIG shape the mobility practices of low-income incumbents?*

1.3 Aims

In line with the previous argumentation, the aim of this thesis is to explore how transport-induced gentrification (TIG) manifests within the context of Latin American cities, considering both the regional specificities shaping the phenomenon and the burdens imposed on gentrifying communities. To this end, a threefold objective was defined:

1. Develop a conceptual framework to better understand the unfolding of this phenomenon in Latin American cities.
2. Investigate the specificities underlying residential relocation into and out of a gentrifying community near a new transit project implemented in a Latin American city.
3. Investigate the role of TIG in shaping the mobility practices of low-income incumbents, using their perceptions as an analytical lens.

The first aim is addressed in chapter 2, while the second and third aims are addressed in the empirical chapters 3 and 4 (see Chapters Outline – Section 1.5).

1.4 Methodological overview

This thesis is composed of three interconnected yet independent manuscripts, organized as a sequential qualitative inquiry in which findings from each study informed subsequent stages of the research. Consequently, each manuscript employs a specific research

design tailored to address a particular aim. While more detailed explanations are provided in the following chapters, I clarify in advance:

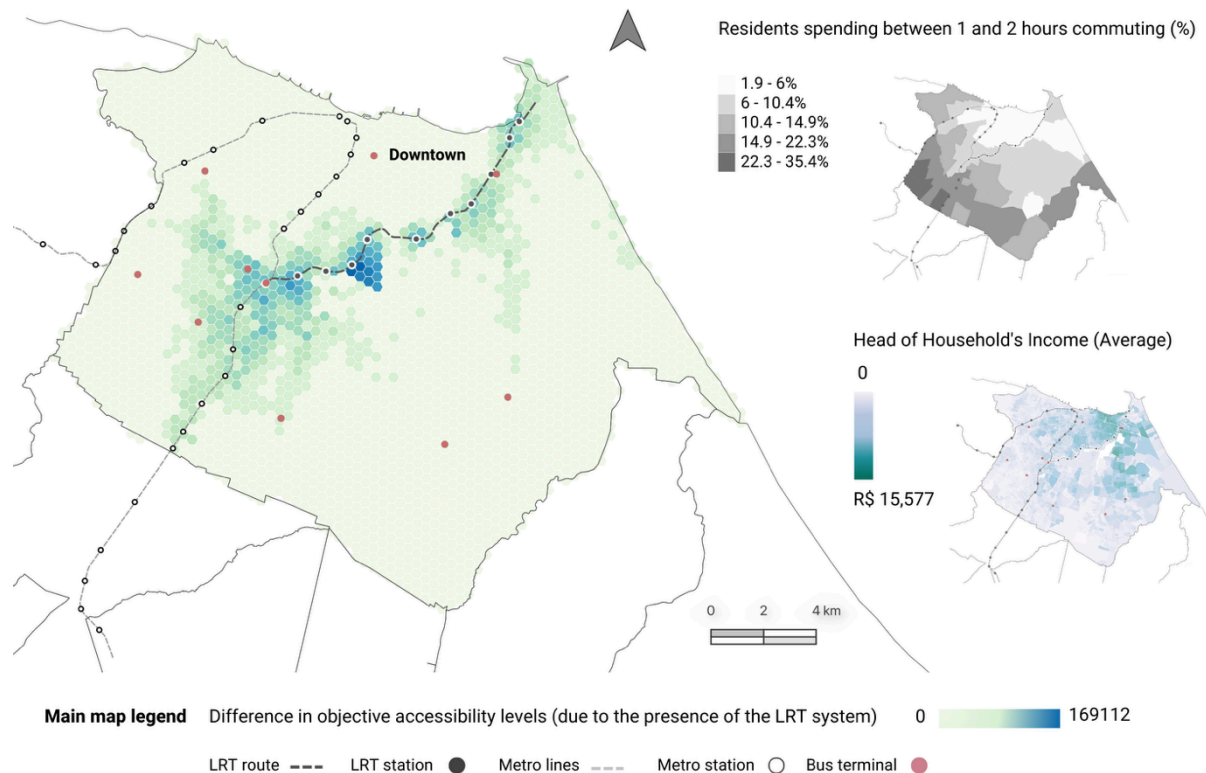
1. The first manuscript (Chapter 2) is essentially a Systematic Literature Review – SLR, whose set of secondary evidence supported the development of the mentioned conceptual framework.
2. The second manuscript (Chapter 3) is a single-case study in which my co-authors and I investigate two theoretical-based hypotheses in the *Trilha do Senhor* community, an informal settlement located in Fortaleza (Brazil).
3. The third manuscript (Chapter 4) is also a single-case study in which my co-authors and I apply the *process tracing method* as a qualitative tool for causal inference. To this end, we conducted interviews with current residents of the same community.

In Chapter 3, I provide a more detailed justification for the selection of the *Trilha do Senhor* community as a representative case of TIG in Fortaleza. In advance, however, I identify the Light Rail Transit - LRT system, implemented in the mid-2010s, as the primary driver of this phenomenon. This single-route system was part of the public investments undertaken as the city prepared for the 2014 World Cup. During the 2010s, as two megaevents drew nearer in Brazil, the 2014 World Cup and the 2016 Olympic Games, twelve Brazilian metropolises experienced the materialization of various structural urban projects (Vargas and Paiva, 2014; Júnior *et al.*, 2016). Among these, transportation infrastructure stood out, particularly massive transit systems (Rodrigues, 2015; Freitas, 2015). In this context, while broad sectors of society contested the scale of public spending, a more focuses coalition of grassroots movements and scholars documented the burdens imposed on low-income communities, especially those which were partially or entirely located within intervention areas (Castro e Novaes, 2015).

This was precisely the experience of seventeen informal settlements along the LRT route in Fortaleza, as the project implementation was contingent upon to the forced removals of numerous families (Rocha, 2014; Viana *et al.*, 2014; Viana, 2015; Iacovini, 2017; Oliveira, 2017). Known as *Comunidades dos Trilhos* (literally, “Rail Communities”), these low-income communities experienced massive dispossession despite all their attempts to resist, exemplifying the intersection of urban conflicts and transportation projects in Brazil (De Assis *et al.*, 2025). Overall, this 13.29-kilometer transit project passes through 22

neighborhoods across the city; and since its first announcement, it has faced criticism for not benefiting the most critical urban areas, especially in terms of travel time and accessibility needs (Pinheiro *et al.*, 2015, Freitas, 2017).

Figure 1 – Contextualization of Fortaleza’s LRT system – Objective accessibility gains (job opportunities), and residents’ commute time and income.



Source: Elaborated by the author based on IBGE and IPEA databases.

Figure 1 illustrates this contradiction through a grayscale map that shows the percentage of residents with a commute of one to two hours across the city. To generate this map, I used data from the 2010 Brazilian Census, conducted by the Brazilian Institute of Geography and Statistics (IBGE). I note, however, that the unit of analysis is not the individual census tract, but rather the Population Concentration Areas (ACP). This is because certain variables, such as *commute time*, are derived from sample results to which a weighting factor is applied, ensuring that the estimates accurately reflect the total population's behavior within each ACP. This differs from the *average income of the head of household* shown in the green-scale map, since this variable derived from the census universe. As indicated, the LRT

route is mostly located in wealthier neighborhoods, where the percentage of residents with high commute times remains below 10.4%.

In line with that, the main map indicates that the objective accessibility gains linked to the presence of the system were limited in wealthier neighborhoods, especially in comparison to areas around its southwestern boundary, which are located farther from the downtown core, where most of urban activities are concentrated. These gains were estimated using the *aopdata* R package (Pereira and Herszenhut, 2023), which has been employed in previous studies to calculate and analyze job accessibility in Brazilian cities (Pereira *et al.*, 2022). The metric applied is essentially a location-based indicator (cumulative opportunity) that relies on population, transportation, and land-use data compiled by the Brazilian Institute for Applied Economic Research (IPEA). In this sense, using data from the same year, each hexagon represents the increase in the number of job opportunities reachable within a 60-minute threshold once the LRT is integrated into the transportation network.

That said, and relying on the justice and equity framework of Pereira *et al.* (2016), this brief characterization casts doubt on the understanding of Fortaleza's LRT system as part of a fair transport policy. First, because individuals' basic rights were violated through massive forced displacements, which should never occur on the grounds of improving the accessibility levels of others. Second, because as the LRT route passes through areas that were already well off, the fairness of its distributive effects is likely to be undermined. In the following chapters, I will explore this debate through a local perspective, taking into account the neighborhood changes gentrification entails.

1.5 Chapters Outline

This thesis is organized into five chapters, the first being this Introduction and the following three composing a set of interconnect yet independent manuscripts:

1. **Chapter 2:** De Assis, R. F., Loureiro, C. F. G, Freitas, C. F. S., Timms, P., 2024. Transport-induced gentrification in Latin America: An urban conflict arising from accessibility improvements. *Transportation Research Part D: Transport and Environment* 134, 104352.
<https://doi.org/10.1016/j.trd.2024.104352>
2. **Chapter 3:** De Assis, R. F.; Loureiro, C. F. G; Freitas, C. F. S.; Humberto, M. Can Informal Settlements Face Transport-induced Gentrification and

Displacement? Insights from a Low-Income Community in Fortaleza, Brazil 2026. Preprint (SocArXiv). Disponível em: https://osf.io/preprints/socarxiv/ebq89_v2. (Submitted to Cities).

3. **Chapter 4:** De Assis, R. F.; Loureiro, Tiznado-Aitken, I. (forthcoming). Transport-induced gentrification, perceived accessibility, and mobility practices: What happens to those who stay in their communities? Disponível em: https://osf.io/preprints/socarxiv/gwzvm_v1. (Submitted to Transport Geography).

Chapter 2 provides the theoretical framework of this doctoral research, recognizing TIG as a set of intertwined processes and thereby challenging its understanding as an outcome. In this first manuscript, my co-authors and I first present a theoretical review on the long-term interaction between land development and transportation, developing an *a priori* conceptual framework. Subsequently, we apply a systematic review on empirical studies of Latin-American gentrification to incorporate some regional specificities into the framework. As a result, we represent the phenomenon as an urban conflict generated in and through accessibility improvements. As mentioned earlier (Research Questions – Section 1.2), this manuscript gave rise to additional inquiries, particularly involving the unfolding of TIG in contexts of informal urban development.

In this sense, Chapter 3 advances this debate by addressing a twofold objective. First, my co-authors and I wonder if gentrification can unfold in Latin American informal settlements through the entry of slightly more affluent households. Second, we investigate whether the relocation of long-term residents can be considered market-driven displacements. To this end, we undertook a two-step approach that combined the comparison of Google Street View (GSV) images from different dates (to capture significant changes in the façades) with a participatory workshop in the *Trilha so Senhor* community aimed at providing explanations to the observed changes (Figure 2), such as self-upgrading, rental strategies (with the permanence of owners), or the full replacement of residents.

Figure 2 – Examples of changes in the built environment observed in the *Trilha do Senhor* community, Fortaleza (Brazil).



Resource: Elaborated by the author based on GSV images.

As mentioned earlier (Research Questions – Section 1.2), as we found no evidence on market-driven displacement, I drew my focus to the burdens imposed on incumbents. That is why Chapter 3 provides an empirical study in which my co-authors and I investigate the role of TIG in shaping the mobility practices of low-income incumbents, using their perceptions as an analytical lens. Finally, Chapter 5 articulates the main contributions of this thesis and provides some recommendations for future research. This concluding chapter also offers actionable insights into what an equity assessment of transport policies should entail, as well as the comprehensive perspective that the planning practice requires in contexts of uneven urban development. That is mainly because the effects of accessibility improvements in housing markets (formal and informal) must be considered and mitigated in advance. After all, the aim should be to guarantee inclusive transit-oriented developments, preventing morally arbitrary disadvantages from reproducing the inequalities and urban poverty that are remarkable in Latin American cities.

2 TRANSPORT-INDUCED GENTRIFICATION IN LATIN AMERICA: AN URBAN CONFLICT ARISING FROM ACCESSIBILITY IMPROVEMENTS

This chapter is derived from a published paper (De Assis *et al.*, 2024).

2.1 Introduction

Over the last years, investigations into transport-induced gentrification have evidenced some conflicting implications from transport projects, particularly in the Global North (Zuk *et al.*, 2018; Padeiro *et al.*, 2019). Potentially, investments in new transportation infrastructures hold the capacity to transform urban socioeconomic landscapes by reshaping accessibility levels and encouraging, as a result, new developments around these infrastructures (Delmelle, 2021). Ideally, such landscape transformations could be accompanied by the social mobility of long-term inhabitants, since access to opportunities has been directly linked to positive labor market outcomes (Andersson *et al.*, 2014; Jin and Paulsen, 2018). However, some empirical evidence has shown that the observed changes may actually result from exclusionary processes such as gentrification, meaning that the benefits provided to some communities can potentially generate social constraints in the long-term (Chapple and Loukaitou-Sideris, 2019).

The main reason behind this is the dilemma on how housing affordability can decrease as accessibility improves, considering the tendency property values have to follow accessibility changes (see Iacono and Levinson, 2011, 2017). Consequently, as a regulation factor of urban occupation, rising rental prices may result in the displacement of those less privileged groups. This may suggest that designing transport systems only focusing on the distributive justice of access to opportunities (see Pereira *et al.*, 2017; Martens, 2012) is not sufficient to ensure a fair transportation policy; a critical concern lies in effectively implementing these transport projects and policies in order to guarantee the real enjoyment of accessibility improvements over time.

The dilemma surrounding transport-induced gentrification has boosted numerous investigations in the last two decades (Kahn, 2007; Lin and Chung, 2017; Nilsson and Delmelle, 2018; Baker and Lee, 2019). Despite being essential to a critical city planning, these studies, as cross-section analyses, offer limited information on how gentrification unfolds over time by relying on operational definitions that are very vague and simplistic (Zuk *et al.*, 2018, Padeiro *et al.*, 2022). Overall, scholars in the core of gentrification theory

agree that this phenomenon is generated in and through intertwined processes (Smith, 1996; Clark, 2005), depending on the geopolitical, economic, and social context in which it is developed (Ley, 1996; Lees, 2000, 2012; Robinson, 2015). We argue in this paper that such variations stem from both the preferences of gentrifiers and the strategies deployed by powerful stakeholders (public and private sectors).

In addition, it is worth noting that most of these studies are empirically grounded in Global North (Padeiro *et al.*, 2019), where transportation networks are already mature and fully developed. As argued by Iacono and Levinson (2017), this ideal context may diminish the marginal effect of accessibility improvements on real estate prices in higher-income countries. In this sense, some argue that scenarios marked by inequalities are more interesting for investigations on transportation and equity, such as Latin American cities (Vecchio *et al.*, 2020). For this reason, we intentionally delimited as our research object the Latin American metropolises, where the highly unequal patterns of accessibility and mobility (Tiznado-Aitken *et al.*, 2023) may result in more significant socio-spatial constraints. We note that urban theorization in Latin America has emphasized the role of transportation in the restructuring of capital and space (Rufino *et al.*, 2021; López-Morales *et al.*, 2021; Apaolaza *et al.*, 2016; Rérat, 2018).

Based on both the conceptual and geographical gaps mentioned above, this paper aims to provide researchers and policymakers with a conceptual framework of transport-induced gentrification in Latin American metropolises. To achieve this aim, we have structured this paper to address some questions: Section 2.2 covers a background review on gentrification theorization (*How can we explain gentrification as a phenomenon generated in and through intertwined processes?*); Section 2.3 presents an a priori general version of our conceptual framework, in which we represent the long-term interactions between transport and land development (*How can we represent transport-induced gentrification?*); Section 2.4 covers a Systematic Literature Review (SLR) that seeks for empirical evidence on Latin American gentrification (*What are the characteristics and mechanisms of gentrification in Latin America?*).

Section 2.5 incorporates into the a priori framework the evidence found in the previous section, consolidating our aimed conceptual framework; and finally, in Section 2.6, we draw our conclusions and make some recommendations for future research.

2.2 Gentrification as a transformative process: explanations of spatial production and consumption

Originally used to describe a spontaneous influx of the gentry into inner neighborhoods in London (Glass, 1964), the concept of gentrification was later refined by Neil Smith (1996), who associated it with the idea of urban frontiers constantly evolving to surround processes of capital expansion in space. In this analogy, the primary physical outcome would be the revitalization of initially deteriorated or undervalued urban areas. Following Smith and many other scholars (Smith, 2002; Lees, 2000, 2008; Clark, 2005), gentrification is understood in this paper as a kind of neighborhood transformation, distinct because it involves: capital investment in space - whether by public or private sector (or both of them); the influx of medium or high-class families and individuals to an originally working-class area; and possible displacements of low-income inhabitants.

These elemental aspects are generic and conceptually delimit gentrification as a transformative phenomenon. As argued in Section 2.1, we defend that the effect of geography on the phenomenon is indeed on the ways in which these elements are induced by concomitant and intertwined processes (Smith, 1996; López-Morales *et al.*, 2016a; Harvey, 2019). After all, it is less likely that gentrification occurs from the emergence of a spontaneous new “affluent residential choice” (Atkinson, R., 2008, p. 1), and more likely that it results from “some form of collective social action” (Smith, 1996, p. 65). That is why there is a growing advocacy in the gentrification literature for the development of urban theories and descriptive efforts based on explanations of both spatial production and consumption. Neither side is completely understandable without the other (Clark, 2005).

On the one hand, the production-side is related to the actions of those powerful stakeholders with the ability to strongly modify the built environment; while on the other hand, the consumption-side brings up some humanist and qualitative information, regarding the reasons behind the emergence of new trends in residential choices (Ley, 1996; Butler, 1997; Butler and Robson 2003). In practice, the combination of such explanations helps us to explain that actions from a powerful stakeholder (or a set of them) were able to improve the perception or esteem that a higher-income population had about a location. In other words, strategies inherent to space production made room for the creation of a new consumption demand.

Besides those cross-sectional actions, other nuances keep acting as driving forces of gentrification over time, especially those regarding the private domain to which urban

planners refer as land use. Firstly, it is important to consider that neighborhoods attracting affluent in-movers, whom scholars often refer to as gentrifiers, are also likely to be chosen as the new location for commercial and services developments – especially those attempting to meet the consumption demands of higher-income classes (Zukin, 1990). Secondly, it is equally important to consider the existence of a spillover effect (González-Pampillón, 2022) as the ongoing inflows of affluent neighbors can be seen as an amenity, attracting other higher-income residents into the target area (Guerrieri *et al.*, 2013). Over time, both land use interactions may induce outflows of lower-income people due to its role in increasing the cost of living - including property values and rents (Hamnnet, 1984).

All these cross-sectional and dynamic nuances may compose gentrification as the transformative phenomenon it is, whose intrinsic aspects and outcomes depend on the place in which gentrification manifests (Lees, 2000, 2012; Robinson, 2015). In this sense, recognizing such nuance's occurrence and systematizing the relationships between them are efforts that may help researchers from designating other process as gentrification and confounding what constitutes the phenomenon and what is its outcome, as well as from producing biased analyses due to the incorrect attribution of causes and consequences. Therefore, we understand that the lack of descriptive efforts on cases of gentrification muddles the waters for urban planners, especially when it comes to predicting or identifying the phenomenon, as well as to anticipate anti-displacement strategies and tools (see Chapple, 2009).

Based on the arguments above, the discussion in the next section was designed to aid the formulation of an a priori conceptual framework that describes the unfolding of transport-induced gentrification. In this effort, the central idea is representing the processes related to both spatial production and consumption over time, considering it as the initial force for the introduction of a new transport project as well as its consequences in terms of urban development.

2.3 Understanding gentrification as an urban conflict associated with accessibility improvements

Over the last decades, many scholars in urban planning, mainly related to transportation, have dedicated part of their efforts to develop frameworks regarding the Land-Use and Transport Interactions - LUTI, in line with a systematic approach which considers land development and transportation as urban subsystems (Wegener and Fürst, 1999; Miller, 2003; Geurs and van Wee, 2004; Cascetta, 2009; Lopes *et al.*, 2019). On one

hand, their frameworks point out that the travel behavior which is observed in a local or regional area depends on the current state of the land-use pattern. On the other hand, they assume that the gradual consolidation of a land-use pattern results from aggregate location choices, which are largely influenced by the spatial distribution of accessibility; defined for many scholars, including for us in this paper, as the extent to which land-use pattern and transportation enable people to reach activities (Geurs and Van Wee, 2004).

The evolution of such models has been permeated by changes in the components of each urban subsystem as well as by the growing understanding that the interface between them occurs via accessibility. However, most of these frameworks do not report the ambivalent role played by accessibility (De Assis *et al.*, 2022): while regions with good accessibility levels are considered attractive in location choices (Zondag and Pieters, 2005), this same condition also acts as a socio-spatial constraint (de la Barra, 1989), as it has a strong influence on urban real estate markets, contributing to higher property prices (Iacono and Levinson, 2011).

Exception to this is observed in the representation of Geurs and van Wee (2004), in which accessibility is fragmented into the following components: (a) Transport component, that express the cost for an individual to reach a destination or activity by a specific transport mode or network; (b) Land-use component, which reflects the distribution of supply and demand for activities across space; (c) Temporal component, relating to the existing time constraints (the availability of opportunities at different times of the day, and the time available for individuals to participate in certain activities); and (d) Individual component, represented by individuals' physical, social, and economic limitations.

Therefore, accessibility seems to be a suitable construct to represent the nuances of transport-induced gentrification over time. First because it is not surprising that, resulting from a state-led action, improvements in its transport component can encourage the migration of people and economic sectors towards new neighborhoods (Bertolini, 2005; Delmelle, 2021). Second because in a consolidated scenario not only are observed changes in the demand for transportation (Waddel, 2011), but also in the neighborhood's capacity of encouraging new inflows due the potential improvements in the land-use component; considering people and firms aspire to engage in activities (Wegener and Fürst, 1999). Furthermore, considering the individual component of accessibility helps us to emphasize that people (or social groups) exhibit different travel behaviors, levels of engagement in activities, and, notably, distinct freedom in processes of location choice.

Emphasizing this dynamic is essential when there is the intention of representing the location choices of people with different income, as it is the case of gentrification, since inflows and outflows of inhabitants may occur gradually and concomitantly over time. In this sense, it's worth noting that, despite being helpful, LUTI frameworks are not designed to describe the process of location choice; they focus on the interface between both urban subsystems. As a consequence, traditionally, the location choices are only linked to the spatial distribution of accessibility as well as to the availability of space. Not even Geurs and van Wee (2004) exhaust the representation of this process, since their focus is on the relationships between the components of accessibility, excluding exogenous factors.

The next section addresses the challenge of representing the location choice as a broader process in which accessibility components play an important role.

2.3.1 Accessibility and location choices: the perspective of space consumption

Beyond the traditional arguments on how location choices are determined by accessibility levels and the confrontation between space supply and demand, in Figure 3 we also represent as determinants of such process: (i) the spatial distribution of land value as an explicit factor that contains its own determinants, including accessibility itself; (ii) other competitive advantages which make some portions of the territory more attractive than others, such as urban planning regulations (Kok *et al.*, 2014), and promises of plans and interventions, revealing an appreciation potential (Singer, 1982); (iii) environmental, cultural, physical, and social amenities that together influence the built environment quality (Kauko, 2001). In some studies, such amenities have been linked to aspects such as lifestyle, preferences, and perceptions (van Acker *et al.*, 2010) and are useful to understand high prices in remote areas.

2.3.2 Powerful stakeholders and their impact on accessibility improvements: the perspective of space production

People and economic sectors move from one place to another over time. Using the same terminology of Figure 3, this means that families and firms are sometimes encouraged to switch places as some determinants of location choices change, whether due to rising rents or the emergence of areas that are more attractive in terms of use and land occupation (land-use component of accessibility) or access to different modes of transportation (transport component). While some of these changes are generally led by the State, as the interventions on the public domain; others involve the proactivity of powerful stakeholders from private initiative.

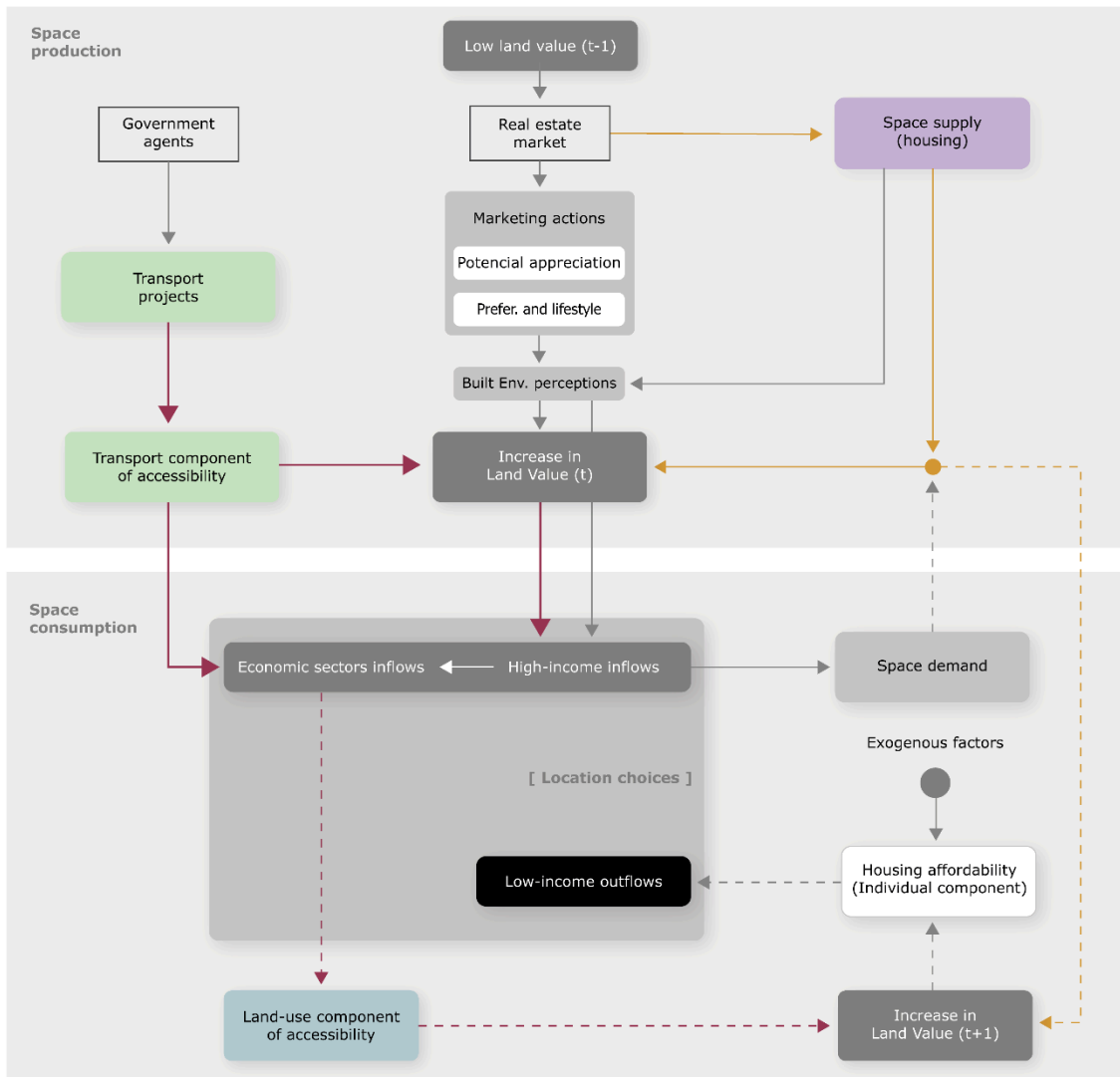
Since the 70's, many space production actions have been pointed out as primarily causes of gentrification depending on the time or place. Some examples are mentioned as follows: tax incentives (Wilson, 1985), improvement grants (Hamnett, 1973), and the opening credit for building rehabilitation (Williams, 1978); besides urban revitalizations (DeGiovanni 1983). More recently, attention has been given to processes of housing market renovation (Helms, 2003; Wong, 2006; Boustan *et al.*, 2019; González-Pampillón, 2022) as well as to the implementation of transport projects (Rérat and Lees, 2011; Chapple and Loukaitou-Sideris, 2019; Delmelle and Nilsson, 2020; López-Morales *et al.*, 2021).

Specifically in the case of changes related to land-use component, it is worth noting the role the real estate market may play in the reconstruction of places; given that whenever newly built units replace vacant or deteriorated structures, the quality of a neighborhood improves attracting higher-income residents into these neighborhoods (Guerrieri *et al.*, 2013; González-Pampillón, 2022). As a consequence of this, it is known that target areas also tend to experience processes of use diversification over time, resulting in improvements in the distribution of supply and demand for activities (land-use component of accessibility). As the other argued changes, this new urban liveliness also has the potential to help change the image people may have about an originally undesirable area, an aspect that is part of the reproduction and transformation of any symbolic order (Harvey, 1989). That is the point of connection between explanations of space production and consumption, as the improvements in accessibility (land-use and transport components) help to create new space demands.

2.3.3 A priori conceptual framework of transport-induced gentrification: aligning space production and consumption over time

Based on the discussions in previous sections, in Figure 4 we propose an a priori general conceptual framework of the transport-induced gentrification, aligning explanations of space production and consumption. This general framework covers the direct and indirect impacts of accessibility (red arrows) on land valuation, as well as the impacts of space supply expansion, which is promoted mainly by the real estate market (orange arrows). As a start point, we depart from a stage of low land valuation and assume two moments of increase, linked to different components of accessibility (transport and land-use). In a phenomenological point of view, this low condition is quite suitable for the real estate market, whose representatives aim to obtain the more expressive rent gaps as possible, redirecting the production of residential and non-residential buildings to initially devalued regions.

Figure 4 - *A priori* general framework of transport-induced gentrification



Source: Authors.

Unlike depicted in Figure 3, determinants such as potential appreciation, preferences, and lifestyle are now considered as strategies used by the real estate market to change the current image consumers have about the targeted place, aiming to create a new space demand, as mentioned before (Section 2.3.2). Along with the newly built units, such aspects improve the built environment perceptions, leading to an increase in land value which arises from space production dynamics.

Over time, improvements in the land-use component of accessibility may also be observed, due to the inflows of newly affluent families and new economic sectors. This justifies the emergence of higher properties and rents as well as the increasing local cost of living, making it difficult for lower income groups to remain and engage in local activities. In this sense, antagonistic conditions are created for groups of different income classes: while

affluent individuals move into the developing territory, working-class families may be displaced over.

Planners deal, therefore, with a conflicting situation: on the one hand, by presenting higher levels of accessibility, an urban area can be developed in terms of territorial occupation by the action of real estate investors or individuals and firms who construct their own buildings (Hansen, 1959; Wegener and Fürst, 1999; Bertolini *et al.*, 2005); on the other hand, the consequent increases in land value related to more attractive places can induce the displacement of low-income groups, who are more sensitive to fluctuations in the real estate market (de la Barra, 1989). In this sense, we argue that transport-induced gentrification should be seen as an urban conflict arising from improvements in accessibility.

It's noteworthy that we consider Figure 4 to be a “general” conceptual framework because, as previously argued, the intricacies underlying this transformative phenomenon vary depending on the location where gentrification occurs (Lees, 2000, 2012; Robinson, 2015). For this reason, we opted not to include conditions and actions that are typically observed in gentrification cases but whose representation may not apply universally across geographical contexts, such as changes in urban regulations and urban revitalization projects. Certainly, for example, it is possible that in some contexts, gentrification occurs independently of urban revitalization projects.

Ley (1996) refers to such conditions as the “geography of gentrification”, an expression that has been defended by Lees (2000, 2012) to encourage non-Global North scholars to develop postcolonial approaches taking on board critiques around developmentalism, categorization and universalism (Lees, 2008). In line with that, many researchers have dedicated their scientific production to such a geographic debate (Wong, 2006; He, 2007; Harris, 2008; Visser and Kotze, 2008; López-Morales *et al.*, 2021, 2016b), seeking to avoid the reproduction of unrepresentative narratives, incapable of contemplating the specificities of their geographical contexts.

However, as mentioned in Section 2.1, studies on gentrification and transportation rarely investigate the phenomenon through broad and flexible approaches in order to provide rich insights regarding its underlying processes (Padeiro *et al.*, 2019). Such efforts should involve the recognition of geopolitical aspects, power structures and market strategies, depending on each geographical context. Based on that, we applied in the next section a Systematic Literature Review (SLR) to formulate insights on Latin-American gentrification based on empirical evidence, adding information to the *a priori* general framework.

2.4 Gentrification in the Latin American Context: A Systematic Literature Review

Urban theorization has always highlighted the role of public actions as drivers of urban dynamics, particularly through investments in transportation and communications (Harvey, 2013). Up until this date, the majority of studies on gentrification in Latin America have aimed to describe their analyzed cases through qualitative approaches (Janoschka and Sequera, 2016; Gonzalez, 2016; Bin, 2017; Hayes, 2020). Some of them even report transportation improvements as a part of the broader phenomenon (Rivadulla and Bocarejo, 2014; Janoschka and Sequera, 2016; López-Morales *et al.* 2016a); but in general transportation has not been the central focus of the Latin American research agenda – at least not with the intention of investigating its inducing role. The same is observed in the rare studies in which quantitative methods were employed (López-Morales, 2016b) – justifying the absence of Latin American papers in the quantitative review undergone by Padeiro *et al.* (2019).

The lack of Latin American studies that are both descriptive and focused on transportation led us to conduct a comprehensive review, including studies not directly related to transportation. In this sense, the main goal of this Section is to situate gentrification and its underlying processes of space production and consumption in Latin America. As argued in Section 1, we understand that what geographically distinguishes gentrification is how these explanations unfold in space, considering the mechanisms of powerful stakeholders, the preferences of gentrifiers, and the consequences of all this.

2.4.1 Review questions

Janoschka and Sequera (2016) identified some typologies of gentrification in Latin America, obtaining as outcomes the following classifications: the symbolic gentrification related to architectural heritage; the symbolic gentrification related to cultural heritage; the formalization of subaltern urbanisms; and the creation of new real markets. Each type of gentrification was defined based on: (i) the kind of target area - if a centrality or historic center for example; (ii) the methods and mechanisms which were played by powerful stakeholders; and (iii) the used forms of violence (cultural violence, evictions, market forces, among others).

To some extent, we understand that these three criteria or dimensions are related to our previous discussion, especially to the explanation of space production; thus, we turned

them into the following first three review questions: (a-i) *who are the powerful stakeholders modifying and producing the built environment?*; (a-ii) *What mechanisms do they use?*; and (a-iii) *What kind of area has been targeted by the phenomenon?*. As explained in Section 2.3, many mechanisms have been reported in other contexts, such as tax incentives, improvement grants, urban redevelopment projects, and incentives for building rehabilitation. The aim here is to identify which mechanisms are applied in the Latin American context - by whom and where they take place.

Additionally, considering the consumption-side, we establish the following questions: (b-i) *Who are the so-called gentrifiers?* and (b-ii) *what are their locational preferences?* Regarding micro-sociological processes, the last two questions become relevant since gentrifiers have been markedly linked to social classes, considering aspects such as: income, gender, age, race, or sexual orientation (Warde, 1991; Bondi, 1999; Knopp, 1990). Generally, representatives of these groups share locational preferences that can explain migrations. Furthermore, it is almost impossible to disregard that these locational preferences may also incorporate gentrifiers' travel behavior or mobility practices, an important issue for analyses about transport-induced gentrification (Rérat and Lees, 2011).

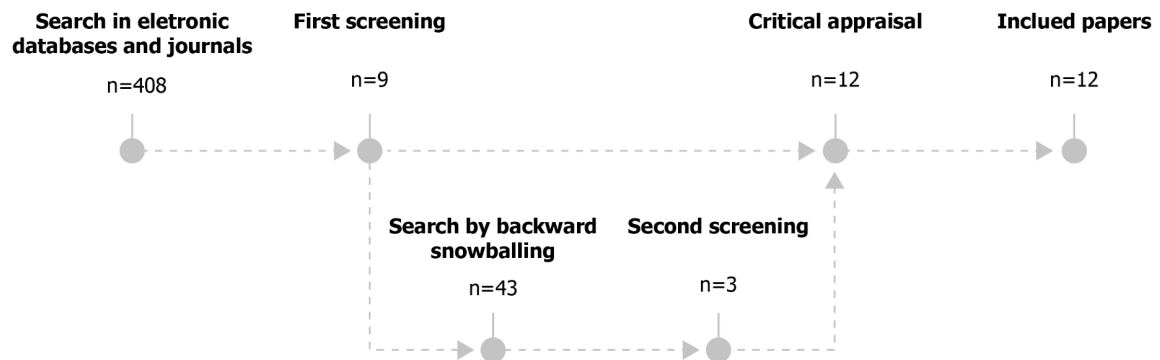
2.4.2 Review protocol

As there is no consensus on the best way to conduct a SLR (Higgins and Green, 2008), we considered a set of different methods that are often used, especially by researchers on transportation and urban planning studies (van Wee and Banister, 2016). We ended up following the same procedures adopted by Baker *et al.* (2021), due to its closeness to the gentrification literature. Such procedures were: (a) Definition of review questions; (b) Search strategy and data sources; (c) Inclusion criteria; (d) Quality appraisal; (e) Synthesis of studies. In this subsection, we will explain the research method through this protocol, as the review questions were previously presented.

Regarding the search strategy, we put together some keywords via Boolean operators in two electronic databases (SCOPUS and Google Scholar), filtering only papers that contained the keywords in the title or abstract (Figure 5). The used combinations were: "latin america" AND "gentrification"; "latin america" AND "displacement"; "latin america" AND "change" AND "neighborhood". We also conducted an active search in the indexes of "Urban Studies" and "Environmental and Planning D (Society and Space)", as we noticed that many of the initial articles retrieved were from these journals. During this second phase, we

also included articles that had the keywords throughout the text. Thus, a total of 408 papers were found, an amount that corresponds to all selected papers that have at least one of the key-word combinations in the subject or title.

Figure 5 - Review protocol



Source: Authors.

Next, the 408 selected titles were submitted to a screening process based on the three following eligibility criteria: (i) studies presented in the form of scientific papers (essays, notes, book, chapters, and editorials were not considered); (ii) primary studies on gentrification in Latin-America cities with empirical evidence of different income groups' migrations (studies on displacements of informal trades were not considered, neither studies based only on land-value appreciation or rent gap theory, without evidencing residential flows); (iii) papers analyzing only a few neighborhoods (papers analyzing multiple areas were not selected, as we assumed that such papers would hardly contain descriptive information). As a result, 399 titles were excluded, considering duplicity cases and those papers which did not fill the pre-established criteria.

Subsequently, considering the 9 remaining titles, we applied the “backward snowballing” technique, resulting in the founding of new titles. This made it possible to submit 43 new papers to a second screening. By the end, 12 papers had their qualities evaluated. This evaluation process considered the three dimensions suggested by Harden and Gough (2012): the quality of study execution, the adequacy to the review focus, and the adequacy to the questions. This was a categorical evaluation (high, medium, or low), which would imply the exclusion of any paper with some dimension evaluated as "low", meaning that:

- Quality of study execution: the study is not based just on general variables such as property value or building improvements, presenting evidence related to individuals;
- Adequacy to the review focus: related to the first dimension, the study does not make a good use of the term gentrification, portraying cases like urban requalification, social status growth or self-rehabilitation of buildings; and
- Adequacy to the questions: the study does not present a large contextualization of the process, hindering the answer to the questions review.

In the end, no paper was excluded in this critical evaluation appraisal, probably due to the criteria that were initially outlined.

2.4.3 Synthesis of studies

Each selected paper analyses at least one medium or large city in Latin America. In general, the consideration of cities with different sizes showed no significant deviation in responses. Exception to this is the fact that two studies regarding medium-sized cities were straightforwardly linked to what Janoschka and Sequera (2016, p. 21) interpret as a “museification of the historic centre”, due to their architectural and cultural heritage. The answers regarding the review questions can be seen in Table 1, in which cities are identified through codes due to layout preferences.

Table 1 - Synthesis of studies

REVIEW QUESTIONS AND ANSWERS		CITY CODE*												
		A	B	C	D	E	F	G	H	I	J	K	L	M
Who are the powerful stakeholders modifying and producing the built environment?	Real estate developers + City government	x		x	x	x	x	x	x	x	x	x		x
	Landowners + City government					x							x	
What mechanisms do they use?	Supply of medium or high-rise residential buildings;		x			x	x	x	x	x	x	x		
	Refurbish of pre-existence buildings;				x								x	x
	Regulatory relief and zoning;	x	x		x			x	x	x			x	
	Transport projects	x		x						x				
	Requalification of public spaces	x	x	x	x	x				x			x	
	Dispossession and evictions	x		x						x				x
	Monetary public incentives for new residents; and tax incentives	x	x	x										
	Blockbusting or Redlining							x						
What kind of area has been targeted by the phenomenon? and how were they changed?	Heritage and touristic areas					x					x	x	x	x
	Central area that has been receiving high-rise residential buildings						x	x						
	Informal settlements, degraded industrial and port areas	x	x	x	x					x				
	Emergence of commercial enterprises	x	x		x		x	x	x		x	x	x	x
Who are the so-called gentrifiers and those?	Medium-class groups					x	x	x	x	x	x			
	University students				x									
	Migrants and tourists with higher-income lifestyles										x	x	x	x
What are gentrifiers' location preferences?	Green urban landscapes and others nature amenities								x	x				
NOTES														
*Cities codes		References												
Rio de Janeiro (A), Buenos Aires (B), and Mexico City (C)		López-Morales et.al (2021)												
Bogotá (D)		Muñoz & Fleischer (2022)												
Mexico City (E)		Mendoza (2016)												
Santiago (F)		Inzulza-Contardo (2011; 2016)												
Santiago (G)		López-Morales (2016b)												
Lima (H)		del Castillo & Klaufus (2020)												
Medellín (I)		Anguelovski et al. (2019)												
Cuenca (J) and Guanacaste (K)		van Noorloos & Steel (2016)												
San Miguel de Allende (L)		Navarrete Escobedo (2020, 2022)												
Panama City (M)		Sigler & Waschsmuth (2016)												

Source: Authors.

2.4.3.1 Questions regarding the spatial production

Table 1 shows that all papers mention the inducer role played by city governments, especially through the establishment of flexibilities in urban regulations or rezoning efforts, which tends to facilitate the replacement of traditional residential typologies - mainly terraced houses - for new ones. Most cases report the construction of medium or high-rise buildings, except from the cases of San Miguel de Allende, Casco Antiguo, and Panama City, where gentrification processes involved the refurbish of historical buildings. However, even in these cases, regulatory reliefs were also important, with the flexibility of parameters and uses. Such findings highlight the relationship between municipalities and the real estate market itself, as the main stakeholder that promotes direct changes in housing supply.

Particularly in the case of Parque Patricios district, Buenos Aires, new buildings related to technological activities were more expressive than the emergence of new housing, although the housing market has also invested in apartments supply (López-Morales *et al.*, 2021). This seems to be a result from the tax incentives granted, a Technological Development Zone in the district area.

Several studies report that the production of new homes was accompanied by public projects designed at the urban scale, such as the requalification of public spaces and the introduction of new transportation facilities. Of the four cases reporting forced displacement, three had transport projects as a state-led intervention observed. As pointed out by López-Morales *et al.* (2021), the Rio de Janeiro case involved the piecemeal shutdown of informal collective housings, while the Mexico City case included direct and exclusionary displacement processes. Anguelovski *et al.* (2019) also reports that an indeterminate number of resident displacements have taken place in Comuna 8, Medellín, to make way for new construction associated not only with the Jardín Circunvalar but also with the cable car station and infrastructural pillars along the cable car trajectory. The only exception to this transport-evictions relationship is the case of Casco Antiguo, where the evictions were related to the requalification of historical buildings (Singer and Waschmuth, 2016).

Moreover, findings also show as strategies of space production harassments by landlords, as in the case of Mexico City (López-Morales *et al.*, 2021), and attempts of blockbusting, which consists in a common practice played by real estate firms, when they buy one or two pieces of land in a block previously targeted for redevelopment. This was the case of Santiago (López-Morales *et al.*, 2016).

Regarding the places targeted by the phenomenon, some studies reveal the occurrence of gentrification in historic areas. That is the case of some tourist medium-sized cities such as Cuenca, Guanacaste (van Noorloos and Steel, 2016) and San Miguel de Allende (Escobedo, 2020, 2022), although the cases of Panama City (Medonza, 2016) and Mexico City (Sigler and Wachsmuth, 2016) are also related to heritage centres. Despite that, Latin-American gentrification cannot be restricted the historical or cultural space typologies, since some studies report the occurrence of gentrification in informal settlements (Anguelovski *et al.*, 2019), degraded industrial and port areas (López-Morales *et al.*, 2021) and other well-located regions that were previously occupied by the working-class (van Noorloos and Steel, 2016; López-Morales, 2016; Inzulza-Contardo, 2012, 2016).

In addition, it is worth noting that all 12 selected papers report the emergence of many non-residential buildings in the target areas: whether through the construction of new buildings or the transformation of existing ones. In many cases, the inflow of such activities are related to the new consumption practices of the gentrifiers, whether they are foreigners, students, or middle-class people.

2.4.3.2 *Questions regarding the spatial consumption*

In general, studies point to middle-class groups as the gentrifiers agents, meaning gentrification in Latin America does not seem linked to groups who share other aspects but income and preferences, at least not in the same way it has been shown in other parts of the globe, where there is a proliferation of studies investigating cases headed by women (Bondi, 1999), gay communities (Knopp, 1990), young urban professionals (Short, 1989), among others. In fact, the only studies that bring up some kind of standard gentrifier are those empirical grounded in medium-sized cities, with references to migrants and retirement groups, when it comes to tourist cities (van Noorloos and Steel, 2016; Sigler and Wachsmuth, 2016; Escobedo, 2022), and college students, as in the case of Las Aguas, Bogotá, where the gentrification process is suffering the influence of *Universidad de Los Andes* (Muñoz and Fleischer, 2022).

Unfortunately, despite the middle-class recognition, the selected papers do not provide much information about the gentrifiers' preferences, since only two of them point out amenities that are appreciated by the new space consumers. To some extent, these findings may indicate that the consumption explanation has not been the focus of gentrification studies

in the Latin-American context. Despite the absence of direct evidence, the preferences for apartments, as well as for certain transportation modes, deserve further investigation.

2.5 Transport-induced gentrification in Latin American metropolises: a conceptual framework

According to our SLR results, gentrification cases in Latin America are often related to the gradual replacement of single-family units for multi-family ones. This densification process exemplifies the “gentrification of new buildings” (Davidson and Lees; 2005, 2010) that has been also observed in other contexts, including London and North American cities. However, we note that pointing out this densification process is indispensable to distinguish the dynamic of real estate market in Latin America from other contexts such as Europe, where conventional and green retrofits have been reported (Williams, 1978; Bouzarovski *et al.*, 2018; Cucca *et al.*, 2023).

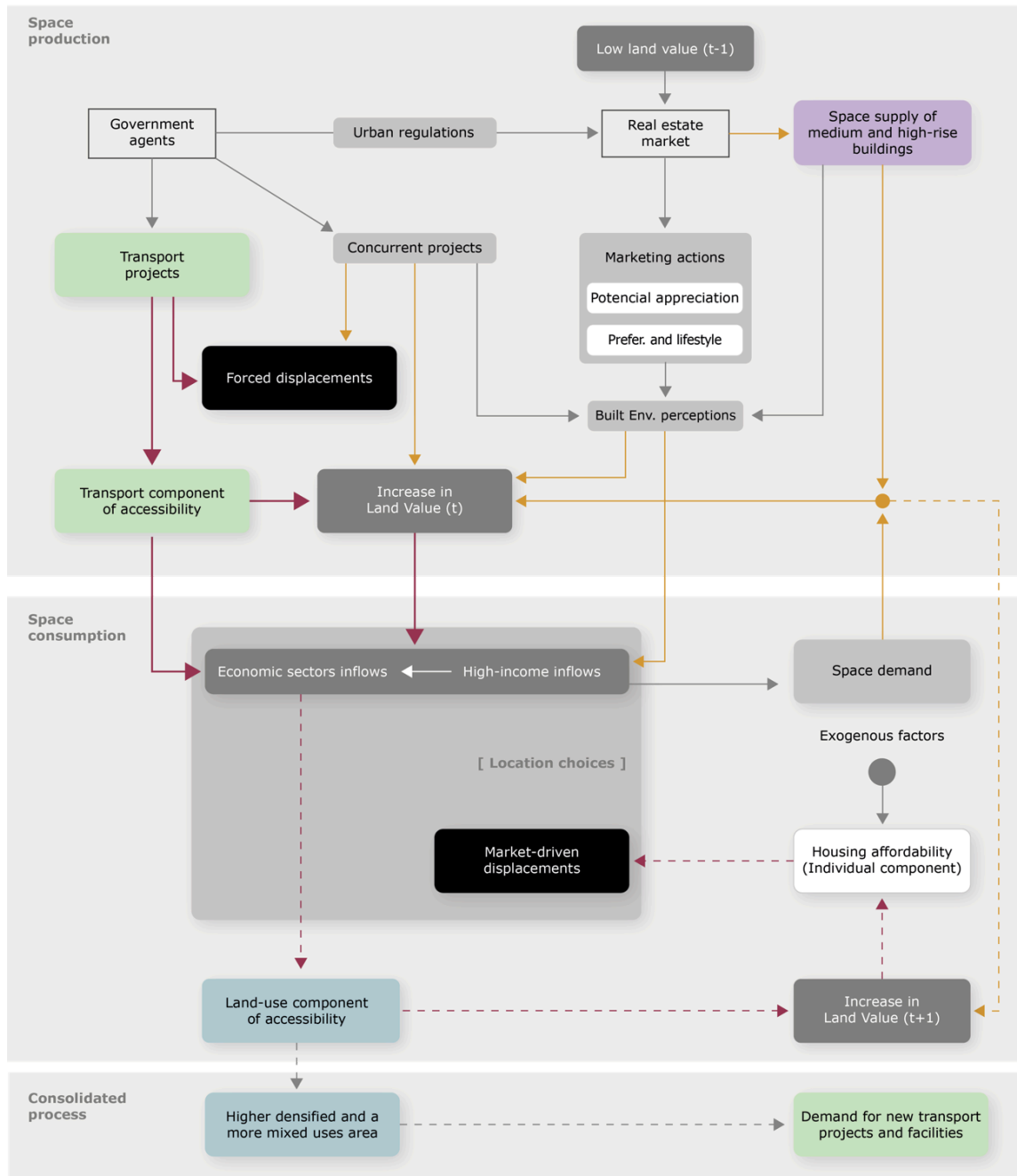
In Latin America, gentrifying people tend to buy a highly commodified new form of urban lifestyle, which means the emergence of a new trend in location choices is preceded by the production of a new housing stock. In this sense the main strategy of the real estate market has been to expand the supply of medium and high-rise buildings. Concomitantly, empirical evidence also points out that city governments have supported these densification processes through regulatory reliefs, as well as by increasing the expected rent gap by means of investments in infrastructure and the provision of amenities such as green areas. This suggests that the turnaround of housing production is usually anchored to public actions. In Figure 6, these space production dynamics are represented in the first frame.

Another important finding from the SLR is that gentrification in Latin America includes dispossessions and evictions of families and individuals residing in favelas and informal settlements. In the framework, this finding is represented by the “forced displacements” component. This condition seems to distinguish Latin American gentrification, revealing that access to land is an ongoing concern in such a region - and in the Global South in general (Lombard and Rakodi, 2016). In this sense, informality and poverty seems to shape the phenomenon and make it unique to the region, facilitating conflicts involving land ownership (see Cummings, 2015).

The interface between space production and consumption frames is played by the determinants of location choices, with the variation in accessibility depending on its transport component. In our proposed framework, we consider the influence of such determinants on

higher-income people and economic sectors, for whom the term “choice” really suits. On the other hand, we represent the gradual outflows of low-income people by the “market-driven displacements” component, which is reinforced by cycles of improvements in the land-use component of accessibility and, as a result, by continuous increases in land values.

Figure 6 - Conceptual framework of transport-induced gentrification in Latin America.



Source: Authors.

As may be seen, we did not specify a type of transport project in Figure 6, establishing no distinction between investments on roadways or public transport networks. López-Morales *et al.* (2021) report that the cases of Rio de Janeiro, Mexico City, and Buenos Aires involve specific transportation projects (tramway, bike lanes, and metro) as one of the “policy instruments” that were used within what the authors call “state-led gentrification”. In general, one possible explanation would be that, in these cases, the phenomenon is related to the interest of gentrifiers in public or active transportation. Some research on Transit-Oriented Development (TOD) goes in this direction, especially in the context of the Global North (Padeiro *et al.*, 2019; Rérat and Lees, 2011).

However, we argue that in the Latin America context, this still is a questionable hypothesis, since most of the public interventions still favor individual motorized transportation modes, despite the significant investments in public transport that have marked this part of the globe in the last years, especially in Colombia (Cobos, 2014). Despite that, Latin-American middle-classes still perpetuate the preference for the individual vehicle, due to: (i) the status symbol automobile remains carrying (Vasconcellos, 2001); and (ii) the effects of inefficient transit systems that generates, in some cases, an almost forced dependence on the individual car for those high-income or medium-income residents living in peri-urban areas (Tiznado-Aitken *et al.*, 2023).

In this sense, attention must be given to the self-selection problem (see Ibraeva *et al.*, 2020), keeping the following question in mind: are higher-income groups moving to areas served by public transportation (because they want to) or, in fact, do middle-class areas become the target of public transport investments afterwards? The same goes for walking or bicycle new facilities. In this sense, such investments might not induce the phenomenon, but rather serve as a coronation of it, adding even more value to the land.

For this reason, we also considered in Figure 6 that a scenario with higher density and greater diversity of uses may demand new projects and interventions in the long term, since the new land-use condition may attract leisure, shopping, and work-related trips of different income groups. Thus, the transit system expansion may become suitable and be related to the process, even if it is not the starting point. However, as we pointed out before, this still needs further investigation, as the selected papers do not allow us to be conclusive on such an aspect of transport-induced gentrification in Latin American metropolises.

2.5 Final comments and research recommendations

Urban planners and researchers seeking to identify or avoid transport-induced gentrification in their communities might obtain valuable insights from this review. First, from our effort to represent such a phenomenon through explanations of both production and consumption of space, we emphasize the underlying processes that composes gentrification, resulting in land valuations over time. The enhancements in the transportation subsystem are just the first piece of the puzzle; other public investments are also essential for the restructuring of urban space, as well as the role of the real estate market. The action of this powerful stakeholder has manifested in many ways - whether through retrofits or the expansion of housing stock, as observed in the case of Latin America.

Jointly, all these production-side actions help to consolidate a fresh perspective regarding neighborhood quality, resulting in the appreciation of working-class areas. In this sense, gentrification poses a greater challenge for *ex-ante* efforts as they confront traditional location theories (Hamnett, 1991; Lees *et al.*, 2008). Hence, we argued it is important to understand this phenomenon in depth - in order to answer under which circumstances it occurs, how, and what it produces.

From our explanatory effort, which was undergone through a SLR, we found some helpful evidence about Latin American gentrification. We recognize that there are probably missing papers in our review whether by the use of keywords in English during our search, our limit on the snowball technique, or the absence of those keywords in the translated abstracts - which is less likely. Even so, our findings show that such a transformative phenomenon tends to involve a particular set of production mechanisms. Overall, the results reinforce that gentrification in Latin America is a form of accumulation by dispossession (López-Morales, 2015) mainly due to public investments. Specifically in those studies involving transportation projects, evictions of families and individuals residing in favelas and informal settlements were reported. This seems to indicate the existence of an intersection between gentrification and urban informality in Latin America.

Besides, our findings also emphasize that the rent gap obtained by the real estate market in Latin America seems to be enlarged by the expansion of floor space. Changes in building regulations have favored the high-rise residential market (López-Morales *et al.*, 2016b). Thus, the profit of the private sector has been expanded by the possibility of building more floors and housing units; and not necessarily by conditions related to monopoly rent, which arises when it is not possible to replicate a specific desired condition (such as living by

the waterfront or in historic center's). This is a condition that differentiates Latin American gentrification from other contexts, such as Europe, where retrofit cases are aligned with the crucial idea of profit from scarcity.

Regarding the space consumption-side, unlike other contexts, gender and sexual orientation do not appear in any of the SLR studies. The only social commonality observed was the gentrifiers' income: most of the in-movers belong to the middle class. In this sense, one could argue that Latin American gentrification is a class phenomenon; however, we recommend that future research explore correlations with race and ethnicity, aspects that were also not addressed in the papers but which we consider relevant. Certainly, this gap will not result in unified findings across Latin American context, considering the different origins and representations of indigenous peoples, colonizers, and immigrants.

Unfortunately, the selected studies did not provide us with many findings on the preferences and consumer behavior of gentrifiers - not beyond the fact they are interested in the high-rise residential market. Mobility patterns and preferences could not be identified. This indicates the existence of a phenomenological gap in Latin American studies. Particularly when it comes to transport studies, we recommend future research to seek evidence on the kind of infrastructures that can play an inducing role in Latin American gentrification. Furthermore, it can be of great value for the urban theorization in the region to identify whether such infrastructures are part of comprehensive plans or isolated interventions, analyzing in both cases who benefits more from them.

In addition, it is worth noting that the SLR selected papers did not provide evidence on the occurrence of indirect displacements (or market segregation) - those which are caused by increases in overall cost of living, which includes the rent burden (Zuk *et al.*, 2018). Therefore, this elemental aspect of gentrification remains a hypothesis in Latin America, grounded in the gentrification theory. In this sense, looking ahead, a possible question for future research would be: *Does transport-induced gentrification in Latin America involve the indirect displacement of lower-income groups?*

A key recommendation of this paper is to investigate this phenomenon through a comprehensive approach, recognizing it as a longitudinal set of processes rather than a mere outcome. To do so, we argue that a relevant methodological question arises from this recommendation: *how can we empirically analyze cases of transport-induced gentrification in order to provide pertinent information to urban planning?* We understand that one of the main purposes of these *post-facto* investigations should be providing urban planners with sufficient information to recognize and prevent gentrification occurrences, as well as to map the

susceptibility of certain regions. This kind of effort has been well conducted in the Global North (Chapple, 2009; Zuk *et al.*, 2018). However, we have not found studies with this purpose in Latin America.

In this regard, we recognize that the definition of the research questions we did in Section 2.4 limited the discussion about gentrification in Latin America. In this sense, we raised some other questions that may be relevant to the development of urban theorization in the region: *What has been the role of displaced groups during the onset of the phenomenon? What resistance practices have they been engaged in? Have these practices been effective? When not, have these groups been penalized in terms of accessibility?*

Finally, we argue that the long-term interactions between land development and transportation should be more explored by the growing transportation agenda on justice and equity. Transport-induced gentrification raises questions about city planning efforts that confine transportation policy formulation to improving the infrastructural accessibility levels of vulnerable groups. It seems imperative to ensure that such groups will be able to benefit in the long term. This is a perspective that led us to the advocacy for more transparent *ex-ante* analyses of large transport infrastructure, in ways to expose their long-term social effects on local populations and communities (Lucas, 2012), especially in Latin America which is one of the most interesting geographical backgrounds to investigate issues regarding transportation and equity (Vecchio *et al.*, 2020).

3 DISPLACEMENT AND TRANSPORT-INDUCED GENTRIFICATION: WHAT ABOUT INFORMAL SETTLEMENTS BENEFITING FROM ACCESSIBILITY IMPROVEMENTS?

This chapter is derived from a preprint version of a manuscript submitted to *Cities* (De Assis *et al.*, 2026) and complementary visual data is available in Appendix B.

3.1 Introduction

Over the past two decades, the relationship between gentrification and transportation has been increasingly studied (Kahn, 2007; R  rat and Lees, 2011; Lin and Chung, 2017; Nilsson and Delmelle, 2018; Baker and Lee, 2019; Chapple and Loukaitou-Sideris, 2019). Most of the analyses rely on the understanding of displacement as a defining feature of the phenomenon, diverging from its core theorization (Glass, 1964; Smith, 1996), where the phenomenon is conceptualized as the influx of both capital investment and wealthier individuals into originally working-class areas. In this context, displacement rather alternates between being a tool and an outcome, if it occurs at all in gentrifying neighborhoods (Grier and Grier, 1978; Marcuse, 1985, 1986). Drawing on this latter understanding, Zuk *et al.* (2018) and Finio (2022) note that urban studies are not consistent in their findings that gentrification induces residential displacements. According to these authors, definitional and methodological shortcomings are among the reasons for that, including some flawed decisions regarding the time window for analyses.

Central to this debate is the consensus that greater transportation convenience has tangible consequences in terms of rising land prices (Bae *et al.*, 2003; Lin and Hwang, 2004; Bocarejo *et al.*, 2013; Kay *et al.*, 2014; Yang *et al.*, 2019; Beaudoin and Tyndall, 2023). The same applies to land development, often measured through increased density and diversification of uses (Pan and Zhang, 2008; Calvo *et al.*, 2013; Ratner and Goetz, 2013; Ibraeva *et al.*, 2020). After all, as neighborhoods become more attractive, new individuals and firms might become more willing to move in, greatly increasing the value of the land. Ultimately, this influx is likely to not only affect the sense of community (Gibbons, 2020), but also to force the most vulnerable to leave (Chapple and Loukaitou-Sideris, 2019). In this sense, processes of urban reshaping near transit may become a critical concern for urban planners, especially when it comes to its impacts on lower-income incumbent residents.

In general, volumes have been devoted to exploring the role that transit-oriented development (TOD) plays in North American cities (*Padeiro et al.*, 2019). However, some argue that transportation may play a more substantial role in reshaping neighborhoods in low- and middle-income countries, where transportation networks are not yet mature and fully developed (Cervero and Day, 2008; Cervero, 2013). This is primarily because such a scenario could intensify the marginal effects of accessibility improvements on rental markets (Iacono and Levinson, 2017). To the best of our knowledge, this dynamic has been overlooked in Latin American studies, as they often focus on State-led dispossessions, instead on 'market-driven displacement' (De Assis *et al.*, 2024, p. 10), i.e. those indirect displacements caused by increases in overall cost of living, which includes the rent burden. This paper aims to address this gap by exploring this debate in the context of informal urban development, as informal settlements have long been a housing solution for work-class people living in the Global South (Ward, 1984; Holston, 1991; Stiphany *et al.*, 2024).

Following Ascensão (2018), we draw on the framework of *slum gentrification* and argue that responses to urban investments near poor communities may include an influx of slightly more affluent households (from now on: *low-income gentrifiers*). Whether this is the case with informal settlements benefiting from transportation improvements is one of the major hypotheses under investigation in this paper. The second hypothesis concerns the reasons why some residents leave. We specifically wonder if their relocations can be considered as market-driven displacements. To investigate these two hypotheses, we conducted a qualitative analysis combining an initial purposive sampling effort with a subsequent participatory workshop in an informal settlement in Fortaleza, Brazil, where a Light Rail Transit (LRT) system was implemented during the city's preparation for the 2014 World Cup. The sampling process relied on the tracking of significant parcel-level physical changes through the comparison of Google Street View (GSV) images from different years. Afterwards, the visual dataset was used in a participatory workshop involving current and former residents to link observations to possible explanations of movements into and out of the community, helping us overcome the lack of data on informal rental systems.

This paper first establishes some normative stances (Section 3.2), considering the existence of conflicting and muddled terminologies in gentrification theory. Subsequently, we propose a conceptual framework that systematizes Transport-induced Gentrification (TIG) in the context of informal settlements and their surroundings (Section 3.3). In this framework, both formal and informal housing markets were represented at the neighborhood level, along with the influxes of gentrifiers from diverse income backgrounds. In Section 3.4, we describe

and justify our method design, advocating for an intertwining of the methodological approach and the understanding of the phenomenon, a relationship that has seldom been stressed in gentrification studies (Lees, 1998). In Section 3.5, we present and discuss our empirical findings; and finally, in Section 6, we draw our conclusions and make some recommendations for future research.

3.2 Displacement, gentrification, and transportation: some normative stances

Within the literature on TIG, the works of Zuk *et al.* (2018), Chapple and Loukaitou-Sideris (2019), Padeiro *et al.* (2019), and Delmelle (2021) are good examples of investigations in which displacement is not seen as a defining characteristic of gentrification. However, as much as this comprehension advances, we note that a lot of urban studies (transportation-related or not) keep reproducing this association (Elliott-Cooper *et al.*, 2020; Brandt and Münch, 2025). In this paper, following the core of the theorization, we adopt as a normative stance that gentrification and displacement are indeed completely different and independent concepts. Since its introduction by Glass (1964), the term gentrification has been used by scholars who focus on theorization to cover the influxes of both capital investments and affluent groups into areas undergoing long periods of devaluation (Chapple and Loukaitou-Sideris, 2019). It is this central idea that associates the “back to the city movement” detailed by Glass with Smith's (1996) later “gap theory” and urban frontier analogy, both used by him to explain the phenomenon as a 'form of collective action' that mobilizes investments into areas originally occupied by the working class.

In this sense, conceptually, the primary focus of the phenomenon is on the influx of gentrifiers rather than on the displacement of incumbents, although some argue that such an influx necessarily entails displacement. Regardless of its plausibility, other scholars remind that this perspective is not free from scrutiny, as displacements may occur (when they occur) at different stages of gentrification, especially considering the time window in which investments are made (Grier and Grier, 1978, Marcuse, 1985, 1986; Zuk *et al.*, 2018). On the one hand, evictions and expropriations are forms of displacement that can make room for future investments; on the other hand, increases in rental prices following investments may actually be the reason why the most vulnerable tenants leave. Additionally, Zuk *et al.* (2018) remind us that even when no evidence has yet been found in gentrifying neighborhoods, indirect displacement should not be a dismissible concern, given that rising rent burdens are

unlikely to be sustainable over the long term. Hence, displacement can be seen as a tool, emergent threat, or outcome, depending on the way gentrification manifests or its stage.

When it comes to the relationship between gentrification and transportation, it seems clear that displacements by expropriations may result from the design of solutions in consolidated urban areas, as a sort of unfortunate necessity. However, mechanisms as evictions (formal and informal), landlord harassments, foreclosure, and building condemnations are often reported in cases of gentrification involving transport projects (Anguelovski *et al.*, 2019; López-Morales *et al.*, 2021; De Assis *et al.*, 2024). As for market-driven displacements, we note that there is no consensus on their occurrence within gentrifying neighborhoods where transport projects were implemented, even though evidence on land value increases is well documented (Bae *et al.*, 2003; Lin and Hwang, 2004; Bocarejo *et al.*, 2013; Kay *et al.*, 2014; Yang *et al.*, 2019; Beaudoin and Tyndall, 2023). The same applies to studies covering other strategies related to TOD, such as upzoning and greater walkability.

It is worth noting that we also adopt the normative stance that *Transit-Oriented Displacement* (Chapple and Loukaitou-Sideris, 2019) should be conceptually distinguished from displacement linked to transport-induced gentrification. We highlight this distinction to draw attention to all those cases where gentrification arises from isolated transport projects designed apart from comprehensive plans, since the term TOD usually implies a broader and integrated planning effort. Another noteworthy issue is that we intentionally avoid adopting the expression Transit-induced Gentrification (Padeiro *et al.*, 2019; Delmelle, 2021) even when discussing gentrifying neighborhoods favored by public transport projects. Our main concern is that, due to the focus on the influx of affluent people, this terminology would suggest that gentrifiers are moving to working-class areas primarily to enjoy the benefits provided by the transit options.

As Chatman (2013) reminds us, there are reasons to doubt this assumption since affluent residents are most likely to rely on automobile use. In his study based in New Jersey, he showed that some housing developments near railways led to unintended increases in automobile use. In the same study, his results also suggest that, even in cases where a decrease in automobile commuting was observed, other built environment factors showed greater statistical significance than rail proximity. Population density, employment density, and parking availability were some of them. Similarly, in a study grounded in both San Francisco and Los Angeles metropolitan areas, Chatman *et al.* (2019) found a weak influence of rail proximity in affecting the Vehicle Miles Traveled (VMT). The little association or even

positive relationship between proximity to rail transit and both auto ownership and use have been shown by other studies (Chatman, 2008; Loo *et al.*, 2010; Cervero and Murakami, 2010).

These findings weaken the assumption that access to transportation has a straightforward influence on attracting wealthier new households to some neighborhoods. Instead, they remind us that the influence of transport infrastructure and services on land-use patterns can mediate this relationship, as improvements in transportation tend to draw commercial and leisure activities as a first stage of urban redevelopment. Stated slightly differently, the land-use changes that arise from transport investments may be more appealing to some upper-class individuals than the transit project itself. After all, to attract affluent in-movers, neighborhoods need to offer job and recreational opportunities (Lees, Slater, and Wyly 2008). That is the main reason why we refer to the phenomenon as Transport-induced Gentrification (TIG), emphasizing the role of new transport infrastructure and services in reshaping urban space in exclusionary ways, rather than attributing gentrification just to the residential self-selection of transit riders.

Nevertheless, in this paper, we argue that urban contexts with significant socioeconomic inequalities may introduce some extra complexity into this discussion, as affluent individuals are often reluctant to move into areas where people from vastly different financial backgrounds live (Sampson and Sharkey, 2008). Based on this argument, in the following section we continue proposing a few normative stances, now focusing on the contextualization of transport-induced gentrification in Latin American cities, which are well known for their profound socioeconomic inequalities and struggles involving land ownership (Angotti, 2013).

3.3 Transport-induced gentrification in Latin America: challenging the usual definition of gentrifier

While the concept of gentrification was first coined by Glass (1964) in the early 1960s, it was not until several decades later that Latin American scholarship embraced the term. As Richmond and Garmany (2023) remind us, even in the 1980s and 1990s, researchers involved in the gentrification debate continued to frame the discussion under a Global North perspective, applying it just to a handful of cities sharing a core set of characteristics. Thus, until recently, cases of *blanqueamiento* or slum landlordism would hardly be considered instances of gentrification. However, this has changed significantly in recent years

(López-Moralez, 2015; Cumming, 2015; Janoschka and Sequera, 2016; Gonzalez, 2016; Bin, 2017; Rivadulla and Bocarejo, 2014; López-Morales *et al.*, 2016). To a certain extent, this turning point resulted from both the broader meaning that was given to the term as the time went by (see Lees, 1996, 2000, 2012; Robinson, 2015) and the consequent lesser resistance from Latin American scholarship in adopting the term and situating it within the context of low- and middle-income countries.

De Assis *et al.* (2024), for example, argue that informality and poverty seem to shape the phenomenon and make it unique to this region (and, to some extent, to Global South), facilitating conflicts that often involve land ownership. Building on the idea of an intersection between gentrification and urban informality, Ascensão (2018) defines slum gentrification as the process in which capital or material investments are made in informal settlements, changing the built environment and resulting in the partial or total substitution of the incumbent population. As much as we recognize the importance of his terminology and definition, we propose a subtle adjustment here. Based on our previous discussion (Section 3.2), we refer to slum gentrification as a specific type of the phenomenon empirically grounded in poor communities and their surroundings, where the influx of both investments and wealthier individuals has been observed. Terms such as substitution and displacement were excluded from our definition.

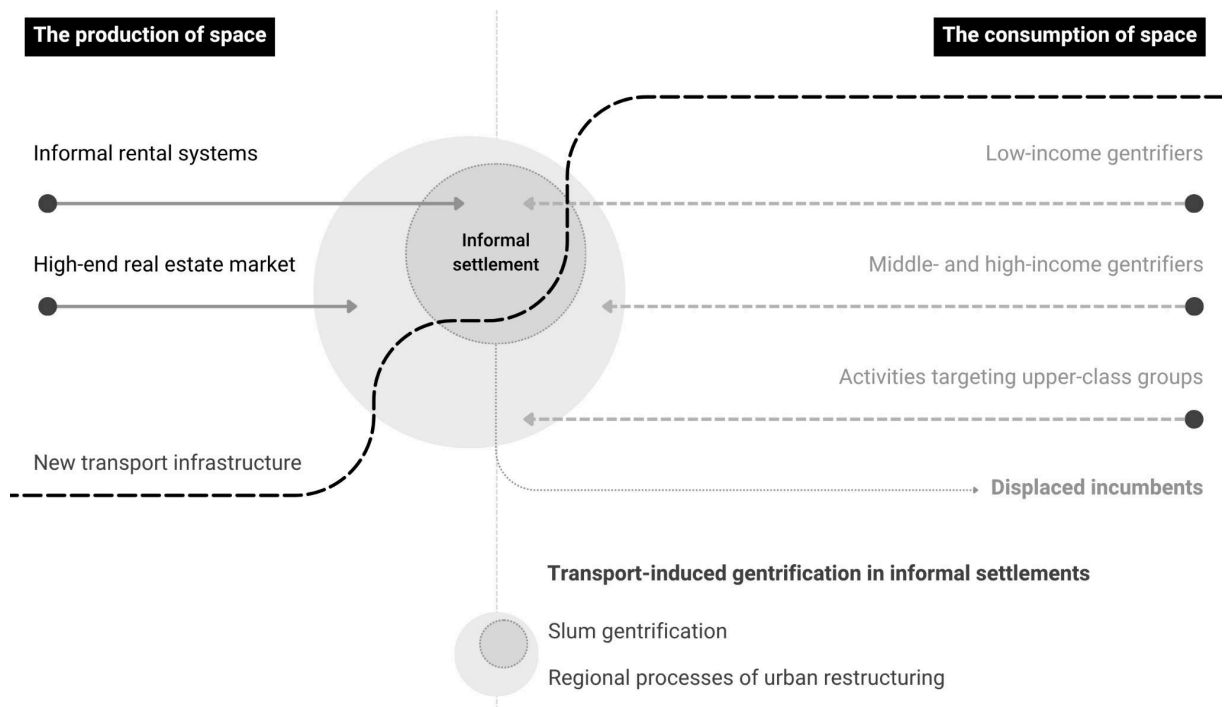
Despite this difference, we proceed to quote Ascensão (2018), noting that his definition encompasses both (1) cases where there is a cultural or social appreciation of informal housing areas and (2) processes closer to the classic slum clearance, often associated with public investments in informal settlements. According to the author, the first group would gather those cases closely related to explanations of spatial consumption, being primarily driven by the interest of middle-class people and tourists in some celebrity slums. As opposed, the second group would be associated with explanations regarding the production of space, referring mainly to public-led urban renewal (or even public-private ones) in informal settlements, often involving disposessions. Furthermore, the author also draws attention to cases combining both explanations. As an example, Ascensão mentions when gentrification manifests in ordinary slums where the tourist appeal does not exist. In his view, when it comes to these marginalized spaces, the so-called gentrifiers are more likely to consist of new households with slightly higher incomes.

Despite acknowledging that there is some reluctance to name moderate neighborhood ascent as gentrification (Owens, 2012), in this paper, we advocate for slum gentrification as a useful terminology to advance theorization towards a “geography of

gentrification” (Lees, 2012, p. 1). After all, informal settlements have long been a housing solution for working-class groups across Latin American cities (Ward, 1984; Holston, 1991) and the idea of such spaces as refuges from renting is becoming increasingly outdated (Bonduki, 1994; Baqai and Ward, 2020). In this regard, recent studies indicate that informal rental strategies have played a key role in reshaping the landscape of urban peripheries in São Paulo, Brazil, through moderate transformations in the parcel-level (Stiphany *et al.*, 2024; Stiphany, 2025). This micro-development of renting by owners and by other intermediaries reveals that landlordism is a lucrative business in informal settlements, likely contributing to gentrification (Stiphany and Wegmann, 2020).

Building upon the foregoing discussion, in this paper we argue for the combination of slum gentrification and broader urban restructuring processes happening in the surroundings of poor communities (Figure 7). One reason for this is that the same forces driving slum gentrification can also influence housing dynamics beyond these precarious territories. Based on the prior discussion (Section 3.2), one could say that the introduction of a public transit system is likely to induce land-use changes at the neighborhood level over time, creating new job and recreational opportunities. After all, the presence of middle- and upper-class people attracts businesses and services that are increasingly unaffordable (Zukin, 1990). That said, in this paper, we position all the changes taking place in the surroundings as the production of locational advantages (Harvey, 2013) that are likely to intensify pressures on poor communities as the *urban frontier advances* (Smith, 1996). Within these territories, informal rental arrangements may arise due to the interest of low-income gentrifiers and, externally, the arrival of middle- and high-income gentrifiers may make the neighborhood less affordable and less welcoming for people living within informal settlements.

Figure 7 - Conceptual framework of transport-induced gentrification in contexts of informal urban development.



Source: Authors.

Additional notes in Figure 7 might be worthy. First, two different housing systems were represented in this conceptual framework. The formal real estate market was associated with the construction of high-end developments in the so-called formal city, whereas informal rental systems were linked to their role in providing housing solutions for working-class groups within informal settlements. This distinction also enables the recognition of different magnitudes in the parcel-level transformation. Accordingly, a study conducted in a Brazilian city revealed that occupation intensification in informal settlement seems to be more related to land fragmentation than to verticalization (Castro *et al.*, 2024). Second, the distinction of gentrifiers in accordance with their income reveals their different abilities in consuming urban space. Ultimately, this is reflected both in the built environment they move into and in the housing standards they can afford. Furthermore, due to their different experiences and needs, their 'mental maps' of what is important in the neighborhood is also expected to vary. In this sense, even the influence of public transit on the 'where to live' decision may differ between the two groups.

In summary, the discussion established here relies on the comprehension that the presence of informal housing markets challenges the definition of gentrifiers as upper-class people in Latin America. This is mostly because these markets are more likely to drive the entrance of low-income gentrifiers (as we defined it here). Furthermore, to theorize the phenomenon in Latin America, it also seems helpful to embrace the idea of gentrification as a regional restructuring, with the combination of two juxtaposed processes. While slum gentrification would develop in a portion of the territory (from the influx of slightly affluent people), a different transformation would manifest in its surroundings (from the influx of upper-class people). In our understanding, considering such a combination can provide some comprehensive insights to studies empirically grounded in Latin America, ultimately contributing to more appropriate methodological designs.

3.4 Proposed methodology to investigate both transport-related displacement and gentrification in informal settlements

Many studies on gentrification show the role of retrofits and new residential developments in attracting affluent inhabitants to gentrifying neighborhoods. In Latin America, De Assis *et al.* (2024) show that middle-class gentrifiers often occupy newly built units in high-rise developments, aligning with the scenario of new-build gentrification described by Davidson and Lees (2005, 2010). However, as argued earlier (Section 3.3), moderate changes in the built environment are expected with the influx of low-income gentrifiers, often resulting from rental strategies that range from the construction or subdivision of low-rise buildings to situations where original owners remain on-site, adapting their self-built homes to incorporate incremental rental units (Stiphany *et al.*, 2024).

In this sense, identifying such physical changes may offer an alternative path for investigations involving slum gentrification, especially given the absence of official data on rental agreements, which are often based on verbal commitments between landlords and prospective tenants. That is the main reason why the core of our investigation follows the suitable work of Stiphany (2025), who investigated the issue of informal settlement upgrading through the combination of ethnographic fieldwork and building-level documentation. In this paper, the methodological design starts with a longitudinal analysis of building façades (Section 3.4.2), followed by a participatory workshop designed to provide explanations for the tracked changes (Section 3.4.3). This two-step approach was designed to investigate the following hypotheses:

- H1: When benefiting from transportation improvements, informal settlements experience the influx of low-income gentrifiers.
- H2: As a result of rising rents, incumbents of informal settlements are gradually displaced instead of benefiting from transportation improvements.

Although our hypotheses are both related to the dimension of slum gentrification, we note that the emergence of new high-rise buildings was taken as a signal of urban reshaping near transit, influencing the selection of the informal settlement (Section 3.4.1).

3.4.1 Selection of the informal settlement

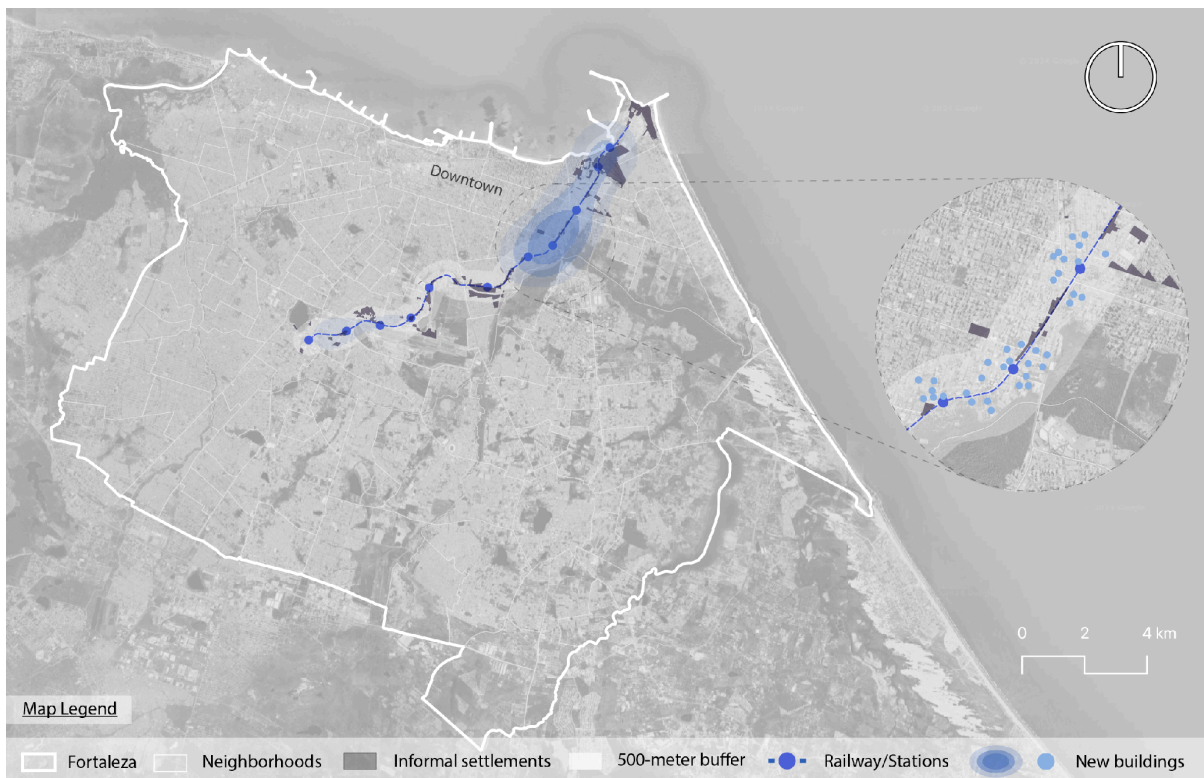
As introduced in Section 3.1, our case study was conducted in Fortaleza, which is the fourth most populous Brazilian metropolis. Because of its remarkable socio-spatial inequalities, population size (population 2.5 million, *cf.* IBGE, 2023), and policy initiatives around sustainable mobility, Fortaleza presents a large window through which we can see processes and patterns that are likely to be observed in other Latin American metropolises. In this city, the old railway system was modernized in the early years of the 2010's to support the Light Rail Transit (LRT) system implementation. As part of the investments made to prepare the city for the 2014 World Cup, the Parangaba-Mucuripe line connects the city's main gateways, the airport and the maritime terminal, besides facilitating daily commutes between downtown and the Parangaba neighborhood, an emerging urban centrality in the city (Freitas, 2017).

Extending for 13 kilometers, the LRT system directly impacted at least 17 low-income communities, leading to the expropriation of a substantial number of households to make its implementation possible (Oliveira, 2017). Including these communities, we mapped a total of 54 poor communities within a 500-meter buffer from the axis of the railway route. This distance was adopted because it is widely accepted as a reasonable walking distance in many transportation studies. To delimit this sample, we relied on the survey from the social housing plan called *Plano Local de Habitação de Interesse Social* (Fundação de Desenvolvimento Habitacional de Fortaleza [Habitafor], 2010).

We narrowed down the initial sample to focus on communities located in neighborhoods where urban development was particularly prominent over the last years. To capture this condition, we mapped the residential developments that were built near the LRT stations, using aerial views from the years 1995, 2009 and 2023 as documentary sources. We adopted this time window because the LRT project was first announced in 2001, remained on

hold until 2009, and was only opened in 2016, with full operation not achieved until 2020. In this sense, adopting a long-established date allowed us to consider that the perspective of some urban projects may already be sufficient to draw the interests of the real estate market (Singer, 1982). Meanwhile, we chose a recent upper time bound to account for gradual changes in the physical and social environments (Zuk *et al.*, 2017; Finio, 2022).

Figure 8 - Informal settlements and formal housing production near the tram system (500-meter buffer)



Source: Authors.

Figure 8 presents the distribution of these residential developments through a heatmap. As can be observed, neighborhoods closer to downtown stood out compared to others. Particularly in this area of highest concentration (zoom in), our survey revealed that 15 new high-rise developments were built during the 1995-2009 period, while 16 buildings were counted and attributed to the 2009-2023 period. Within this area, we selected the Trilha do Senhor community to undertake our analysis due to the engagement of incumbents and former residents in both social movements and previous academic studies (Menezes, 2013; Oliveira, 2017; Freitas, 2017; Câmara *et al.*, 2019, De Assis *et al.*, 2025).

3.4.2 *Purposive sampling: tracking significant changes in the parcel-level*

Qualitative research commonly relies on non-probabilistic sampling strategies aimed at selecting analytically relevant observations within the study context rather than statistically representative samples (Patton, 2015). Accordingly, informed by the previous discussion on slum gentrification, the sampling process focused on parcels that displayed significant physical transformations identified through longitudinal comparisons of GVS images. The GSV images were from 2012 and 2023, with 2012 representing the earliest year available in the database. Before collecting these images, we mapped all buildings related to the base scenario using a satellite image from Google Earth. We then linked each feature to an ID in a spreadsheet. This vectorization effort was necessary due to some inconsistencies in official datasets, such as the absence of some buildings or the aggregation of multiple properties into a single feature. To avoid reproducing these inconsistencies, we also used Google Earth's 3D Buildings tool to better visualize each building. We proceeded with a similar effort using a 2023 satellite image to identify new constructions and demolitions over the years. Subsequently, GVS images were linked to each feature in the spreadsheet, where we documented our parcel-by-parcel analysis, tracking changes such as vertical and horizontal expansions, significant façade renovations, and changes in land use.

This subset of images (upgraded and newly constructed buildings) was used during the participatory workshop to collect information about possible inflows and outflows. After all, the visual comparison alone would not constitute sufficient evidence to address our pre-established hypothesis. It is worth noting that we were unable to analyze access-restricted properties, as the GSV survey does not include images of internal lot buildings.

3.4.3 *Participatory workshop*

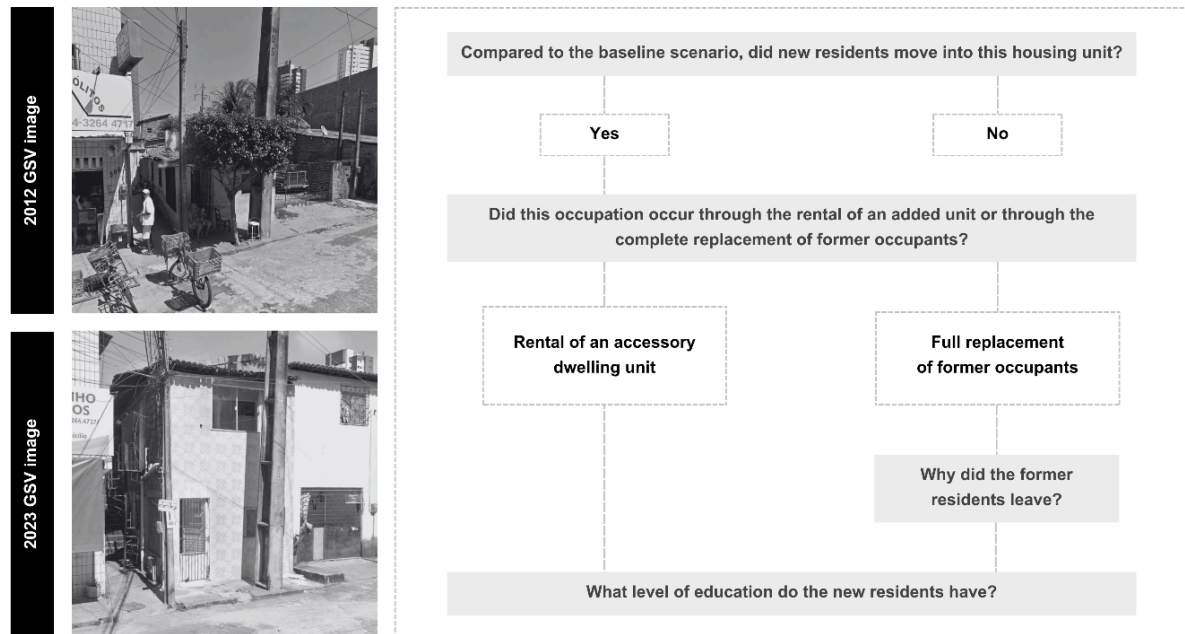
As argued by Padeiro *et al.* (2019), individuals' perceptions can provide insights and site-specific explanations to fully understand gentrification and its consequences. In this sense, ethnographic and other field-based approaches may serve as valuable tools for collecting and interpreting evidence on gentrification and displacement, both of which have been very difficult to empirically demonstrate (Chapple, 2009). In our investigation, we conducted a participatory workshop with a group of 11 participants, including current and former residents of Trilha do senhor community. Despite the limited number of participants, we note that vulnerable communities in the Global South are frequently characterized by

strong social cohesion and close interpersonal relationships among residents (Mpanje et al., 2018), especially in communities facing constant threats of displacement, as is the case of the Trilha do Senhor community (De Assis *et al.*, 2025). Consequently, the workshop played an important role in collecting information on the inflows and outflows of residents, as interactions among participants enabled the cross-checking and validation of information between them, including data about people who no longer live in the community.

We also note that the workshop did not take place in isolation; rather, it was made possible through a prior process of territorial engagement and the development of familiarity with the community. As outsiders with no prior connections to the community, our initial approach to entering the area and engaging with current and former residents involved building relationships with local leaders and participating in broader community events, which also provided opportunities to invite people to the participatory workshop, which took place on a weekday evening in order to facilitate participation. Although the research involved prolonged engagement with the community, we do not characterize the study as an ethnographic approach (Geertz, 1973), since the immersion in the community did not constitute its primary analytical strategy. Instead, such engagement served to support the development of the participatory workshop that constituted the core methodological component of this investigation. Similar approaches have been adopted in studies of gentrification that employ participatory workshops as a means of collectively reconstructing residents' experiences, trajectories, and perceptions of urban change (Calderón-Argelich *et al.*, 2025).

First, we showed participants the collection of before and after images regarding the remaining dwellings with significant changes. Participants were initially asked about the possible arrival of new residents in each dwelling (Figure 9). Negative cases were interpreted as self-upgrading initiatives undertaken by incumbents. In cases with affirmative responses, the group was further asked whether this influx had occurred through the rental of an added unit or through the full replacement of former occupants. For replacement cases only, we asked the group about the motivations behind the departure of the former residents. In both cases, participants were asked to report the educational background of the new residents. We used this condition as an indicator of socioeconomic profile.

Figure 9 - Example of a dwelling with significant changes and the question structure applied during the participatory workshop.



Source: Authors.

Three educational levels were adopted here: low education (people who are illiterate or did not complete basic or secondary education), medium education (people with only a secondary education), and high education (people holding undergraduate and graduate degrees). This classification is in line with the standards adopted by the Brazilian Institute of Geography and Statistics (IBGE). Basically, we assumed that the influx of new residents with slightly higher educational levels than incumbents would suggest their role as low-income gentrifiers. Otherwise, if there is no significant divergence in educational levels between the groups, the arrival of new residents would simply reflect a natural residential turnover or a densification process.

Since we lacked disaggregated data on the education levels of Trilha do Senhor's incumbents, we used the average income of local household heads and associated this information with an IBGE ranking which links labor income to education level. As a result, we assumed the household heads to be predominantly of low education. We applied the same logic to cases involving new households as well as multi-story buildings.

3.5 Evidence from a Brazilian metropolis: the LRT system and its impacts in the Trilha do Senhor community

The first inhabitants of the Trilha do Senhor community began settling on the edge of the cargo railway system in the 1940s (Menezes, 2013; Oliveira, 2017; Câmara *et al.*, 2019). For decades, this location remained outside of Fortaleza's main urban footprint, a situation that began to change later, during the 1970s, when the urban activities started to expand eastward beyond the railway line. According to the current administrative division, the community is located in what is now known as the Aldeota neighborhood, a well-located area whose occupation alternates between large sections occupied by high-income individuals and some informal settlements, following a common pattern of urban development in Latin American cities. Data from different sources highlight the socioeconomic gap between the community and its immediate surroundings: while the 2010 national census shows that the average monthly income of household heads ranged from 10 to 11 minimum wages (R\$ 5,100 to R\$ 5,610) in the Aldeota neighborhood, a 2012 social housing plan indicates that household heads in the Trilha do Senhor community earned monthly between 1 and 2 minimum wages (R\$ 510 to R\$ 1,020).

The 1995 aerial view showed that there were a few multifamily buildings surrounding the community at that time. However, this area was still predominantly occupied by single-story buildings, with informal settlements on both sides of the railway. Besides that, the 2009 satellite image revealed the disappearance of an entire community on the right side of the railway, following several public interventions and private claims (Oliveira, 2017). In its place, new upper-class houses as well as some high-end shops and services were established. As shown in Figure 10, two large blocks were being fully reoccupied by 2009. An open-air shopping center, an office tower, and a furniture store (later replaced by a university) were built there. We note that these changes align with the framework of De Assis *et al.* (2024), where TIG in Latin America is framed as a complex and intertwined set of processes, including disposessions and the subsequent land-use changes.

Figure 10 - Trilha do Senhor community - Changes in Ground-Level Occupation (2009 - 2023).



Source: Authors.

Analyzing both the GSV images and the footprints we vectorized, we counted 210 buildings within the community in the 2009 scenario, distributed across three blocks (Figure 10). Most of these buildings were dwellings, although some had commercial or mixed-use purposes. As mentioned earlier, 2009 was the exact year when the LRT project was revived after years of its first announcement. From that date, incumbents led several community-based actions opposing the expropriations planned for all 17 communities affected along the route (Câmara *et al.*, 2019; De Assis *et al.*, 2025). Specifically in the case of Trilha do Senhor community, the removals directly associated with the LRT resulted from both adjustments to the railway track and the construction of a pedestrian bridge built to facilitate the access to the nearest station (Papicu station).

Our analysis also revealed a reduction in the number of buildings between 2009 and 2023, since only 101 were counted. Among them, 75 were remaining buildings and 26 were new ones. Buildings in the latter group were mostly constructed in areas that were vacant as of 2009 or on residual land, meaning those remaining portions of plots that were expropriated for being within the right-of-way area. Only seven new buildings appear to have resulted from changes in ground occupation due to demolition and reconstruction activities. In this regard, Freitas (2017) notes that the residual land along the Fortaleza's LRT system was partially reoccupied over the years in the absence of regulation from any government entity. On the other hand, we observed a total of 122 cases of state-led expropriations, most of which were directly linked to the LRT project. Only seven demolition cases appear to be associated with another transportation improvement - the construction of a tunnel at the southern edge of the settlement.

3.5.1 Evidence from the façades analysis

Regarding the 75 remaining buildings, we found 22 cases that underwent significant changes between 2009 and 2023 (Appendix B). Among those cases, there are examples of initially single-story dwellings to which an additional floor was added. Some of them were turned into mixed-use buildings, while others remained residential (see examples A and B in Figure 11). A total of 14 cases involving verticalization were identified, while different kinds of transformation were observed in the other eight cases, each of which presented a more modern façade in the 2023 scenario (example C). Among the remaining buildings without significant interventions, one case stood out: a three-story building with multiple low-standard rental units that already existed by 2009 (Example D-1). The visual analysis showed the emergence of new buildings potentially associated with this kind of housing typology (Example D-2).

Figure 11 - Examples of changes in the built environment – Trilha do Senhor (2009-2023)



Source: Authors.

When it comes to the replacement of buildings, at least 13 old buildings were demolished to make room for new ones. We observed that such replacements did not occur solely on a one-to-one basis, revealing changes in ground-level occupation. As a result, seven new buildings were constructed on previously occupied plots, some of which included mixed uses. While a makeshift dwelling was demolished to accommodate a three-story building with independent entrances (Example E), an old mechanic's workshop was replaced by a two-story mixed-use building (Example F), and a three-story house was built where another dwelling once stood. Among cases of substitution, we only found a single house containing one floor. All the other dwellings were built with two or three stories.

New buildings on previously vacant or residual land showed more significant observations. As mentioned earlier, in our investigation 19 new buildings fit into this category. Over half of them were constructed with at least two stories, with some buildings reaching as high as three or four stories. Overall, these buildings exhibit significant variation

in construction standards. While some of them have no exterior finishing (exposed brick), others had their façades covered with paint or porcelain tiles.

3.5.2 Explanations provided during the participatory workshop

During the participatory workshop, current and former inhabitants were asked to analyze a set of 48 cases, over half of which referred to new buildings constructed after the LRT project. Overall, the participants' answers revealed that the majority of images in this largest group could be associated with incumbents whose original homes had been expropriated, meaning they were able to use the compensations they received to construct new houses within the community. Some of the new buildings feature relatively modern façades, but many could be considered as substandard houses, mostly built on vacant areas of neighbors' plots or on the remaining portions of their own plots. Nonetheless, we found three cases of newly constructed buildings that were all associated with unrelated people who had recently moved into the community. Two of them were described as cases of *slumlordism*. That happened to be the case, for example, of the four-story building we mentioned earlier, where each extra floor accommodates an independent low-standard studio apartment. Differently, the other case involves extra rooms that are rented out by the owners while they reside on-site.

At least four of these units were related to people with relatively higher educational backgrounds, given the presence of individuals who had completed secondary education, although participants also mentioned a few who held undergraduate degrees. This was not the case with the pre-existing building containing studio apartments (Example D-2 in Figure 5), where participants reported that units are repeatedly occupied by very low-income tenants, who are often evicted for nonpayment and subsequently replaced by individuals of similar backgrounds, thereby perpetuating the cycle.

Regarding the 22 older buildings with significant improvements, we found a similar case involving multiple rental units, although the participants could not provide any information about the educational levels of the new residents, as they had no social ties with them. However, participants were unanimous in affirming that the ground floor remained occupied by members of the original family, thus providing no evidence of displacement. Similarly, we found that in half of the cases, incumbents had not only managed to stay but had also undertaken some form of refurbishment for their own benefit. Despite a few cases limited

to aesthetic improvements, changes undertaken by incumbents primarily involve verticalization and fragmentation efforts to accommodate family growth.

The other half of cases was directly linked to different informal arrangements. While two different households were incremented with an extra floor each for rental purposes; a single case of business ownership transfer was verified; two cases were referred to as rental turnovers in pre-existing units; and other five cases were identified as instances in which original residents had been entirely replaced. In this regard, upon being asked about the arrivals in improved dwellings, participants concluded that at least six units had been occupied by individuals with higher educational backgrounds, showing some uncertainty about the other cases. Moreover, when it comes to former tenants and owners, participants identified different factors contributing to their departures: city change, workplace relocation, cost savings, death, and desire to live closer to family, to name a few.

3.6 Final comments and recommendations

This paper had a twofold objective. Firstly, we aimed to investigate whether informal settlements benefitting from accessibility improvements could experience slum gentrification, here understood as the influx of both capital investment and slightly wealthier people into an originally working-class area. Our findings strengthen the hypothesis regarding the low-income gentrifiers, as we found a few cases of people with medium and high education levels who had moved into the Trilha do Senhor community after the LRT project was announced and afterwards implemented. For the Latin American theorization, this challenges the usual definition of gentrifiers and undermines the framing of the phenomenon as a conflict between antagonistic classes over space. A more moderate perspective seems appropriate. Another theoretical contribution of our study concerns the regional perspective, as the changes in the physical environment cut across the formal and informal cities. As the frontier described by Smith (1996) advances toward informal settlements, their surroundings change, introducing new dynamics into these communities. A new kind of enclosure emerges, and, due to the condition of juxtaposition, these communities become attractive to new working-class groups.

Secondly, we wondered if market-driven displacements could explain the exit of long-term residents, along with the well-known disposessions and expropriations that are largely linked to gentrification in Latin America (López-Morales, 2015). Our findings did not show strong evidence in this regard, since the participants' answers associated the observed

outflows with different factors, being the need to save money just one of them. To some extent, this reinforces our argumentation on gentrification and displacement being two different and independent phenomena. However, we also argue that the lack of evidence on market-driven displacement should not make it a dismissible concern (Zuk *et al.*, 2018), given that rental arrangements driven by individuals' livelihood needs are likely to result in unregulated and exploitative rental practices over time (Ascensão, 2018). In this sense, a noteworthy point is needed, as the responses of workshop participants revealed that the ability of long-term residents to remain in the community was supported by informal housing arrangements, particularly involving those who had been evicted from their homes during state-led interventions. Additionally, we emphasize that Fortaleza's LRT system remains recent, implying that its impacts on land occupation are yet far from being fully realized.

In absolute terms, one could argue that the number of cases implying slum gentrification is quite low; however, we note that together these cases are statistically significant due to the current size of the community, which ended up being composed of only 101 buildings after consecutive State-led expropriations and private claims (Oliveira, 2017). Nonetheless, we acknowledge that our findings may have been underestimated by the methodological approach we adopted. Firstly, because by seeking for cases that necessarily involve physical improvements, we may have overlooked rental opportunities with visible deterioration and lack of maintenance (see Gulyani and Talukdar 2008; Stiphany *et al.*, 2024). Secondly, as mentioned earlier, some access-restricted properties were not included in our visual analyses due to the lack of GSV images showing buildings located on back alleys and internal lots. Undoubtedly, that is one major limitation of our methodological approach. Still, we argue that similar approaches may provide valuable insights, especially when combined with subsequent fieldwork phases. As the workshop we conducted showed, on-site stages may be crucial to differentiate gentrification from other phenomena such as densification and verticalization.

Within the transportation agenda, we argue that gentrification should be examined beyond its association with displacement. After all, as we argued in Section 3.3, this phenomenon tends to create a local mismatch between the available opportunities and the needs and abilities of incumbents (see Zukin, 1990). In this sense, when unfolding in contexts of urban reshaping near transport projects, this phenomenon should be framed as a distinct type of Transport-related Social Exclusion - TRSE (Church *et al.*, 2000; Lucas, 2012), advancing debates on justice, equity and accessibility. Situating this discussion in relation to our findings on the engagement of those who had been evicted from their homes in informal

rental arrangements led us to question incumbents' decisions to remain in the community: *After all, are incumbents fighting to stay so they can reap the benefits of accessibility improvements?*

Another key recommendation of this paper is to investigate the different consequences faced by incumbents who keep trying to stay in their places. Based on our findings, we recommend that future research seek to better understand the aspects and conditions underlying the dynamics of informal rental arrangements, particularly through ethnographic approaches. Finally, we argue that these post-facto analyses should also investigate issues related to community ties and the analysis of incumbents' sense of social inclusion.

4 TRANSPORT-INDUCED GENTRIFICATION, PERCEIVED ACCESSIBILITY, AND MOBILITY PRACTICES: WHAT HAPPENS TO THOSE WHO STAY IN THEIR COMMUNITIES?

This chapter corresponds to a forthcoming manuscript and complementary data is available in Appendixes C, D, E, F, G, and H.

4.1 Introduction

Over the last decades, the association between transportation and gentrification has drawn the attention of urban studies (Kahn, 2007; R  rat and Lees, 2011; Chapple and Loukaitou-Sideris, 2019; Delmelle, 2021; Yu and Hsu, 2025; Villar-Abeij  n *et al.*, 2025; Kandt *et al.*, 2025; Qin *et al.*, 2024; Schmidt and Bardaka, 2024; Yoo *et al.*, 2024). Attempts to define, measure, and predict residential displacement have divided scholarly focus (Zuk *et al.*, 2018). This is primarily because the threat of displacement challenges the normative commitment of transportation planning to enhance urban accessibility, i.e. the ease with which people can reach places, activities, and opportunities (Martens *et al.*, 2012; Van Wee and Geurs, 2011). Notably, displacements arising from accessibility improvements show that transportation policies and projects may fail to benefit those who are most in need of them (Padeiro *et al.*, 2019), as displaced people cannot reap the advantages of local changes and may, in fact, face accessibility and mobility disadvantages in their new neighborhoods.

While recognizing the importance of situating displacement within the transportation debate, this paper shifts the focus from displaced households to remaining incumbents, defined here as those residents who keep trying to stay in their neighborhoods, even if it means paying higher rents or doubling up (Chapple 2014; Freeman, 2006). We mainly argue that transport-induced gentrification constitutes a distinct type of transport-related social exclusion - TRSE (Church *et al.*, 2000; Lucas, 2012), as the gentrification phenomenon tends to create a local mismatch between the available activity opportunities and the needs and abilities of incumbents. Scholars at the core of gentrification theorization usually define the phenomenon as the transformation of a working-class area into one increasingly inhabited by wealthier groups (Smith, 1986), inevitably introducing activities that many cannot afford to participate in (see Zukin, 1990). Accordingly, long-term inhabitants may face consequences beyond housing burdens and the disruption of community

ties (Clagett, 2014), including the disconnection from the opportunities of job, services, and facilities that are within walking distance.

Likewise, it is important to acknowledge that improvements in one transport mode do not necessarily enhance regional accessibility for individuals with limited abilities to use that mode or engage in the opportunities the system enables them to reach (Geurs and Van Wee, 2004). To some extent, this aligns with the growing consensus that the relationship between potential travel behavior and both the land-use and transport systems is mediated by how the physical environment is perceived (Golledge *et al.*, 1972; Downs and Stea, 1973; Ma and Cao, 2019; Pot *et al.*, 2021; Ryan and Pereira, 2021; Geurs and Van Wee, 2026). For example, personal evaluations of the built environment can encourage the use of certain modes of transportation, just as individuals' attitudes towards some transport systems are likely to influence their travel behavior when making travel-related choices (De Vos, 2022, De Vos *et al.*, 2025). A relatively recent way to frame this is by saying that 'perceived accessibility' is expected to influence everyday mobility practices and decisions, depending on individual circumstances (Pot *et al.*, 2021; De Vos *et al.*, 2025; Soza-Parra and Tiznado-Aitken, 2025; Negm *et al.*, 2025; Geurs and Van Wee, 2026).

Studies on this topic argue that the use of objective accessibility metrics (hereafter referred to as "objective accessibility") can undermine public policies, since perceived accessibility can be seen as the real basis for converting transport resources into "functionings", i.e. mobility practices, following the insights of the Capability Approach (Ryan *et al.*, 2015; Pereira *et al.*, 2016; Ryan and Pereira, 2021; Negm *et al.*, 2025). Nonetheless, it is worth noting that these perceptions are not stable; rather, they may vary according to changes in the built environment as well as through people's learning and experience (De Vos, 2019, Van Wee *et al.*, 2019). In the context of transport-induced gentrification, for example, such perceptions are particularly sensitive to the introduction of new transport systems and the subsequent urban reshaping they promote. Therefore, this paper aims to investigate how transport-induced gentrification (TIG) shapes the mobility practices of low-income incumbents, using perceived accessibility as an analytical lens.

To this end, we applied the *process tracing method* (Falleti and Lynch, 2009; Beach and Pedersen, 2013; Bennet and Checkel, 2015) to gather site-specific causal explanations grounded in the perceptions and experiences of incumbents in a community affected by a Light Rail Transit (LRT) system in Fortaleza, Brazil's fourth most populous metropolis. We acknowledge that there is a preference for quantitative approaches in studies addressing causal relationships, largely due to the challenges in both controlling bias and

identifying regularities in observations through qualitative data (see Padeiro *et al.*, 2019). However, as Maxwell (2004) reminds us, qualitative approaches may facilitate an in-depth exploration of cases and processes where regularities may not manifest clearly or universally, while also offering distinct advantages in uncovering the influence of contextual factors that cannot be adequately controlled through statistical or experimental methods. Moreover, we argue that quantitative approaches are unlikely to capture behavioral changes at the same level of disaggregation that in-depth interviews afford. In this sense, on the one hand, our paper enriches the body of qualitative research in the transportation field, and on the other hand, from a justice point of view, it further advances the debate on the tangible benefits afforded to incumbent residents, despite the various penalties imposed by gentrification.

This paper is structured as follows. First, Section 4.2 frames the relationship between travel behavior and perceived accessibility. Section 4.3 situates this discussion within a gentrifying scenario driven by accessibility improvements. Subsequently, Section 4.4 presents our research design and explains how the process tracing method was applied in our investigation. Section 4.5 then turns to our empirical study, showing our findings and discussion. Finally, section 4.6 summarizes our main conclusions and draws some recommendations for future research, as well as some actionable insights on urban planning and development.

4.2 Shaping mobility practices: framing perceived accessibility within the debate

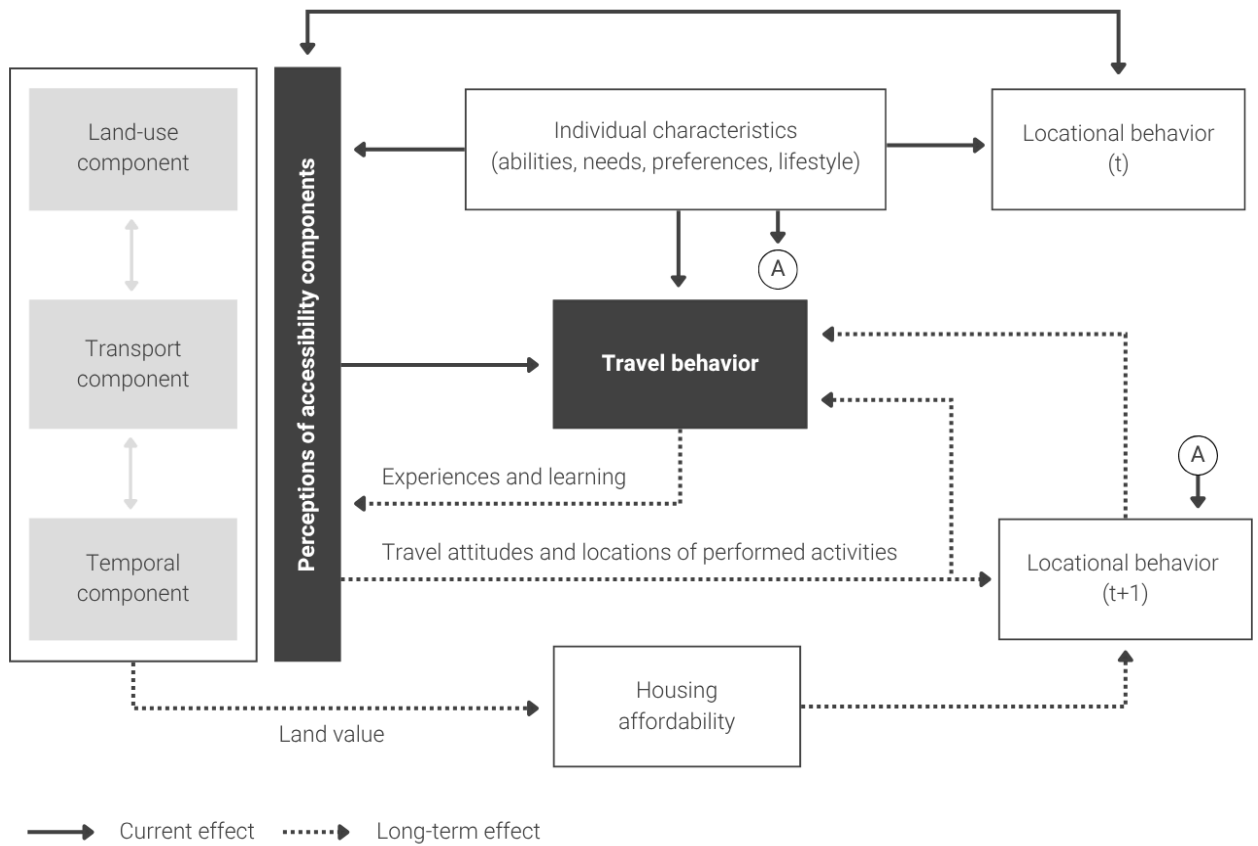
In the transportation field, the most common statement about travel is that it constitutes a derived demand, as people primarily travel to access out-of-home activities (Ortúzar and Willumsen, 2011; Cascetta, 2009). However, in practice, the daily travel patterns are suggested to result from a broad hierarchical decision structure (Ben-Akiva, 1973; Salomon, 1981), which includes individual decisions with different time horizons (Van Acker *et al.*, 2010). As medium- or long-term locational decisions, both the ‘where to live’ and ‘where to work’ choices can significantly influence how individuals commute or satisfy their daily activity needs. For example, people who value (and can afford) living in walkable neighborhoods are more likely to satisfy their daily activity needs on foot, although this may vary depending on gender, income, age, and cycle of life (Jirón, 2009). Likewise, the workplace location choice also plays an important role on travel behavior, as the distance to reach the job (if there is any considerable spatial mismatch) is likely to influence commuting choices - assuming individuals have the freedom to choose where they work. There is also a

growing consensus that travel behavior is influenced by the individuals' perceptions of the available transportation systems (De Vos, 2022, Tiznado-Aitken *et al.*, 2020). For instance, people who hold a positive attitude toward a transit system are more likely to use it when travelling between different neighborhoods.

A similar logic applies to perceptions of the available activity opportunities, as each person tends to form their own 'mental map' of suitable locations for engagement (Van Wee, 2016, Pot *et al.*, 2021). This is particularly relevant because some attributes of the available opportunities, as in the case of their affordability, might inhibit decisions regarding real spatial interaction. As such, a group of residents may have an expensive grocery shop nearby but, because of their income, this shop may not be considered as a suitable opportunity. Central to this debate is the understanding of 'perceived accessibility' as a function of how people evaluate: the transport system, the distribution and characteristics of activity locations (land use), and the temporal feasibility of engaging in these opportunities via the transport system (Pot *et al.*, 2021).

Alongside personal circumstances (such as gender, age, income, disabilities, and time budget), all these dimensions compose the most widely accepted framework of accessibility (Geurs and Van Wee, 2004), playing a crucial role in converting transport resources into actual mobility practices. Following the conceptual model of Pot *et al.* (2021), Figure 12 portrays a direct influence of individual characteristics on other accessibility components, ultimately shaping one's perceived accessibility. In our framework, we consider spatial knowledge as part of individuals' abilities, shaping their valuation of environment-related components, since people can only value an environment which they are aware of. Furthermore, two additional notes on the role of individual circumstances are needed. First, we consider their direct effect on mobility practices through individuals' abilities, needs and desires. Second, this dimension is also identified as a key determinant of an individual's location choices such as residence and workplace, considering that a job position that one may hold (and consequently their workplace) often results from their educational background, experience, housing location, and other individual characteristics.

Figure 12 – Framework of the relationship between perceived accessibility and travel behavior over time.



Source: Authors.

To the best of our knowledge, most studies on this complex decision structure focus on current travel behaviors. As a result, feedback loops are often overlooked, leaving long-term interactions and changes aside. Nevertheless, perceptions are known to change over time due to people's experiences and learning (De Vos, 2019; Van Wee *et al.*, 2019), as well as in response to different transformations in the physical environment. McCarthy *et al.* (2021), for instance, showed that people from the Netherlands who held a negative attitude towards their frequently chosen travel mode improved their evaluation over time. In terms of changes in the land-use pattern, a clear example is when the available opportunities no longer align with the individuals' needs and abilities, which tends to prompt an adapting process that tries to reduce this imbalance, especially through decisions related to locational and/or travel behavior (Van Acker *et al.*, 2010).

Another noteworthy issue is that, over time, significant changes in the physical environment (whether related to land-use or transport accessibility components) are likely to

affect land values and, consequently, housing affordability (Bae *et al.*, 2003; Bocarejo *et al.*, 2013; Calvo *et al.*, 2013; Iacono and Levinson, 2017; Nilsson and Delmelle, 2018; Beaudoin and Tyndall, 2023). This is the main reason why we represented subsequent locational behavior ($t+1$) as an outcome of changes in perceived accessibility, individual characteristics, and housing affordability. In the next section, we draw the discussion toward the gentrification debate, considering instances in which local communities are affected by transportation projects.

4.3 Reshaping mobility practices: Situating transport-induced gentrification as a background

When it comes to TIG, we argue that unpacking the portrayed long-term effects is an essential to understand how accessibility improvements shape mobility practices over time. This is primarily because gentrification often entails the gradual emergence of an imbalance between the supply of activity opportunities and the abilities of incumbent residents (De Assis *et al.*, 2026). Notably, besides drawing in affluent people, gentrifying neighborhoods often welcome new shops and services for the benefit of more affluent residents (Zukin, 1990). After all, to attract upper-class in-movers, gentrifying neighborhoods need to offer shopping, recreational, and job opportunities (Lees, Slater and Willy, 2008). As a result, changes in the local retail composition may no longer meet the budgets and cultural preferences of long-term residents (Cheshire, 2013; Cranor *et al.*, 2015; Chapple and Loukaitou-Sideris, 2019).

Besides this disconnection from nearby opportunities, gentrification is typically associated with rising rental prices, potentially forcing the most vulnerable to leave. In this scenario, residential displacement would represent a much less free decision regarding locational behavior, whereas the attempting to stay could imply an unsustainable effort in the long term (Zuk *et al.*, 2018). Even in this latter alternative, when incumbents stay in their places, other behavioral changes may be observed over time, ranging from travel and activity patterns to longer-term decisions, as in the case of workplace relocation (see Van Acker *et al.*, 2010). For example, to run errands and do grocery shopping, some original residents may become increasingly reliant on motorized modes to cover longer distances - involving or not the transport infrastructure that drove gentrification in the first place.

Likewise, considering mandatory trips, we note that some studies have shown that gentrification may lead not only to residential displacement but also to the displacement of people from their means of livelihood, as less-skilled jobs might be replaced by positions

requiring higher educational qualifications (Curran, 2004, Swanson, 2007; Meltzer and Ghorbani, 2017). In this sense, even when the number of jobs increases in a gentrifying neighborhood, incumbents may face negative effects, such as job loss and the consequent need to commute to more distant opportunities. As shown by Zukin, Kasinitz, and Chen (2015), even local business owners may be adversely affected as a different consumer base may result in stagnant or falling sales for certain existing businesses (Meltzer, 2016). This adds complexity to the claim that incumbents benefit from the new economic dynamics as well as to the relationship between accessibility, as commonly measured, and positive labor outcomes; an association that has been increasingly advocated in the transportation field (Bania *et al.*, 2008; Barton and Gibbons, 2017; Jin and Paulsen, 2018).

To some extent, this may explain the growing number of studies addressing issues such as neighborhood satisfaction and perceptions in gentrifying communities (see McGirr *et al.*, 2015; Gibbons *et al.*, 2020; Huang *et al.*, 2026). In general, studies empirically grounded in the Global North (Fan and Guthrie, 2012; Jones and Ley, 2016; Houston and Zuñiga, 2021) and China (He *et al.*, 2021; Huang *et al.*, 2026) have shown positive levels of satisfaction with local changes among the long-term residents. Among these studies, there is a subset focusing on how long-term residents perceive the subsequent urban reshaping that often follows improvements in transportation, which includes aspects such as occupation density, the closure of small shops, and the opening of large chain stores. To date, we have found no study situating this discussion in Latin America, particularly considering low-income communities, where one's potential to engage in nearby activities is more likely to depend on income-related conditions. We also found no study exploring the role of TIG in shaping incumbents' mobility practices, especially through the lens of perceived accessibility.

This discussion aligns with the growing attention in geography and transportation studies to how travel performance and life satisfaction are shaped by individuals' perceptions of the built environment and transport systems (Farber and Páez, 2011; Delmelle *et al.*, 2013; De Vos and Witlox, 2017; Long *et al.*, 2017; Chaloux *et al.*, 2019, Tiznado-Aitken *et al.*, 2020). First, because the arrival of high-end shops and services does not necessarily make the neighborhood walkable for everyone. Instead, low-income incumbents may be compelled to travel longer distances to achieve suitable opportunities, ultimately illustrating how gentrification may contribute to time poverty (see Tiznado-Aitken *et al.*, 2024) as more time is devoted to travel. Second, because introducing a new transport infrastructure does not necessarily enhance the perception of accessibility for incumbents with limited abilities to use that mode or engage in the opportunities the transport infrastructure enables them to reach.

After all, proximity to transit services can be of little use if they are not affordable or if the infrastructure does not connect people to their desired destinations (see Geurs and Van Wee, 2004, 2026; Pereira *et al.*, 2016).

Therefore, the inability to afford expensive fares and activities, coupled with strict temporal constraints as well as personal needs and preferences, may play a more decisive role in shaping incumbents' daily travel behavior than the improvements in objective accessibility themselves. Ultimately, this perspective may undermine not only public policies that rely on the distribution of transportation resources, but also the ridership of transit services, the expectation of achieving sustainability-related goals, and, particularly, the belief the gains outweigh the burdens in gentrifying communities. The next section presents a hypothesized causal mechanism that challenges this latter assumption.

4.4 Methodology

Qualitative approaches are widely used to explore complex social phenomena and to understand the meanings individuals assign to them (Creswell and Creswell, 2021). In recent decades, however, there has been growing advocacy for the use of qualitative methods to draw causal inferences from the identification and analysis of empirical evidence, particularly in Cognitive Psychology (see Falleti, 2016). Unlike frequentist approaches (De Oliveira *et al.*, 2026), qualitative methods are primarily applied to test hypotheses about causal mechanisms rather than to estimate effects, verifying events that connect a cause to an outcome (Maxwell, 2004). The focus, therefore, is on understanding how and why a cause generates an outcome, not by counting how often a pattern recurs, but by assessing the strength and explanatory power of the evidence at hand.

In this paper, we applied the *process tracing method* (Falleti and Lynch, 2009; Beach and Pedersen, 2013; Bennet and Checkel, 2015), dividing our efforts as follow. First, we conceptually delineated the causal mechanism that links the exposure of incumbents to some urban transformations (cause) with changes in their travel behavior (outcome). As a tool of causal inference analysis, process tracing aims to evaluate prior explanatory hypotheses from diagnostic pieces of evidence, often understood as a sequence of events or situations that unfold over time (Collier, 2011). That is the main reason why we represented the causal pathway through its basic descriptive steps, drawing on the theoretical discussion presented in the previous sections. Then, we proceeded with an interview stage, aiming to capture observable manifestations for each component of the causal mechanism. Finally, we applied

the process tracing tests (Bennett, 2008; Collier, 2011; Mahoney, 2012; Beach and Pedersen, 2013; Bennett and Checkel, 2015) to assess the strength of the collected evidence in increasing (or not) confidence in our hypotheses.

An noteworthy issue is that, instead of relying on *p-values* to draw inferences about a null hypothesis, process tracing focuses on evaluating the established hypotheses based on the *probative value* of within-case evidence (Collier, 2011; Beach and Pedersen, 2013). In this sense, deductive logic is applied by specifying which pieces of evidence should exist if the proposed causal mechanism is at work in the case (Crasnow, 2011). This is the main reason why Mahoney (2012) and Beach and Pedersen (2013) argue that process tracing tests are inherently counterfactual, as they rely on contrasting what we would expect to observe when the causal mechanism is active and what we would expect when it is absent; examining then which of them is more consistent with the evidence actually observed. Equally important is that, alongside its deductive design, scholars also argue that the process tracing method may involve a subsequent inductive phase, as unexpected alternative explanations may emerge during fieldwork (Bennett and George, 1997). Thus, observations may strengthen, weaken, or refine the pre-existing theory, as well as enable the identification of other causal mechanisms for further investigations.

4.4.1 Causal mechanism and hypotheses to be investigated

We first proposed a causal mechanism (Figure 13) that starts with the introduction of a new transport infrastructure. Structurally, the causal mechanism is composed of a set of hypothesized links containing *entities* (such as stakeholders, rules, ideas etc.) that transfer causal force from a link to another through what scholars refer to as *activities* (the actions played by each entity). In Figure 13, the first entity is the introduction of a new transport infrastructure, whose first effect is improving the connectivity between the neighborhood and other areas across the city and, as a result, attracting affluent people and high-end activities into the neighborhood. As argued in Section 4.3, over time, incumbents are expected to revise their own 'mental map' of which activity opportunities they consider suitable to engage in. In this sense, as nearby opportunities turn less affordable, such mental representations might change by being expanded. Consequently, changes in the location of performed activities may be observed, likely reshaping travel behavior (shifts in transportation mode choice or in the frequency and timing of trips are some examples).

Figure 13 – Causal mechanism to be investigated

Cause	Causal mechanism			Outcome
	Links			
A new transport infrastructure improves connectivity between the neighborhood and other areas across the city (H1);	Transportation improvements draw affluent people and high-end activity opportunities, changing the retail composition (H2);	Over time, incumbents start feeling excluded from the activity opportunities available in the neighborhood (H3);	Incumbents begin changing the locations where they perform their daily activities, increasing travel distance (H4);	Given the longer distances, incumbents readjust aspects of their mobility practices relying on motorized transportation modes (H5).
>	>	>	>	

Source: Authors.

Overall, fragmenting the causal mechanism into descriptive links is important to prevent them from being interpreted as equally informative, given that each link is supposed to be assessed separately in terms of evidentiary value and strength, especially in comparison to their rival hypotheses (Befani and Stedman, 2017). Another crucial point is that the more precisely the causal mechanism is decomposed, the easier it becomes to derive clear empirical expectations as well as to operationalize the data-collection phase. As observations are often more difficult to select in qualitative research, procedures such as interviews must be carefully designed to facilitate the capture of observable manifestations. The challenge lies in identifying exactly what needs to be observed, and the links are meant to inform this definition (Lorentzen *et al.*, 2017).

4.4.2 Collecting evidence

In our study, a set of pilot interviews was first conducted with 15 respondents, all of whom were long-term residents of a Brazilian low-income community impacted by an LRT infrastructure (Section 4.5). This pilot stage proved to be of great value, first because it enabled us to refine our communication strategies, from the selection of concepts and terminology to the best way to phrase questions. Additionally, we recognize that our preliminary findings led us to reconsider our initial focus on job accessibility and incumbents'

commutes, assigning equal importance to both mandatory and non-mandatory trips. These insights included perceptions on the closure of small shops and the opening of large chain stores; with some respondents expressing negative attitudes towards the new activity opportunities nearby. The unaffordability of these opportunities seems to be the main issue, alongside feelings of lack of belonging. Ultimately, this shift brought our analysis into closer alignment with the discussion presented earlier, considering the different types of activities people need to engage in to fully participate in society.

After some adjustments on questions, 29 semi-structured interviews were carried out, having as a reference the following script.

- a. ***Regarding the LRT coverage and connections.*** In your view, how has the LRT service made it easier to reach other neighborhoods across the city?
- b. ***Regarding the land-use transformation.*** Since the LRT infrastructure was implemented, what kinds of changes were you able to observe in your neighborhood, particularly in terms of availability and diversity of shops and services?
- c. ***Regarding their perceptions of nearby activities opportunities.*** How would you describe the affordability of nearby shops and services?
- d. ***Regarding the locations where they perform their daily activities.*** Over the last few years, have you changed the places where you perform some of your daily activities (such as grocery shopping, work, leisure, etc.)? If so, what were the reasons behind that? Are the new locations closer to your home?
- e. ***Regarding their travel behavior.*** Since the LRT was implemented, have you changed the way you travel daily (for example, your transportation mode or departure times), either temporarily or permanently?

All respondents were first asked some socioeconomic questions (such as gender, age, household structure, and occupation), including possible educational attainment over time (Appendix C). Collecting this information served a dual purpose. First, it allowed us to analyze some nuances over which the causal mechanism may operate. As process tracing does not rely on evidence regularity, the presence of only a few pieces of evidence supporting hypotheses does not invalidate them, although some contextualization may be necessary to draw inferences, such as associating strong evidence with a particular social segment of the population (women, younger groups, elderly, white/black people etc.). Second, this previous survey also helped us to account for some alternative mechanisms, as in the case of both

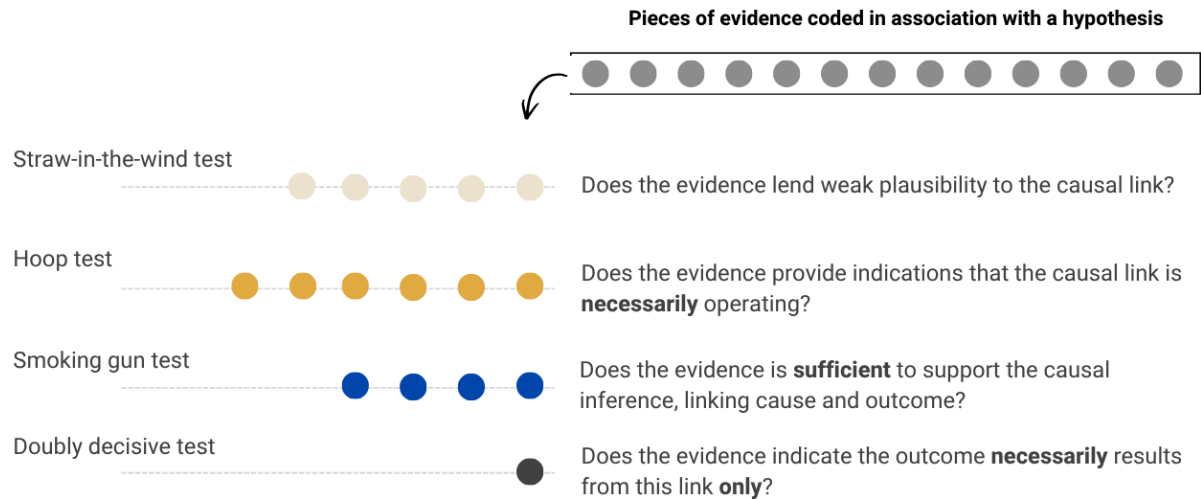
professional qualification and socioeconomic mobility resulting in behavioral changes. As scholars at the core of this method remind us, contextual and external factors must be carefully analyzed, as they can offer insights and shape the interpretation of the evidence (Falleti and Lynch, 2009).

Following the data collection phase, all the interviews were fully transcribed. To identify potential pieces of evidence we conducted a coding procedure very similar to those applied in previous urban studies (Vila-Henninger *et al.*, 2022; Wainaina and Truffer, 2024). Basically, we first generated a theoretically based codebook (containing label, description and inclusion criteria). Subsequently, we conducted an initial round of coding using a subset of interviews to refine and expand the codebook. This first round was particularly important for identifying some within-case links and, consequently, incorporating additional codes such as the LRT's fare free policy, some concurrent urban design interventions, and the massive State-led dispossessions that occurred during the infrastructure's implementation. This iterative engagement with the data also enabled the development of preliminary code equations, i.e. structured combinations of codes that consistently co-occurred and jointly pointed to specific explanatory mechanisms. We then systematically verified these code equations against the full dataset, examining whether the identified combinations held across cases, under which conditions they emerged, and where they did not apply.

4.4.3 Evaluating the strength of the collected evidence

Process tracing tests for causal inference may be summarized as follows: straw-in-the-wind test, hoop test, smoking-gun test, doubly decisive test (Bennet, 2008; Collier, 2011; Mahoney, 2012; Beach and Pedersen, 2013; Bennett and Checkel, 2015). As mentioned earlier, the main idea is to assess the extent to which the hypothesized links are supported by the collected evidence. To this end, a hypothesis may pass through multiple tests, relying on different evidence and their respective content (Figure 14).

Figure 14 – Scheme of process tracing tests applied to hypothesized links



Source: Authors.

Basically, considering quotes as the pieces of evidence:

Hypothesis passes the straw-in-the-wind test relying on evidence that makes the link slightly more plausible than the contrafactual but is neither sufficient nor necessary to support causal inference (*e.g., people acknowledging that the LRT system connects the neighborhood to key urban areas, without reporting actual improvements*).

Hypothesis passes the hoop test if it relies on evidence that presents indications that would necessarily be observed if the link operates. It is compatible with the hypothesis, but it is not sufficient to establish a causal inference (*e.g., a respondent stating that reaching other neighborhoods using the LRT system is fast or free*).

Hypothesis passes the smoking-gun test when a piece of evidence is considered sufficient to support a causal inference, but it does not necessarily rule out other explanations (*e.g., quotes of people saying that, because nearby opportunities are no longer affordable, they now run errands and do grocery shopping in other neighborhoods*).

Hypothesis passes the doubly decisive test when it provides necessary and sufficient conditions to support the link and substantially weaken alternative explanations (*e.g., a rare quote from a respondent explicitly stating that no other reason led them to change the location of an activity except the rising prices of nearby opportunities*).

In this sense, the prevalence of straw-in-the-wind evidence would suggest that the hypothesis remains plausible but only weakly substantiated. A larger number of hoop tests would indicate that the hypothesis cannot be ruled out, though stronger evidence is still required to support the causal inference. By contrast, a significant presence of smoking-gun tests would signal a robust support for the link, even if alternative explanations cannot be fully dismissed. Finally, the doubly decisive test would simultaneously strengthen the hypothesis and discredit alternative explanations, thereby offering the strongest possible support.

4.5 Empirical analysis

4.5.1 Case study context

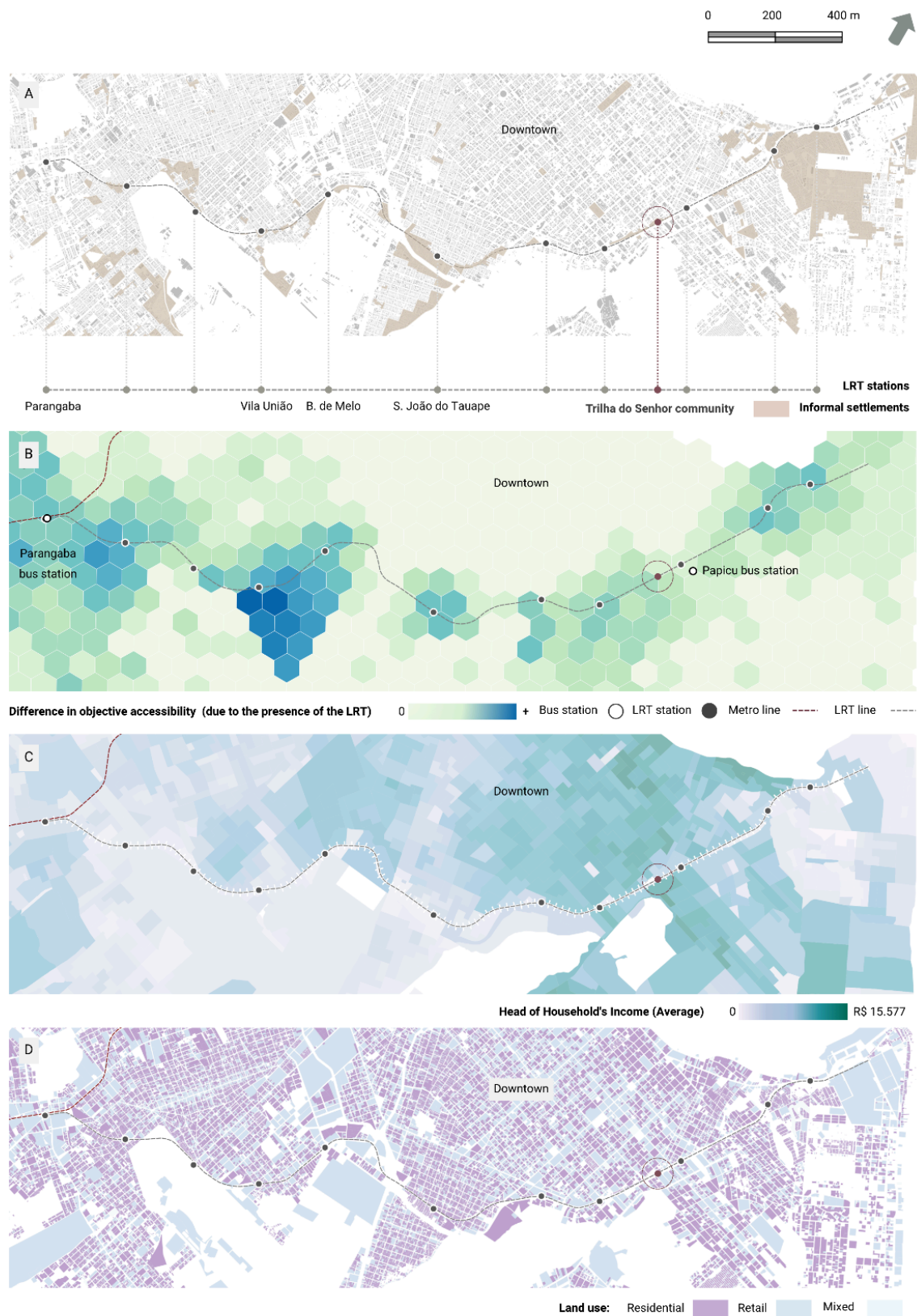
The *Trilha do Senhor* community is one of the 17 informal settlements that were directly impacted by the implementation of the LRT infrastructure in Fortaleza (Menezes, 2013; Freitas, 2017; Oliveira, 2017; Câmara *et al.*, 2019, De Assis *et al.*, 2025), the fourth most populous city in Brazil (population 2.5 million, *cf.* IBGE, 2023). As part of the preparation of the city for the 2014 World Cup, this single-route transit system resulted from the modernization of an old cargo rail line, connecting Fortaleza's main gateways (the airport and the maritime terminal) as well as two of its busiest bus stations (see Figure 15). The LRT infrastructure is primarily recognized for facilitating daily commutes between downtown and the Parangaba neighborhood, an emerging urban centrality, and for having its southwestern end linked to the most heavily used metro line, which connects downtown Fortaleza to the broader metropolitan area.

As shown in Map A (in Figure 15), along the LRT route, the *Trilha do Senhor* community stands out as one of the informal settlements closest to downtown. This proximity to core urban activities likely explains the more limited objective accessibility gains observed in the community (and its surroundings) in comparison to areas located farther from downtown, where the LRT speed may have contributed more substantially to accessibility improvements (see Maps B and D in Figure 15). These gains were estimated using the *aopdata* R package (Pereira and Herszenhut, 2023), which has been employed in previous studies to calculate and analyze job accessibility in Brazilian cities (Pereira *et al.*, 2022). The metric applied is essentially a location-based indicator (cumulative opportunity) that relies on

population, transportation, and land-use data compiled by the Brazilian Institute for Applied Economic Research (IPEA).

In this sense, using data from the same year (2018), each hexagon represents the increase in the number of job opportunities reachable within a 60-minute threshold once the LRT is integrated into the transportation network. That said, a major note about the use of this indicator during this contextualization effort is that the `aopdata` R package does not consider the burden of transportation fares, which is likely to underestimate the objectively calculated gains of the LRT service in Fortaleza, mainly due to its free-fare condition, as the transport service has remained fare-free while operating under assisted operation for several years (Metrofor, n.d).

Figure 15 – LRT system across Fortaleza – Contextualization



Source: Authors.

According to the current administrative division, the community is located in the Aldeota neighborhood, a key urban area whose occupation alternates between informal settlements and large sections occupied by upper-class groups, following a common pattern of urban development in Latin American cities. In this regard, data from different sources highlight the socioeconomic gap between the community and its immediate surroundings: while the 2010 national census (see Map C in Figure 15) shows that the average monthly income of household heads ranged from 10 to 11 minimum wages (R\$ 5,100 to R\$ 5,610) in the Aldeota neighborhood, a 2012 social housing plan¹ indicates that household heads in the Trilha do Senhor community earned monthly between 1 and 2 minimum wages (R\$ 510 to R\$ 1,020).

Among all the 17 informal settlements mentioned earlier, the *Trilha do Senhor* community was selected based on prior evidence of slum gentrification unfolding in this community (De Assis *et al.*, 2026). In that study, the phenomenon was linked to regional processes of urban restructuring, including the expansion of high-end housing and public investments in urban space, such as the LRT project. Their findings highlighted the coexistence of two juxtaposed processes within and around the *Trilha do Senhor* community: an internal process of slum gentrification, driven by the influx of slightly more affluent people, and an external transformation in its surroundings, marked by the arrival of upper-class groups.

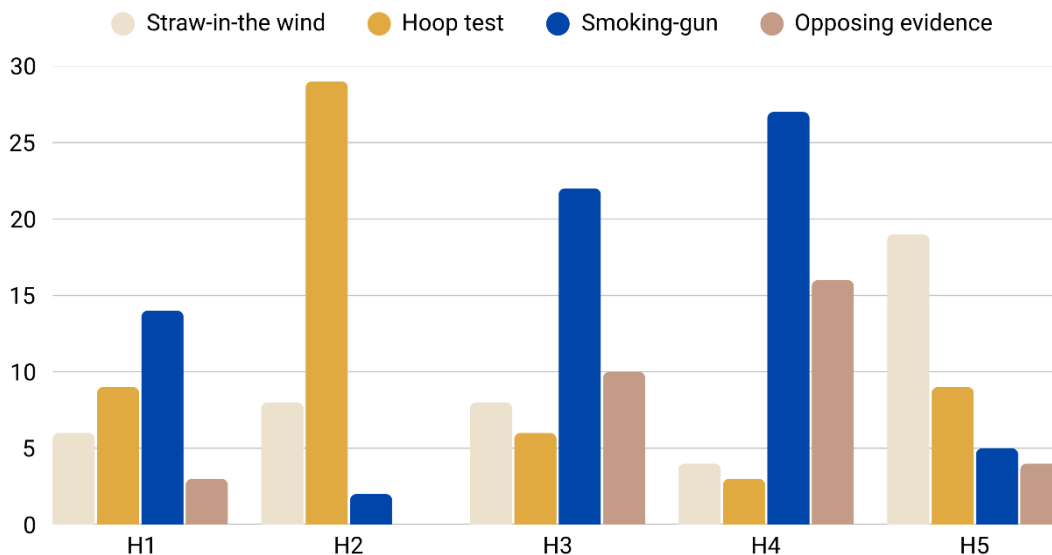
4.5.2 Hypotheses under investigation

In the following pages, we provide a detailed picture of each hypothesized link. A summary of the distribution of the process tracing tests is presented in Figure 5. Overall, our findings show that some of the hypothesized links composing the causal mechanism (Figure 16) are more strongly supported by the evidence than others, with no piece of evidence addressing the doubly decisive test. As Bennett (2010,211) notes, single tests that accomplish this are extremely rare in social science, since it must necessarily suggest the absence of alternative explanations. We also note that a few pieces of opposing evidence were identified during the coding procedure, ultimately reflecting individual perceptions that weaken our

¹ This information was obtained from the *Plano Local de Habitação de Interesse Social* (Fundação de Desenvolvimento Habitacional de Fortaleza [Habitafor], 2010)

theoretically grounded causal mechanism. That said, we note that the pieces of evidence running counter to hypothesized links do not necessarily invalidate them, unless the link fails several tests. We elaborate on these pieces for each hypothesis below.

Figure 16 – Distribution of process tracing tests



Source: Authors.

4.5.1.1 Hypothesis 1: A new transport infrastructure improves connectivity between the neighborhood and other areas across the city

In line with the job accessibility gains (Figure 15), which were objectively calculated, most respondents reported positive attitudes towards the role that the LRT plays in connecting their neighborhood to other key areas, frequently mentioning the ease of reaching Parangaba (Appendix C). In general, positive smoking-gun and hoop tests relied on personal evaluations that resemble scenarios with and without the LRT. Quotes in which residents refer to the free fare policy, travel speed, and decreases in travel time were also linked to those tests.

It made it easier to get to Parangaba and to... To the Maracanaú area, right? I go there a lot. So the LRT takes me straight there, you know? Before, I had to go around a lot by bus just to get to the Parangaba terminal so I could take the metro to go there. Now I go straight there (Resident 15; Example of a positive smoking-gun test).

In my view, it helped a lot. Many people who work, you know, here in parts of Aldeota [neighborhood], Papicu [neighborhood]... so when they come, they use it a lot. People coming from Parangaba, from other distant neighborhoods. (...) I used to

work near the intercity bus station and used the LRT a lot, every week (Resident 6; Example of a positive straw-in-the-wind test).

In contrast, evidence providing only limited support for the hypothesis passes through the straw-in-the-wind test (Figure 16). This applied to quotes primarily based on mobility patterns and the service ridership. Residents referring to some acquaintances that now use the LRT without mentioning actual improvements exemplifies this case. The same applies to those quotes reporting a significant volume of people arriving at nearby stations from distant neighborhoods. From a methodological perspective, we could not consider this kind of report as evidence of improvements resulting from the transport infrastructure. However, we note that by aligning with the distribution of objective accessibility gains (Figure 4), to some extent, those quotes are likely to support the positive association between route-based accessibility improvements and ridership response (see Albuquerque-Oliveira *et al.*, 2024), indicating at least that the LRT has improved the neighborhood's passive levels of accessibility.

When it comes to evidence that weakens the hypothesis (Figure 5), three pieces of evidence expressed a negative view on the LRT's capacity to improve access to other neighborhoods. The first one relies on the difficulty of accessing or exiting some stations, as most of them are connected to the street network via pedestrian bridges, which were reported as lengthy walkways. Other two respondents provided partially positive answers, however, they somewhat challenge the idea that the infrastructure is a resource they can use to move around the city, as the LRT does not connect them to the places they need to travel to (Pereira *et al.*, 2016).

The LRT doesn't go downtown. Our destination is only downtown, right? The LRT only goes to the beach and over to Mucuripe... and to Parangaba, around that area (Respondent 14, Example of evidence weakening the hypothesis).

4.5.2.2 Hypothesis 2: Transportation improvements change the retail composition by drawing both affluent people and high-end activity opportunities

In comparison to the first hypothesis, the amount of evidence explicitly supporting the causal inference (smoking-gun tests) was lower, mainly because just a few people related the land-use changes to the LRT's implementation (Appendix D). However, many quotes addressed hoop tests (Figure 16), as several respondents referred to the arrival of larger and higher-end shops in the surroundings over the last years, an aspect that composes the link. In this sense, we find worth noting that most respondents reported the closure of

local small business within the community and the simultaneous arrival of a few supermarkets, some retail and service establishments, and a specific open-air mall into the neighborhood, particularly along the avenues near the community.

No store opened around here [in the community]. On Santos Dumont [Avenue]... it did, you know? There's [the Hospital] Unimed, there's also a store that opened right there... what's the name? Apiguana, that wasn't here in Aldeota [neighborhood] either. It opened too. There's also that new open-air mall that opened (...) with a new supermarket, a gym (Resident 2).

The neighborhood became more well-known, you know? Looking less like a favela. (...) There's a pet shop, a florist. Everyone came here with this change. Why? Because the neighborhood had his face changed (Resident 3).

We also identified a handful of quotes also associating the changes in the retail composition with the large-scale evictions that occurred during the implementation of the LRT. Many respondents acknowledged that the population reduction (and, thus, the reduction in the local consumer base) also contributed to the decline of many small businesses, alongside the arrival of new establishments near the community.

Look, we used to have a few local businesses. Some are still here, but others closed down. And some others, I'm not really sure why... Maybe because the number of people living in the community also decreased, as many moved farther away. And I believe that was the reason — some businesses closed, while others now have very little to offer (Resident 4).

Because of this change in, in... residences, because of these removals (...), many shopkeepers left, right? There used to be a lot of people, you know? And also... around here, bigger grocery stores opened. (...) Those small grocery stores ended up closing after those big ones arrived, you know? (Resident 5).

4.5.3.3 Hypothesis 3: Over time, incumbents start feeling excluded from the activity opportunities available in the neighborhood

The third hypothesis was mostly supported by smoking-gun tests, as many residents stated they do not engage in some of the new activity opportunities mostly because they are unaffordable and not compatible with their financial realities (Appendix E). Many quotes associate these new opportunities with upper classes, and some of them express feelings of lack of belonging. Among the responses, a common theme relies on comparisons between the cost of living faced by the community and the costs observed in different informal settlements and peripheral neighborhoods.

Because the population is vulnerable, like in our case here, only a few people frequent [the open-air mall] (Resident 1).

[When asked about price compatibility] It depends on the audience. Who are you talking about? Like... the person? The people in the community? Ah... it's not possible, girl. (...) Around here... it's just passing by, looking at, and bye. It doesn't fit the reality of the people who live in the community (Resident 6).

Accessible... For us who live in the community, not really, you know? Because there are neighborhoods where things are more affordable than here. It's different for people who live in a neighborhood like this. Our income, for those of us in the community... we don't earn as much as they do... so we need to stretch a bit to make it work, right? (...) I don't even go to the gym, you know? Because it still doesn't fit in my budget. In a more distant neighborhood, it would actually be better to find one, because it's cheaper (Resident 9).

Despite most evidence fitting straw-in-the-wind, smoking-gun, and hoop tests, a few quotes indicate positive perceptions regarding the presence of different supermarkets. Many residents mentioned they now manage to save on promotional days, with some arguing that the market competition contributes to more affordable prices. However, for most respondents, these advantages do not extend to other activities opportunities:

Here, if it's not to buy food, in the supermarkets when there are promotions... The other things, we just can't afford. At least, I can't afford the other things. I always go downtown, and the price is ridiculously different. It's like... My mom's medicine costs R\$ 28 here, and in downtown it costs R\$4.50 (Resident 15).

We note that only two respondents explicitly expressed their engagement in different kinds of activities, referring to leisure opportunities near the community. Both residents hold at least the secondary school degree, which distinguishes them from over 40% of the respondents (considering all those who did not complete the secondary education). In the case of Resident 16, for instance, she even associates her participation with the last degree she obtained (graduation degree):

Well... I don't go all the time, but we try to manage to go once a month, you know? After the new degree, that improved a bit (Resident 16).

To some extent, our findings support the distinction between perceived accessibility and perceived sufficiency of opportunities (see Pot, 2025). That is mainly because, even when the respondents report their inability to engage in the nearby activities, they frequently express a positive assessment regarding the number and diversity of activities in the neighborhood, expressing that the retail composition has improved over the years.

Look, things have changed a lot. We now have better access, more stores, more supermarkets, more services, you know? People also come here looking for work. A lot of things have improved significantly. I think the area has become much more central (...) and I think that with the arrival of the LRT, things improved even more. They really did. (...) [those stores] are not exactly cheap. In fact, I've been wanting

to get a job at a gym around here and... the prices are very expensive. There are many gyms, right? I need to do strength training, but I still haven't started because I'm waiting to retire so I can have some extra money to afford it. So, no, I don't think the prices are very affordable (Resident 5).

Around here, there is everything... There's a gym, there are grocery stores, everything is close by. For those who have money, who can afford it, they go, right? So, we just stay here, at our public gym (Resident 14).

In this sense, while respondents' perceptions of accessibility tend to be more closely associated with factors such as income, their perceived sufficiency appears to be strongly shaped by the absolute number and distribution of opportunities in the surrounding environment.

4.5.4.4 Hypothesis 4: Incumbents begin changing the locations where they perform their daily activities, increasing travel distance

The fourth hypothesis was associated with the largest amount of opposing evidence, but overall evidence is still mixed (Appendix E). On the one hand, some residents state that non-mandatory trips, particularly those associated with grocery shopping activities, now involve shorter distances to nearby destinations. Here, perceived affordability of nearby supermarkets and the convenience of walking appeared to be among the reasons running counter to this hypothesis. On the other hand, this hypothesis also passes multiple tests (i.e., positive smoking-gun test) due to the presence of several quotes in which residents explicitly state that they prefer to make longer-distance trips to save money, mentioning a few neighborhoods where they can find more affordable opportunities, especially for leisure activities.

Near our home, when the houses on the other side were still there, we had everything. Whatever we needed... it was all there. Now we need to go to another neighborhood, Verdes Mares [neighborhood], right? To buy things. Because the prices are better there (Resident 1; Example of a positive smoking-gun test).

It's not [affordable]. I can even give you an example. On weekends, we really like to go out to have barbecue, to relax a bit with my partner, you know? But do you know where we go? To the outskirts: Luciano Cavalcante [neighborhood], Lago Jacarey [area], and other more distant neighborhoods (Resident 6; Example of a positive smoking-gun test).

[Today] *the places where we shop are right next to our home, you know? Before, we had the logistics and the cost of... going all the way to Bom Preço [supermarket]* (Resident 7; Example of an opposing evidence).

Particularly when asked about clothing and other non-food items, many respondents mentioned they prefer shopping in other key areas of Fortaleza like downtown,

Messejana neighborhood, and Parangaba neighborhood, where there are popular markets, informal street vendors, and low-end stores. Among the evidence, some residents mentioned that the closure of small businesses within and near the community over the years has incentivized these changes.

Because, whether you like it or not, there aren't these kinds of stores in our neighborhood, you know? Stores that sell things for R\$ 10 or R\$ 20, like in other neighborhoods. So we go to another place where the prices are better (Resident 20).

To be honest, I don't really go around the stores here. My thing is going downtown, you know? (...) So we... We go downtown for pretty much everything, right? We look for prices that are affordable for us, you know? (Resident 21).

I even ended up buying things downtown Fortaleza, you know? That's where the market is more popular. I go... I usually go from here to downtown Fortaleza. (...) Before I started going downtown, I always bought things here, in the local shops (Resident 29).

When it comes to job opportunities, a more detailed analysis is needed. While three residents that work on demand (two house cleaners and a cook) described the neighborhoods as a strategic area to offer their services, other five mentioned job relocations to positions nearer their homes, including adjacent neighborhoods. Only one resident mentioned starting his first job within the community, at his family business, while three other residents reported relocations to positions in more distant neighborhoods. In this regard, while Resident 1 explained her relocation happened after the nearby bakery where she worked closed, Resident 18 mentioned she used to work at home as a beautician, but she now runs a Beauty Salon in other neighborhood, and Resident 25 explained that at some point his former employer had transferred him to a different location.

To some extent, Resident 1 and Resident 18 are likely to serve as examples of people who were *displaced from their means of livelihood* (Section 4.3) - whether due to changes in the available opportunities or in the local consumer base. Drawing on these cases, we consider that the following quote addresses a straw-in-the-wind test, lending weight to the hypothesis of longer mandatory trips:

Look, I'll be honest. A lot of shops closed, a lot of jobs were lost. Many people ended up unemployed. You remember there used to be a gas station here, right? There was [an old open-air called] Parkside, there were hair salons, there was everything here. Back then there were plenty of jobs, but now, after they built this LRT, after they put up this wall, it's all gone (Resident 25)

After all, this specific quote does not mention the expected outcome (longer distances), but it lends some plausibility to the causal inference by pointing to the need for job

relocations. In addition, we bright to light the feeling of exclusion expressed by Resident 1 regarding employment opportunities in the surroundings.

Here, there is no job opportunity for us, except in the supermarkets (Resident 1).

4.5.5.5 Hypothesis 5: Given the longer distances, incumbents readjust aspects of their travel behavior, relying on motorized transportation mode

Among all the hypothesized links, the fifth had the lowest combined number of positive smoking-gun and hoop tests, since most respondents did not indicate that changes in travel behavior were necessarily caused by longer distances (Appendix C). For this link, quotes addressed straw-in-wind tests when they revealed the respondents kept using the same category of transportation mode (motorized or non-motorized), even if they had switched to an alternative within the same category. On the one hand, we considered as opposing evidence those cases in which people mentioned walking or cycling more. On the other hand, any evidence indicating that the resident started driving, using transit alternatives, or began relying on on-demand transportation services, without mentioning longer distances, was treated as a positive hoop test.

I hardly ever take the bus anymore, you know? Thanks to God, I bought a car. But I used to think it was better for us to get around, you know... by bus. That changed because of that (Respondent 1, Example of a positive straw-in-the-wind test).

In the past, we used to get around a lot on foot or by bike, you know? That's how it was. Nowadays, it's mostly *Moto Uber* or our own car, or a motorcycle, you know? That's it. That's what changed (Respondent 26, Example of a positive hoop test).

Our findings include a subset of quotes in which on-demand transportation services are mentioned whether in reference to mandatory or non-mandatory trips. A total of 17 respondents (58.6%) fit these cases, including those respondents who had previously reported working near their homes. Convenience and affordability were the most cited reasons, with no indication of an association between the adoption of such services and income, for which the educational background was used as a proxy. When it comes to transit riders, 10 respondents mentioned they often use some public transit alternatives, with only four mentions of the use of the LRT. Three of which fit cases of non-mandatory trips, when respondents chose to use the LRT to reach other neighborhoods where they mostly run errands and perform leisure and shopping activities.

Particularly regarding mandatory trips, we note that none of the three respondents who reported walking or cycling more, ultimately weakening the hypothesis, correspond to those residents who had mentioned working closer to their homes now. The other piece of opposing evidence was provided by a house cleaner who reported she used to work once a week in a household near an LRT station and therefore used the transit service for a period. Following her case, all three respondents who had indicated they started working daily in farther locations reported switching to motorized modes. However, none of them started using the LRT. While Resident 1 and Resident 26 mentioned they commute by car, Resident 25 explicitly stated he would rather not use the LRT due to his resentment toward the project (specifically because of the evictions). Another resident who works as a construction foreman mentioned he alternates between cycling and on-demand transportation services, according to his assigned destinations.

I was transferred to the Parangaba Mall, but I never really used the LRT much. I was really upset, man. I was upset because many families ended up leaving here, you know. A lot of people died, and some elderly people became depressed (Resident 25).

Finally, we note that only one mention of modal integration involving the LRT was observed during the interviews, as Resident 15 reported integrating the LRT and the South metro line to reach the municipality of Maracanaú for leisure purposes. Among respondents working in neighborhoods along the LRT route or nearby areas, no mention of integration was reported. In this regard, some unobserved factors, such as poor knowledge of the public transit network and negative attitudes toward other alternatives, may underlie this observation, which relates to our previous comment (Hypothesis 1) regarding the infrastructure not being seen as an useful resource to some residents move around the city and, thus, reach their desired destinations.

For me, it [LRT] only made it easier to get to Mucuripe. Just there. It doesn't make it easier to go anywhere else. Why? Because what we needed was over there, near an old hospital... around the HEMOCE area (Ceará Blood Center) ... It doesn't go there. We have to get around by Uber or bus (Resident 18).

4.6 Discussion and key takeaways

Drawing on a theoretical background, our causal mechanism aims to test if transport-induced gentrification generates reliance on motorized modes due to the social exclusion of low-income incumbents (Figure 13). In the transportation field, this adds a new perspective to the body of work that shows unintended increases in automobile use near

transit infrastructures, as current studies are largely based on the assumption that affluent residents are most likely to rely on automobile use (Chatman, 2008; Chatman, 2013; Chatman *et al.*, 2019; Loo *et al.*, 2010; Cervero and Murakami, 2010). By focusing on the perceptions and experiences of low-income incumbents, our findings suggest that changes in the local retail composition, as gentrification unfolds, have reshaped the mobility practices of this group, particularly regarding non-mandatory trips.

Despite the seemingly positive attitudes towards the presence of new supermarkets, most incumbents expressed negative perceptions regarding other retail and service opportunities, largely due to their unaffordability. This reveals how perceived benefits may coexist with feelings of exclusion in relation to different activity opportunities, ultimately highlighting the complexity and ambivalence embedded in residents' perceptions of neighborhood change. Based on these results, the first takeaway of our paper is that studies on perceived gentrification (McGirr *et al.*, 2015; Huang *et al.*, 2026) could benefit from the design of more careful and nuanced evaluations to avoid overly simplistic conclusions. When it comes to studies investigating changes in the perceptions of accessibility as TIG unfolds, a key issue concerns the specific opportunities to which accessibility refers (e.g., jobs, recreational activities, and other opportunities).

In our study, adopting this broader analytical perspective helped to explain much of the mixed evidence surrounding the third and fourth hypotheses (Figure 16), which implied social exclusion and longer travel distances, respectively. That is mainly because much opposing evidence was associated with the convenience that the new supermarkets provided in everyday life. Furthermore, a case-by-case contextualization was also helpful, as the only two respondents who reported engaging in a wider range of nearby activity opportunities had higher levels of educational background than those typically observed within the community, further reinforcing the role of individual circumstances in shaping the perceived accessibility.

We also note that, by giving equal attention to each link and its related question, respondents were able to elaborate more thoroughly on their perceptions of different processes, which occasionally revealed alternative explanations underlying issues such as co-causality, confounding variables, and moderating effects. This was particularly evident in the fifth link, which addresses the anticipated outcome: mobility practices that rely heavily on motorized transportation. The frequent mentions of preferences for on-demand transportation services weaken the inference that reliance on motorized modes resulted solely from the longer distances incumbents are compelled to travel in order to access more affordable activity opportunities. In this case, most of the evidence regarding this hypothesis addresses

straw-in-the-wind and hoop tests, mainly due to the permanence of (or shift towards) motorized modes.

A noteworthy point here is that the identification of contextual factors was largely enabled by the qualitative approach employed in this study. The process-tracing method proved helpful in first, uncovering the influence of contextual factors that cannot be adequately controlled through statistical or experimental methods; second, capturing disaggregated changes in mobility practices; and third, investigating the extent to which these changes could be associated with transformations in the local retail composition commonly observed as gentrification unfolds. Drawing on this, we state a second takeaway as follow: scholars in the transportation field could really benefit from the application of similar approaches to fully understand individuals' perceptions and experiences as argued by Padeiro *et al.* (2019), Huang *et al.* (2026), and Youngbloom *et al.* (2023).

From an empirical point of view, our findings further suggest that urban reshaping near new transit infrastructures may create situations in which, to some extent, long-term residents lose their abilities to participate fully in society, ultimately fitting the definition of TRSE (Church *et al.*, 2000; Lucas, 2012). Instead of benefiting those most in need, mass transit systems may contribute to different forms of displacement. First, residential, which remains the most widely studied form (Rayle, 2015; Chapple and Loukaitou-Sideris, 2019; Delmelle, 2021). Second, the displacement of people from their means of livelihood, as less-skilled jobs might be replaced by positions requiring higher educational qualifications, challenging the assumption that transit investments necessarily generate positive labor-market outcomes (see Bania *et al.*, 2008; Barton and Gibbons, 2017; Jin and Paulsen, 2018). Third, the displacement of people from the locations where they usually run errands, shop, relax and exercise, as illustrated by our findings. Consequently, as our empirical findings indicate, these two latter forms of displacement are likely to reinforce reliance on motorized modes because of longer travel distances.

We also note the low reported use of the LRT among respondents. The intense flow of people coming from other regions and the reported feelings of exclusion from neighborhood opportunities suggests that the Trilha do Senhor was penalized on the grounds of improving accessibility levels for others. That is mainly because, as the neighborhood evolves into a connected destination for many, its incumbents face a deepening process of *socio-spatial fragmentation* (Sposito and Sposito, 2020) since the emerging land-use pattern restricts low-income people from participating in opportunities within walking distance. Stated slightly differently, incumbents do not seem to benefit from the improvements in

objective accessibility as outsiders do. Additionally, the small subset of mentions of LRT usage reinforces that proximity to transit services can be of little use if the infrastructure does not connect people to their desired destinations (Pereira *et al.*, 2016). Therefore, a critical inquiry relies on addressing the following question: *Who are the primary beneficiaries of urban reshaping near transit systems: incumbents, gentrifiers, or in-commuters?*

Given the community's proximity to Fortaleza's downtown, it is likely that this demand from other neighborhoods represents a long-standing demand, formerly absorbed by other modes. However, one could wonder: *To what extent do changes in the local retail composition explain these regional trips, or is it the transit service enhancing access to downtown?* Drawing on the first alternative, we must ask: *if incumbents do not benefit, what truly distinguishes them from in-commuters? When it comes to labor market outcomes, to what extent is this a matter of class and/or educational background?* With regard to evidence of incumbents increasing their travel distance (fourth hypothesis), we state the following question for future studies: *Do incumbents face any consequences for their daily activity needs, particularly regarding spatial mismatch and time poverty?*

All that said, we draw some major policy takeaways. First, susceptibility to gentrification and TRSE should be taken into account in *ex-ante* assessments of mass transit systems, in order to inform both the need for alternative solutions and the design of concurrent strategies. At times, this may require proactive measures to guarantee social mixing, maintain affordable rental prices, and foster local entrepreneurship, to prevent the unfolding of gentrification as a distinct kind of TRSE. Second, given the infrequent mentions of modal integration in the respondents' answers, we suggest that planning practitioners should provide residents with a more comprehensive understanding of the transit network through a variety of communication strategies, thereby helping local communities expand their spatial knowledge and ultimately their actual potential to engage in out-of-home activities. Furthermore, based on our case study, developing urban design interventions aimed at improving access to and from rail stations also appears to be beneficial, since most LRT stations in Fortaleza are connected to the surrounding street network through long and uncomfortable pedestrian overpasses, creating unfriendly conditions for pedestrians. Together, this may support the achievement of both sustainability-related goals and inclusive transit-oriented development (see Ling *et al.*, 2026)

5 CONCLUSIONS

5.1 Main Contributions

Following an exploratory sequential design, this thesis pursued a threefold objective. First, I conducted a systematic literature review (SLR) to identify the key specificities that underlie the unfolding of transport-induced gentrification (TIG) in Latin American cities. As a result, the analyzed papers first reassured Latin American gentrification as a form of accumulation by dispossession (López-Morales, 2015), as state-led dispossessions appear as a frequent tool aimed at making urban space available for neighborhood transformations. Additionally, findings on the supply of high-rise condos and the resulting amplification of the rent gap supported the relevance of the formal housing market as a powerful stakeholder during the production of space, illustrating in an extreme form that “gentrification is a frontier on which fortunes are made” (Smith, 1986, p. 34).

As outlined in Chapter 1, the findings from this first manuscript gave rise to the subsequent research questions. Specifically, the lack of evidence regarding market-driven displacement, combined with references to contexts of informal development, led me to address the intersection of transportation and slum gentrification. To this end, two hypotheses were formulated based on a prior literature review. The first hypothesis challenges the usual definition of gentrifiers as upper-class individuals by associating slum gentrification with the influx of slightly more affluent tenants, whom I refer to as *low-income gentrifiers*. The second hypothesis links the discussion on market-driven displacement to the dynamics of informal rental arrangements. Overall, our findings reinforce scholarly arguments that gentrification and displacement are two different and independent phenomena (Grier and Grier, 1978; Marcuse, 1985, 1986; Zuk *et al.*, 2018) and, ultimately, identify a further set of specificities inherent to TIG in Latin America. This is because, despite finding no evidence of market-driven displacement, we identified a few cases of slightly more affluent individuals who arrived in the community after the LRT project had been implemented.

Another phenomenological contribution of this manuscript concerns the spatial extent of TIG, as changes within the community were closely linked to regional processes of urban restructuring near *Trilha do Senhor*, such as high-end housing supply and public investments in space. After all, two juxtaposed processes were observed within and near the community: while slum gentrification seems to unfold within the community (from the influx

of slightly affluent individuals), a different transformation was observed in its surroundings (from the influx of upper-class individuals). Furthermore, I found that informal rental arrangements have enabled long-term residents to stay in the *Trilha do Senhor* community, which may suggest a form of informal rental governance. However, I note that no solid grassroots organization was identified in the community, an absence that may weaken the long-term permanence of incumbents, since the rental arrangements driven by individuals' needs for livelihood are likely to result in unregulated and exploitative rental practices over time (Ascensão, 2018).

Drawing on these findings, I shifted my focus from the threat of displacement, typical of the gentrification debate, to the burdens imposed on incumbents. In this regard, I formulated a theoretically based causal mechanism that supports my preliminary framework of TIG as a distinctive case of transport-related social exclusion (TRSE). This causal mechanism challenges both the incumbents' engagement in nearby activity opportunities and the performance of mobility practices in ways that align with the expectation of achieving sustainability-related goals. To some extent, the findings of the third manuscript reinforce that improvements in objective accessibility are often a poor match with changes in perceived accessibility, the latter being the actual basis for decisions regarding participating in spatially dispersed opportunities (Pot *et al.*, 2021). After all, many low-income incumbents of the *Trilha do Senhor* community reported travelling longer distances to reach suitable opportunities, while reported reliance on public transit remained remarkably low. Based on that, I argue that the gentrification phenomenon adds some complexity to, first, the ongoing discussion on neighborhood satisfaction (Yin *et al.*, 2025), and second, to the claims that incumbents benefit from the urban reshaping near transit projects, particularly in cases involving low-income communities.

Additionally, the findings also supported the distinction between perceived accessibility and perceived sufficiency of opportunities (see Pot, 2025). That is mainly because, even when the respondents reported their inability to engage in the nearby activities, they frequently expressed a positive assessment regarding the number and diversity of activities in the neighborhood. In this sense, this distinction exemplifies how socioeconomic constraints may override one's preference for performing activities near their home. In this sense, Smith (1992, p. 114) remind us:

Let's for a moment assume the priority of individual preference. Now let us ask: who has the greatest power to realize their preferences? Without in any way denying the ability of even very poor people to exercise some extent of preference, I think it is obvious that in a capitalist society one's preferences are more likely to be

actualized, and one can afford grander preferences, to the extent that one commands capital. We may regret that economics so strongly affects one's ability to exercise preferences, but it would hardly be prudent to deny it; preference is an inherently class question.

Despite his primary focus on housing and spatial consumption, Smith's insights seem to me singularly appropriate for addressing the mismatch between incumbents' perceived sufficiency of nearby opportunities and their actual activity performance. Following his critique, I note that what appears to be a choice in terms of activity performance is often a constraint imposed by personal circumstances.

Finally, from a methodological perspective, I draw the following highlights coming from this thesis:

- Regarding the visual analysis of façades, the longitudinal comparison of GSV images demonstrated that mapping the historical evolution of the built environment can benefit gentrification studies, as it serves as a valuable tool for practitioners and scholars to monitor the spatial unfolding of the phenomenon, particularly in contexts where housing data is scarce or inaccessible, such as informal settlements. However, fieldwork remains indispensable, as it has proved crucial in distinguishing residential relocation from other dynamics.
- When it comes to assessments regarding the impacts on local communities, the use of the process tracing as a qualitative approach reinforced that individual perceptions could provide site-specific explanations to fully understand gentrification and its consequences. This method proved valuable in capturing lived experiences that are often elusive to obtain through aggregate quantitative analyses. For the transportation field, this underscores a pathway to enrich the body of qualitative research focusing on how individuals perceive and experience their neighborhoods, their ease of reaching activity opportunities, and, notably, the impacts of gentrification within the context of transit developments.

5.2 Future Research

Drawing on suggestions from the reviewers of the first paper, I recommend that further studies investigate the role incumbents play during the unfolding of gentrification,

specifically within the context of TIG. In this regard, I state the first set of questions as follows:

- How do incumbents manage to stay in their neighborhoods? What is the role of grassroots movements in this process?
- Do incumbents conduct resistance practices in response to the threat of being displaced, whether due to dispossession or rising rental prices? What is the nature of these practices?
- How can the transportation agenda align with the debate on insurgent planning when addressing pre-existing urban conflicts?

I, myself, have devoted time over the last few years to addressing some of those questions, resulting in a paper that is not included in this thesis (De Assis *et al.*, 2025). Titled as “Transport projects and urban conflict: resistance to formal planning in Fortaleza”, this is a paper in which my two co-authors and I explore the concepts of *urban conflict* and *conflictual planning* to identify the resistance practices of the *Comunidades dos Trilhos* (of which the *Trilha do Senhor* community is a part) as they contested the implementation of Fortaleza’s LRT system. To some extent, our findings reinforce the notion of transport systems as socially constructed entities, as they do not exist as neutral constructs: “they are shaped by and, in turn, shape social structures, cultural norms, economic conditions, and the power dynamics of the societies in which they are embedded” (Fan and Blumenberg, 2024). This kind of debate seems to be of great value, particularly in contexts where a malleable sense of citizen is manipulated to consolidate hegemonic power (Miraftab, 2009), giving room for state practices that my co-supervisor refers to as the “undoing the right to the city” (Freitas, 2017).

A broader recommendation of this thesis is for future research to expand the geographical scope of studies on TIG. To this end, the partial or full replication of the methods applied in the previous manuscripts may prove instrumental. To some extent, this aligns with recent academic attempts that seek to reduce theoretical gaps in the transportation field, for example, through the development of metrics more closely aligned with the principles of equity and distributive justice (see Humberto, 2023). Overall, outcomes from *post-facto* analysis can better inform the formulation of inclusive urban planning policies in the future by reinforcing the need for more transparent *ex-ante* assessments, especially considering the social burdens imposed on local communities (Lucas, 2012).

Based on the outcomes of this thesis's empirical investigations, I also recommend that further research address the following questions:

- To what extent can informal housing arrangements emerge as a mechanism in transport-induced gentrification (and slum gentrification in general), and under which conditions this process occurs?
- How does the arrival of low-income gentrifiers affect the sense of community in gentrifying neighborhoods?
- Do incumbents face consequences related to their activity performances and mobility practices, particularly regarding spatial mismatch and time poverty?
- To what extent, does enabling incumbents to go longer and faster result in positive labor market outcomes?

Drawing primarily on the findings from Chapters 3 and 4, I argue that addressing these questions may pose a challenge to the belief that the gains outweigh burdens in gentrifying communities. First, because the distinguishment processes occurring both within and outside communities (due to influx of distinct types of gentrifiers), alongside displacement and changes in the urban landscape, are likely to affect issues such as the *sense of belongingness* and the *sense of community* (Gibbons *et al.*, 2020; He *et al.*, 2021). Second, because as the local retail composition becomes less affordable, an invisible frontier emerges, generating a condition of *socio-spatial fragmentation* (see Sposito and Sposito, 2020) that splits the neighborhood into two disconnected realities. In this scenario, the *upper urban circuits* (see Santos, 1979) fail to incorporate low-income territories, effectively bypassing them since low-income incumbents cannot afford to engage with the nearby activity opportunities.

Particularly regarding the final question, I note that TIG may muddle the role of mode-specific accessibility improvements in shaping how people interact with the set of available activity opportunities. Attention was intentionally drawn to job opportunities, given the increasing consensus regarding the association between accessibility (as commonly measured) and favorable labor outcomes (Bania *et al.*, 2008; Barton and Gibbons, 2017; Jin and Paulsen, 2018). As discussed in Chapter 4, this may not be the case for vulnerable groups with limited abilities to convert a specific transportation resource into effective mobility

practices, following the insights from the *Capability Approach* (see Beyazit, 2011, Hananel and Berechman, 2016, Pereira *et al.*, 2016).

Finally, I specifically argue that the coalition between academics and grassroots movements should catalyze the establishment of gentrification (and displacement) as a matter of common knowledge and a widely recognized issue in Latin America through, for example, action research efforts aimed at empowering marginalized groups to resist unjust processes, such as market-driven displacement. After all, besides gentrification being an urban frontier of profitability to some stakeholders (Smith, 1986, p. 34):

From the perspective of working-class residents and their neighborhoods, however, the frontier is more directly political rather than economic. Threatened with displacement as the frontier of profitability advances, the issue for them is to fight for the establishment of a political frontier behind which working-class residents can take back control of their homes: there are two sides to any frontier.

My advocacy for this approach stems from the relative scarcity of documentation regarding how community-based movements in Latin American have incorporated the threat of rising rents and market-driven displacement into their discourses and struggles. Compared to other global contexts, such as Southern and Northern Europe (see Annunziata and Lees, 2014; Colau and Alemany, 2012; Nikolayeva, 2015; Kallifatides *et al.*, 2014), a critical need remains to bridge the gap between the traditional land-rights activism and the emerging threats posed by real estate dynamics in the region. I expect this scenario to change in the coming years, as the findings of this thesis reinforce previous established arguments regarding the association between informal settlements upgrading and escalating rental prices (Stiphany *et al.*, 2024), as well as the subsequent occurrence of slum gentrification (Ascensão, 2018).

5.3 Policy takeaways

Overall, the findings from this thesis show that to achieve paramount goals through the lens of justice and equity, a more sensitive and critical approach is required; one capable of anticipating and avoiding the unfolding of contradictory and unfair phenomena like TIG, especially in contexts with deep socio-spatial inequalities such as Latin American cities. After all, to expand the *right to the city* (Lefebvre, 1968) to the urban poor - or, as transportation scholars prefer, guaranteeing them minimum levels of accessibility - is essential to address those morally arbitrary disadvantages that systematically preclude their fully inclusion in society (Pereira *et al.*, 2016). In this sense, findings regarding the Fortaleza's LRT

may provide urban planners and decision-makers with actionable insights, helping to move the discussion from the supply of transportation resources to *inclusive transit-oriented development* (see Ling *et al.*, 2026). To this end, as mentioned in Section 4.6, the extent to which local communities are affected by mass transit systems should not only be part of *ex-ante* assessments but must also be mitigated in advance. At times, this may require proactive measures to guarantee social mixing, maintain affordable rental prices, and foster local entrepreneurship, to prevent the unfolding of gentrification as a distinct kind of TRSE. To some extent, this aligns with the insights of Fainstein (2010) regarding the intersection of urban reshaping, outcomes, and the socio-spatial constraints under which urban planners operate (Chapter 1). Finally, following my recommendation for action research (Section 5.2), I close this thesis by arguing that formal power structures, such as institutional frameworks, should foster the consolidation of an urban agenda that also focuses on resisting displacement, for instance, by encouraging the emergence of community rental governance.

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APPENDIX A – ETHICAL COMMITMENT APPROVAL

MATERNIDADE ESCOLA ASSIS
CHATEAUBRIAND DA
UNIVERSIDADE FEDERAL DO
CEARÁ - MEAC/UFC



PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Gentrificação induzida pelos transportes na América Latina: Planejando a acessibilidade para quem e por quanto tempo?

Pesquisador: REBECA FROES DE ASSIS

Área Temática:

Versão: 1

CAAE: 92523325.9.0000.5050

Instituição Proponente: UNIVERSIDADE FEDERAL DO CEARÁ

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 7.944.439

Apresentação do Projeto:

As informações elencadas nos campos *Apresentação do Projeto*, *Objetivos da Pesquisa* e *Avaliação dos Riscos e Benefícios* foram retiradas do arquivo Informações Básicas da Pesquisa (PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_2606547, de 30/07/2025). O desenho metodológico desta pesquisa consiste na condução de um estudo de caso em uma grande cidade latino-americana. Para tanto, um assentamento informal localizado em Fortaleza, quarta maior metrópole brasileira em termos populacionais, foi selecionado como recorte territorial de estudo. O intuito da investigação é compreender a ocorrência de um fenômeno específico, intitulado como "gentrificação" pela literatura de estudos urbanos, através de uma abordagem qualitativa. A investigação será conduzida a partir da aplicação dos seguintes procedimentos: oficina participativa e entrevistas individuais com os moradores que residem no assentamento. Selecionado previamente, o território de análise é a comunidade Trilha do Senhor, um assentamento que foi fortemente impactado pela implantação de um sistema de transporte urbano (Veículo Leve sobre Trilhos - VLT). Durante os procedimentos, serão utilizados materiais como: fotografias, mapas e roteiros para entrevistas semi-estruturadas.

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Continuação do Parecer: 7.944.439

Objetivo da Pesquisa: Objetivo Primário: O objetivo deste projeto de pesquisa é investigar se os benefícios proporcionados por projetos de transportes, em termos de acessibilidade urbana, podem ser redirecionados ao longo do tempo através de processos gentrificatórios em grandes cidades da América Latina.

Objetivo Secundário:

Ampliar a teorização da gentrificação induzida por transportes para as grandes cidades da América Latina, agregando à discussão as especificidades e particularidades desse contexto geográfico.

Avaliação dos Riscos e Benefícios: Riscos: Esta pesquisa apresenta riscos mínimos para os participantes, porém algumas situações devem ser consideradas, especialmente em razão da natureza dos temas abordados e do perfil dos participantes. Isso porque a participação de alguns moradores pode trazer à tona lembranças ou sentimentos relacionados às mudanças indesejadas provocadas pela implementação do sistema VLT (Veículo Leve sobre Trilhos), tais como remoções de residências antigas e ruptura de laços sociais e afetivos, o que pode causar algum desconforto emocional temporário. Para reduzir esses riscos, será garantido o respeito ao tempo e à vontade dos participantes, que poderão se retirar do estudo a qualquer momento, sem prejuízos. De forma geral, o pesquisador se compromete a: *;* Reforçar a cláusula de recusa, assegurando que o convite para participação não seja acompanhado de pressão ou expectativa de aceitação; *;* Enviar previamente o roteiro simplificado da entrevista, possibilitando ao participante refletir sobre os temas a serem tratados; *;* Encaminhar com antecedência o Termo de Consentimento Livre e Esclarecido (TCLE), permitindo que o participante leia com tranquilidade e tire dúvidas antes da entrevista; *;* Reforçar as cláusulas de interrupção da entrevista a qualquer tempo e de recusa a responder qualquer pergunta, caso haja desconforto;

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¿ Ressaltar o direito ao anonimato, que será garantido sempre que solicitado, e oferecer ao participante a opção de revisão e aprovação do conteúdo a ser utilizado. Os dados coletados serão armazenados de maneira segura em plataformas protegidas por senha, e somente a pesquisadora terá acesso. Após a conclusão da pesquisa e publicação dos resultados, o material será excluído de forma definitiva. Ainda assim, caso solicitado, qualquer conteúdo poderá ser retirado total ou parcialmente a pedido do participante, a qualquer tempo, mesmo após o encerramento da pesquisa, sem necessidade de justificativa. Adicionalmente, reconhece-se que parte dos participantes pode exercer liderança em movimentos sociais ou coletivos comunitários cujas práticas, ideias ou reivindicações eventualmente se opõem a interesses políticos ou econômicos locais. Essa exposição pode representar riscos, como retaliação, discriminação ou constrangimento público.

Para mitigar esses riscos: ¿ O direito ao anonimato será reforçado, mesmo nos casos em que o participante inicialmente tenha autorizado a identificação; ¿ A pesquisadora evitará registrar ou divulgar qualquer conteúdo que possa comprometer a integridade ou segurança do participante, mesmo indiretamente; ¿ Será garantida autonomia total ao participante quanto à forma de registro, uso ou exclusão de seu conteúdo. Por fim, a pesquisadora se compromete a manter canais de comunicação abertos durante e após a pesquisa, estando à disposição dos participantes para esclarecer dúvidas, realizar exclusões de dados ou acolher eventuais desconfortos.

Benefícios:

No futuro, esta pesquisa poderá contribuir de forma significativa em dois aspectos principais. Primeiro, espera-se que avance a teorização sobre a gentrificação no contexto do Sul Global, oferecendo uma compreensão mais aprofundada do fenômeno em ambientes marcados por informalidade e desigualdade

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social, comuns em cidades latino-americanas. Em segundo lugar, os resultados obtidos poderão fornecer aos planejadores urbanos informações ricas e fundamentadas sobre como esses processos ocorrem, estimulando reflexões que auxiliem na formulação de políticas de transporte mais justas e inclusivas. Dessa forma, a pesquisa pode apoiar a construção de intervenções urbanas que promovam maior equidade social e evitem deslocamentos involuntários, contribuindo para o desenvolvimento sustentável e democrático das cidades. Além disso, na perspectiva comunitária, entende-se que a realização das entrevistas e da oficina poderá gerar benefícios diretos aos participantes, principalmente pela oportunidade de refletirem sobre suas próprias trajetórias, ações coletivas e desafios no enfrentamento de injustiças na pauta habitacional. A escuta qualificada e o registro das experiências, conduzidos de forma ética e respeitosa, podem favorecer um processo de autoanálise e valorização das práticas coletivas, o que, em alguns casos, poderá fortalecer o engajamento nos grupos e movimentos dos quais os participantes fazem parte. Além disso, a troca de experiências entre a pesquisadora e os participantes poderá promover o reconhecimento mútuo de saberes e práticas, contribuindo para uma relação mais horizontal e colaborativa.

Comentários e Considerações sobre a Pesquisa:

Trata-se de uma pesquisa da Universidade Federal do Ceará, Programa de Pós-Graduação em Engenharia de Transportes

ÁREA DE CONCENTRAÇÃO: PLANEJAMENTO/OPERAÇÃO DE SISTEMAS DE TRANSPORTES

LINHA DE PESQUISA: MOBILIDADE E ACESSIBILIDADE DE PESSOAS

Considerações sobre os Termos de apresentação obrigatória:

Vide campo ¿Conclusões ou Pendências e Lista de Inadequações¿.

Recomendações:

Vide campo ¿Conclusões ou Pendências e Lista de Inadequações¿.

Conclusões ou Pendências e Lista de Inadequações:

Solicitamos adicionar o telefone do CEP MEAC no TCLE tendo em vista este projeto ter sido analisado por este Cep (3366-8528) bem como solicitamos atualizar o

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Cronograma. Considerações Finais a critério do CEP:

Ressalta-se que cabe ao pesquisador responsável encaminhar os relatórios parciais e final da pesquisa, por meio da Plataforma Brasil, via notificação do tipo <relatório> para que sejam devidamente apreciadas no CEP, conforme Norma Operacional CNS nº 001/13, item XI.2.d.

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMACOES_BASICAS_DO_PROJETO_2606547.pdf	30/07/2025 20:57:05		Aceito
Outros	12_Curriculo_do_Sistema_de_Curriculos_Lattes.pdf	30/07/2025 20:55:43	REBECA FROES DE ASSIS	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	3_Termo_de_consentimento.pdf	30/07/2025 20:52:02	REBECA FROES DE ASSIS	Aceito
Projeto Detalhado / Brochura Investigador	2_Projeto_de_pesquisa_detalhado.pdf	30/07/2025 20:51:33	REBECA FROES DE ASSIS	Aceito
Declaração de concordância	8_Termo_de_compromisso_para_utilizacao_dos_dados_assinado_assinado_assinado.pdf	30/07/2025 20:49:38	REBECA FROES DE ASSIS	Aceito
Solicitação Assinada pelo Pesquisador Responsável	4_Carta_de_apreciacao_assinado_assinado_assinado.pdf	30/07/2025 20:49:10	REBECA FROES DE ASSIS	Aceito
Declaração de Pesquisadores	11_Declaracao_dos_pesquisadores_envolvidos_assinado_assinado_assinado.pdf	30/07/2025 20:46:22	REBECA FROES DE ASSIS	Aceito
Orcamento	13_Orcamento_financeiro_assinado.pdf	30/07/2025 20:44:45	REBECA FROES DE ASSIS	Aceito
Cronograma	15_Cronograma_assinado.pdf	30/07/2025 20:44:36	REBECA FROES DE ASSIS	Aceito
Folha de Rosto	01_folhaDeRosto_assinado_rebeca_assinado.pdf	30/07/2025 20:44:22		Aceito

Situação do Parecer:

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Aprovado

Necessita Apreciação da CONEP:

Não

FORTALEZA, 03 de Novembro de 2025

Assinado por:
Álison Menezes Araújo Lima
(Coordenador(a))

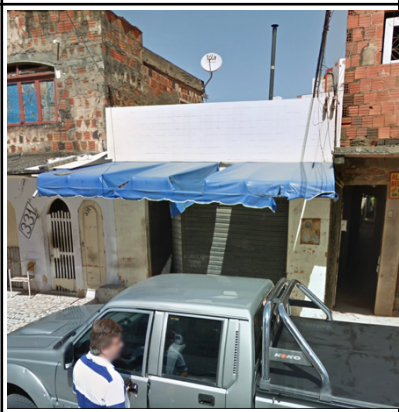
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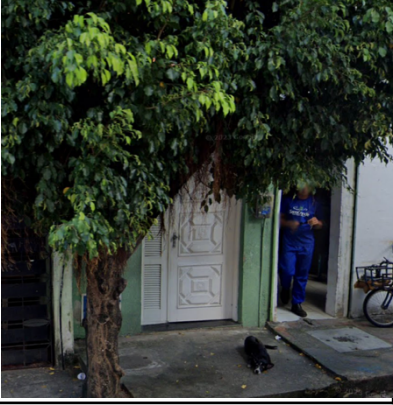
APPENDIX B – VISUAL ANALYSIS USING GOOGLE STREET MAPS (GSV)

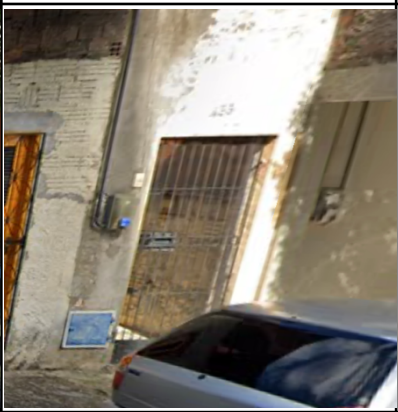
ID	GSV images		Note
	2009	2023	
1			New building: Replacement; Vertical extension.
2			New building (Replacement); Floor reduction.
3			Upgrading case: Floor addition; Recladding; Replacing windows/doors;

4			Upgrading case: Vertical extension; Recladding; Replacing windows/doors.
5			Upgrading case: Floor addition; Recladding; Replacing windows/doors.
6			Upgrading case: Recladding; Replacing windows/doors.
7			Upgrading case: Recladding; Replacing windows/doors.

8			New building (replacement); Vertical extension; Changed use.
9			Upgrading case: Floor addition; Recladding; Replacing windows/doors.
10			Upgrading case: Recladding; Replacing windows/doors.
11			Upgrading case: Recladding; Replacing windows/doors.

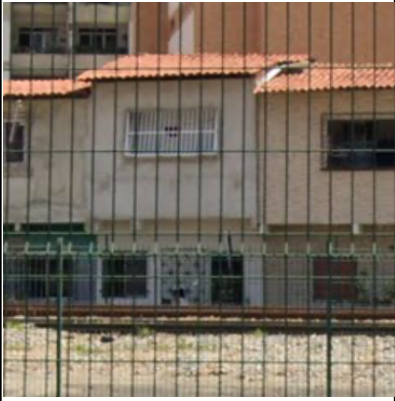
12			Upgrading case: Recladding; Replacing windows/doors.
13			Upgrading case: Recladding; Changed use.
14			Upgrading case: Recladding; Replacing windows/doors.
15			Upgrading case: Floor addition; Recladding; Replacing windows/doors.

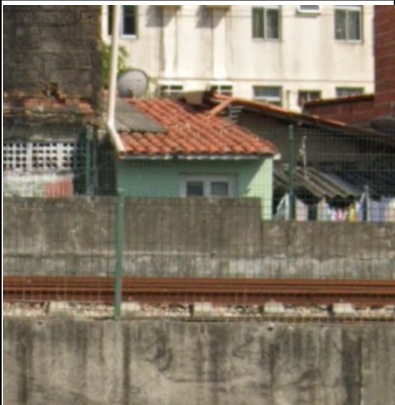
16	(Vacant plot)		New building
17			Upgrading case: Recladding; Replacing windows/doors.
18			Upgrading case: Recladding; Replacing windows/doors; Changed use.
19			Upgrading case: Recladding; Replacing windows/doors; Changed use.

20			Upgrading case: Recladding; Replacing windows/doors.
21			Upgrading case: Lot subdivision.
22			Upgrading case: Floor addition; Recladding; Replacing windows/doors.
23			Upgrading case: Floor addition; Recladding; Replacing windows/doors.

24			Upgrading case: Recladding; Replacing windows/doors.
25	(Formerly mid-block)		Upgrading case: Floor addition.
26	(Formerly mid-block)		Upgrading case: Floor addition; Recladding; Replacing windows/doors.
27			Upgrading case: Recladding; Replacing windows/doors; Changed use.

28	(Residual plot)		New building
29	(Vacant plot)		New building
30	(Occupied plot - Formerly mid-block)	(mid-block)	New building (Replacement)
31	(Occupied plot - Formerly mid-block)	(mid-block)	New building (Replacement)
32	(Occupied plot - Formerly mid-block)	(mid-block)	New building (Replacement)
33	(Occupied plot - Formerly mid-block)	(mid-block)	New building (Replacement)
34	(Residual land)		New building

35	(Residual land)		New building
36	(Residual land)		New building
37	(Residual land)		New building
38	(Residual land)		New building

39	(Residual land)		New building
40	(Residual land)		New building
41	(Residual land)		New building
42	(Residual land)		New building

43	(Residual land)		New building
44	(Residual land)		New building
45	(Residual land)		New building
46	(Residual land)		New building

APPENDIX C – RESPONDENTS’ SOCIOECONOMICAL PROFILE

Resident	Living in the community since	Gender	Age	Job occupation	Educational level	Household structure
1	1978	Woman	46	Small business owner	Secondary education	Married with kids
2	1984	Woman	64	Dressmaker	Incomplete primary education	Single with kids
3	2004	Woman	64	Retail worker	Secondary education	Single
4	1978	Woman	65	Homemaker	Incomplete primary education	Married
5	1988	Man	38	Security guard	Secondary education	Married with kids
6	1998	Woman	53	House cleaner	Incomplete primary education	Married
7	1989	Man	36	Print shop worker	Undergraduate degree	Married with kids
8	1963	Woman	66	House cleaner	Incomplete primary education	Single with kids
9	1987	Woman	39	Homemaker	Undergraduate degree	Married with kids
10	2000	Woman	46	Massage therapist	Incomplete secondary education	Married
11	1983	Man	43	Small business owner	Secondary education	Married with kids
12	1976	Woman	51	Administrative assistant	Undergraduate degree	Married
13	2009	Man	36	Cook	Secondary education	Married
14	1978	Woman	60	Homemaker	Incomplete secondary education	Single with kids

15	1984	Woman	52	Dressmaker	Secondary education	Single adult living with relatives
16	1975	Woman	51	Teacher	Graduate degree	Married with kids
17	1982	Woman	44	Homemaker	Incomplete primary education	Married
18	1986	Woman	58	House cleaner	Undergraduate degree	Single adult living with relatives
19	1984	Woman	42	Retail worker	Secondary education	Married with kids (double up)
20	1997	Woman	40	Beautician	Incomplete secondary education	Married with kids
21	1994	Woman	32	Small business owner	Secondary education	Married
22	1993	Man	36	Retail worker	Incomplete primary education	Single adult living with relatives
23	1992	Woman	56	Small business owner	Primary education	Married with kids
24	1992	Man	57	General services worker	Secondary education	Married with kids
25	1991	Man	35	Unemployed	Undergraduate degree	Single adult living with relatives
26	2005	Woman	42	Beautician	Secondary education	Single adult living with relatives
27	2002	Man	42	Driver	Incomplete primary education	Married with kids
28	1986	Woman	53	Unemployed	Secondary education	Married with kids

29	2009	Man	38	Construction foreman	Primary education	Married with kids
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Source: Author.

APPENDIX D – PIECES OF EVIDENCE FROM THE INTERVIEWS (HYPOTHESIS 1)

Resident	Piece of evidence	Process tracing test
1	So, honestly, I have never ridden the LRT. For other people, yes, right? (...) There where I work, there is a girl who comes from Parangaba. She comes to work here at Frangolândia [supermarket].	Straw-in-the-wind
2	[It made things] much easier. I think it became better for us to get around, right? Up to now you don't have to pay the fare. It is free, it is faster than the bus, and it's very good.	Hoop test
3	For me, yes. Why? Because, besides being free transportation, it is faster and gives access to several neighborhoods from here. And we only have to walk a little bit and pay nothing, right? It has that advantage.	Smoking-gun
	I have already gone to Mucuripe, I have gone to Parangaba, I have gone to Dionísio Torres. Several neighborhoods that it goes directly to. We get there quickly, it is very fast, and for now you do not pay anything.	Hoop test
4	It made things easier for some people. For those who use the LRT, it was good, very good. Because, well... it goes to Mucuripe, it goes to Parangaba, it goes to other neighborhoods too. So, for people who use the LRT, it made many things easier.	Smoking-gun
5	Yes, definitely, right? The neighborhoods it goes through, right? Which are, in this case, Papicu [neighborhood]... here, Mucuripe [neighborhood]... and all the way to Parangaba [neighborhood]. And this route... it facilitates access, you know? (...) The good thing is exactly the transportation. The LRT has this... this... this ease in relation to people being able to... to move around, right, to other communities, you know? And because it is now free, right? That is another advantage.	Smoking-gun

6	In my view, it helped a lot. Many people who work, you know, here in parts of Aldeota [neighborhood], Papicu [neighborhood]... so when they come, they use it a lot. People coming from Parangaba, from other distant neighborhoods. (...) I used to work near the intercity bus station and used the LRT a lot, every week	Straw-in-the-wind
7	In terms of logistics, right? You used to spend, I don't know, one hour from here to Parangaba [neighborhood]. [Today] you spend 10 minutes. Many people I know, people I worked with, worked, lived, I don't know, in Maracanaú [city], would come to the station there by Frangolândia and then get off at Antônio Sales and walk to Iguatemi. Do you understand?	Smoking-gun Straw-in-the-wind
8	It made things easier. Like, because we take it and then... to Parangaba [neighborhood], right... in no time we get there. Around 20 minutes. By bus, it takes more than one hour.	Smoking-gun
9	Yes [it made things easier]. Because of the speed it provides, right? And... that, mobility itself. It is much faster.	Hoop test
10	For example... going to Mucuripe Beach became much easier for me. I think it's great not having to go by car. I do not need to worry about parking. And... Parangaba Shopping Mall too... we go there for free.	Smoking-gun
11	Yes. I even have a coworker who comes every day... she comes to work by LRT.	Straw-in-the-wind
12	I think it is faster and there is also... I have never used it, but I hear people's accounts, right? There is the issue of speed and also the fact that you do not pay, right? Because it is free. So I think it is something that makes things easier.	Hoop test

13	It helped a lot. A lot... I do not use it. Actually, I have never ridden this LRT here. But I see it in the news. It made life easier for many people. Many people. The flow of people coming and going, of people who use the LRT, helped many people.	Smoking-gun
14	It helped a lot. I mean, people who go somewhere else, right, who are still able to get around, can go and do not pay anything, right? It is free.	Smoking-gun
	The LRT doesn't go downtown. Our destination is only downtown, right? The LRT only goes to the beach and over to Mucuripe [neighborhood]... and to Parangaba [neighborhood], around that area.	Opposite
15	It made it easier to get to Parangaba and to... To the Maracanaú area, right? I go there a lot. So the LRT takes me straight there, you know? Before, I had to go around a lot by bus just to get to the Parangaba terminal so I could take the metro to go there. Now I go straight there	Smoking-gun
16	It helps if you are going from one terminal to another. Then it helps, right? But... it is a direct route, a direct route. But if you want to get off at one of those places, in my opinion, it did not help. (...) Because it... like the wall, right? The wall is from neighborhood to neighborhood, except for the places where you get off. In my case, no [it did not help], I do not even use it. I work and live 15 minutes apart, 10 minutes if I were to take the LRT. But it is so complicated for me to use it that it becomes far away. (...) There is a station behind my workplace and I do not take it because of that.	Opposite
17	I cannot even tell you, because I... I do not even ride it.	-
18	For me, it [LRT] only made it easier to get to Mucuripe. Just there. It doesn't make it easier to go anywhere else. Why? Because what we needed was over there, near an old hospital... around the HEMOCE area [Ceará Blood Center]... It doesn't go there. We have to get around by Uber or bus	Opposite
19	Yeah... it improved, right? It is a straight route, right? It improved a lot.	Hoop test

20	Yes. Well... I have used it, and the girls I work with use it a lot. They come from their homes. One of them lives around Lagamar. She also takes it near Pontes Vieira. (...) And at work they talk a lot about how it helps, right, because they no longer spend money on fares.	Hoop test
21	Yes, although I have never used it. Not for any particular reason, right, but because I have my own transportation, so I have never used it. But nowadays people say access became good, even though we had many problems before it happened, right? But today everyone says it is very good, especially because it is free at the moment.	Hoop test
	So people who came to work on this side and lived in Parangaba and those other areas, what used to take two hours by bus... people spent more time commuting than anything else. Now they get here in about half an hour, right? So in that sense it really helped a lot.	Hoop test
22	It helped. I see... I have not used it much. But I see many workers, people who come from other places, and the turnover is large. Many people come to work... from Parangaba, from here, from there.	Straw-in-the-wind
23	If you take the LRT to go to Parangaba instead of taking a bus or something else to get there, it is faster.	Smoking-gun
24	It improved things, right? Because we go to Parangaba and only pay... actually, we only take it, right? For free, right? Going to Parangaba improved a lot.	Smoking-gun
25	It helped, and a lot. I mean... it solved the route issue. The neighborhoods... people who lived in one place now have access to come to Aldeota.	Smoking-gun
26	It is faster, right? Especially for people who work in another neighborhood, because they get there faster. There is no traffic, right? And it is still free too, right?	Smoking-gun

27	Everyone who lives here and needs to get around, whether to another neighborhood or somewhere else, always uses it, right? When they want to go to Parangaba, they go there and from there they can get somewhere else.	Straw-in-the-wind
28	It helped. Because, look... to get to the Women's Hospital, for example, I used to have to take two buses, right? Two, three buses. I took the LRT, got off in Parangaba, took a bus there, and then went to the Women's Hospital.	Smoking-gun
29	Yeah... getting around is faster, right? When it was by bus, we spent more time waiting at the bus stop until a bus came, right? And now we don't... we already know the schedule when the LRT is going to pass, right?	Hoop test

Source: Author.

APPENDIX E – PIECES OF EVIDENCE FROM THE INTERVIEWS (HYPOTHESIS 2)

Resident	Piece of evidence	Process tracing test
1	Yes, the supermarket [the community uses], right? But the gym is more for people who exercise, right? It is more for people who are better off financially. (...) Since the population is poorer, which is our case here, very few people go there. I myself do not.	Straw-in-the-wind
	After that damned [World Cup] came, with the LRT, that World Cup that brought the LRT, it destroyed many structured families, it destroyed local businesses, right? (...) Girl... when the whole community was here, and there were more local shopkeepers, there were more groups of people (...), we lived better. Because, well... when those little grocery stores were there, I used to go to Louro, right? I used to go to Rodão, which was on the corner. I used to go to Mãe do Mato to buy cookies. Mr. Geraldo's place, there on the corner. (...) And now? We have to go to other places, but it is a bit more costly.	Hoop test
2	No store opened around here [in the community]. On Santos Dumont [Avenue]... it did, you know? There's [the Hospital] Unimed, there's also a store that opened right there... what's the name? Apiguana, that wasn't here in Aldeota [neighborhood] either. It opened too. There's also that new open-air mall that opened (...) with a new supermarket, a gym	Hoop test
3	The neighborhood became more well-known, you know? Looking less like a favela. (...) There's a pet shop, a florist. Everyone came here with this change. Why? Because the neighborhood had his face changed.	Hoop test

	There is the lottery agency, gyms. Several good things appeared. I think it has improved, right? It improved a lot. There is Unimed, there is... There were many good things, many changes. It improved a lot. For those who stayed, right? Because many people left.	Straw-in-the-wind
4	Look, it changed a lot. We have more access, more stores, more supermarkets, more services, right? People looking for work, things like that. A lot of things improved. I think it became much more central. Because we already lived in Aldeota, right? And I think that with the arrival of the LRT, many things improved even more. They did improve. (...) No, those stores are not really cheap. In fact, I really want to work at a gym around here and... the price is very expensive. There are several gyms, right? I need to do weight training, but I still have not started because I am waiting to retire so I can have some money to pay for it. I do not think the prices are very affordable, no. Look, we used to have a few local businesses. Some are still here, but others closed down. And some others, I'm not really sure why... Maybe because the number of people living in the community also decreased, as many moved farther away. And I believe that was the reason — some businesses closed, while others now have very little to offer	Smoking-gun Hoop test
5	Because of this change in, in... residences, because of these removals (...), many shopkeepers left, right? There used to be a lot of people, you know? And also... around here, bigger grocery stores opened. (...) Those small grocery stores ended up closing after those big ones arrived, you know? On the main avenues there was an improvement, right? Because I think this area is very central, right? Since the community is located in a very central neighborhood, Aldeota, right? There, where they built the tunnel, they removed many stores and many houses, but it improved the main avenues. (...) For example, Parkside Shopping Center was on Padre Antônio Tomás Avenue,	Hoop test Straw-in-the-wind Hoop test

	right?... Padre Antônio Tomás. As I told you, some businesses left because of the tunnel, right? And that shopping center, in fact, was very popular among community residents, right? The prices were very affordable, right? Parkside. And it closed, right? Because of that, the community had to use other shopping centers, which are more expensive, newer, and farther away.	
	I noticed that it added something positive, right? More... There is more along this part [the avenues]. More stores, more... there are these condominiums, gyms, offices, right? Many furniture stores too.	Hoop test
6	Inside the community, no. On Marechal Rondon Street, João do Frango closed. Mr. José's grocery store closed. The restaurants that were there, right? The ones that sold meals and lunch boxes. Today there are only, what? Two people selling lunch boxes.	Hoop test
7	Around the community, many things improved. Supermarkets, shopping centers, avenues were opened. But inside the community itself, I did not see new businesses opening or anything like that. The businesses that existed... the ones that are there are the same ones that were already there. (...) Now we have supermarkets practically next door to our house, Lagoa and Center Box, which are two blocks away. Center Box is just across the LRT footbridge, right? Lagoa is right beside it. (...) There are gyms, hospitals... there is also Normatel on Santos Dumont Avenue, which is close to the community. So those are the businesses that opened after the LRT arrived, right? (...)	Smoking-gun
	But our community itself does not have that characteristic of neighborhood businesses, do you understand? Like other peripheral neighborhoods and communities that have a strong local commercial sector. Unfortunately, our community does not have that. It does not provide that opportunity for residents, right?	Straw-in-the-wind

8	It changed a lot, right? Many supermarkets. (...) There is Lagoa, there is Assaí, right? There is Normatel. Up there [in the complex] there is a gym, a beauty salon, a laundry service, there is everything there. There is also a Cobasi store.	Hoop test
9	In the surroundings, right? It increased. Inside the community, I think some businesses disappeared and others appeared, right? But in terms of quantity, of increasing... no. Only in the surroundings, right? Large stores. Most of them are supermarkets, pharmacies, and gyms, right? Those are what have been growing the most lately around here, right?	Hoop test
	What we had the most were small grocery stores, right? So, since the number of supermarkets increased, people go there more. And the number of people who left the community also increased, so demand decreased. And I think purchases gradually declined because of that.	Hoop test
10	Inside the community? The small grocery stores decreased. There are almost no grocery stores left... they closed. (...) It decreased because there are many supermarkets nearby now.	Hoop test
11	It increased. Let's put it this way... it increased a little bit, you know? Bars, snack bars, grocery stores, supply stores.	Hoop test
12	The local commerce definitely improved a lot. Supermarkets, for example. Nearby, we didn't have this one, we didn't have Normatel, we didn't have Lagoa [supermarket]. There was Center Box, but that one wasn't there, right? I think it improved a lot, a lot. It really did improve. (...) [Inside the community] it decreased, because we used to have a huge community. And since many people left, consequently the people who owned businesses left too.	Hoop test
13	In the community, it is practically the same thing. But around it, there is more. There is more. A lot more things appeared. Pharmacies, lots of delivery services, lots of delivery businesses, gyms,	Hoop test

	restaurants. There are many restaurants where we live. So I think it increased, it increased a lot. It increased a great deal.	
	Prices here are very high. Very high. I even think it's unfair, you know? Things should be charged at a fair price, based on what they are, not based on the purchasing power of the area.	Straw-in-the-wind
14	It improved a lot, right? Not in the community, but very close by, right? Right nearby... (...) Around here there's everything... Gyms, supermarkets, everything is very close. For those who have money, those who can afford it, they go, right? As for us, we stay right here, at our own little gym.	Straw-in-the-wind
15	The change is that the stores closed, right? The little grocery stores that used to be here, because stores opened around here, right? Larger stores, larger supermarkets.	Hoop test
16	What I remember most is what left, but new things that arrived... Well, the Lagoa supermarket arrived here, which today occupies the place where the Detran used to be.	Hoop test
	I have seen a decline in stores, you know? Especially along the route where it passed, on the sides, because they wanted to close stores. I've seen that. Both in the community and along the avenues. These are stores that were shut down. (...) For example, Maia, Lojas Maia, right? How many years wasn't Lojas Maia operating here? Romana itself, the lumber store, and today everything is closed.	Hoop test
17	There is a supermarket that was built there, right? Lagoa. But around here itself... there isn't, right? (...) Because what used to be here... closed. Ah, the prices of things are sky-high. Everything is expensive, right? Meat, fish, everything, everything, everything is expensive.	Hoop test
18	A decline in many things. Many things. Building-material suppliers, grocery stores, neighbors' businesses that made things easier for us, hairdressers, manicurists, all of that... Seamstresses, bakeries—we don't have those anymore either. Miami Utilidade isn't there anymore either. That little	Hoop test

	shopping center over there isn't there anymore either. (...) Super Lagoa and Center Box arrived. And for us to shop, we have to compare prices (...) we have to look around to find where it's cheaper, where we can afford to buy things.	
19	It decreased here on Marechal Rondon [Street]. (...) Ah... [but] that little shopping center arrived too, didn't it? Then Lagoa opened here as well.	Hoop test
20	Not that much, right? It decreased, actually. Both in terms of people and also because, in the past, it was much more diverse, but nowadays... (...) Oh, my dear, the avenues are the only places where things change.	Straw-in-the-wind
21	Here it has always been harder to have a store or something like that. You can see that the development of businesses here has always been more difficult. It always has been. Look... I think the only store that increased here was practically mine. And the little grocery store that used to belong to Ivan, which isn't a grocery store anymore, right? About a month ago it became an açaí shop (...). But apart from that, the development of businesses here on Marechal Rondon Street has been very limited. (...) Yes, [in the surroundings] there was. Things like Center Box, right? It was built and there are actually several stores there.	Hoop test
22	There are fewer stores [in the community]. There are fewer services too... (...) [Along the avenues] I think there are more.	Straw-in-the-wind
23	Well... some closed and others opened, right? Because Ivan's store left this street. Then farther ahead Mercantil 15 opened. It wasn't there before, right? There was already Glauco's grocery store. And the other business here is us, selling water, right? (...) [In the surroundings] things opened up, right?	Hoop test

	Because there wasn't that Guará supermarket before, right? Guará opened, Lagoa opened, and farther ahead that other Frangolândia wasn't there either. A lot of things have changed..	
24	Teve agora o [supermercado] Lagoa que abriu agora, né? O [supermercado] CenterBox fechou, né? Fechou sim, né... Porque ninguém vai mais pra lá, né? [Na comunidade] fechou um e abriu o [mercantil] Número 15, né, ali, né? Um mercantilzinho que está servindo a gente, né, a comunidade, tá servindo. Devagarzinho tá servindo. Um pouquinho, mas tá servindo.	Hoop test
25	<i>Look, I'll be honest. A lot of shops closed, a lot of jobs were lost. Many people ended up unemployed. You remember there used to be a gas station here, right? There was [an old open-air called] Parkside, there were hair salons, there was everything here. Back then there were plenty of jobs, but now, after they built this LRT, after they put up this wall, it's all gone</i>	Hoop test
26	I think it increased, right? I think it did increase. Some closed, others opened, right? So one created opportunities for the others. I think it's good. (...) That little shopping center over there has lots of things. There's a beauty salon, they also opened Cobasi there, right? The gym. And there are several other little stores that we don't even know because we don't go there. But there are a lot of little stores there, yes.	Hoop test
27	On Santos Dumont [Avenue], right, there's a new Lagoa [supermarket], right? There's Cobasi too. There are several stores that opened as well, right?	Hoop test
28	A lot of things changed, because here there used to be only Pão de Açúcar [supermarket]. Then Center Box came, then Lagoa came, right? (...) [In the community] it decreased because Marechal Rondon used to have three restaurants. There was Juvenal's, there was Seu Paulo's, which was Docentes e Decentes, and there was O Gordo's as well... there were three restaurants. I mean... and there was a	Hoop test

	gas station on the other side, and none of that exists anymore. Now what do we have? The Açaí shop, Ivan's Açaí shop, which used to be Monólito. Now it's an açaí shop. And there's Glauco's farther ahead. Very little, there's almost nothing. You know? (...) It may have increased over there, right? On Eduardo Garcia [Street], where there are those little shopping centers, right? Things like that. But here it didn't increase, no, because the shopping center... there wasn't a shopping center here, there weren't little stores here. You look for something here and you can't find it.	
29	There were many changes, right? Even because of the LRT project, right? Because it used to be more populated, right? And now the population has decreased somewhat because of that... But in terms of businesses, many appeared, right? Supermarkets, right? And today we have several chains, even wholesale supermarkets. So, regarding supermarkets and those kinds of businesses, things actually improved.	Hoop test

Source: Author.

APPENDIX F – PIECES OF EVIDENCE FROM THE INTERVIEWS (HYPOTHESIS 3)

Resident	Piece of evidence	Process tracing test
1	Because the population is vulnerable, like in our case here, only a few people frequent [the open-air mall]	Smoking-gun
	The supermarket [the community uses], yes, right? But the gym is more for people who exercise, right? It is more for people who are better off financially.	Smoking-gun
	Near our house, when the houses on the other side were still there, we had everything. Whatever we needed... we had it. Now we have to travel to a neighboring area, Verdes Mares, to shop. Because prices are better there.	Smoking-gun
	There are no jobs here for us, except at the supermarket.	Smoking-gun
2	Here I go to Center Box, Lagoa, Frangolândia, and Cometa supermarkets. I stay around here, you know? (...) In the past it was São Luís, where we used to go, beyond Santos Dumont Avenue.	Opposite
3	<i>The neighborhood became more well-known, you know? Looking less like a favela. (...) There's a pet shop, a florist. Everyone came here with this change. Why? Because the neighborhood had his face changed</i>	Straw-in-the-wind
	Before, we only had one option for shopping, for going to a mall, for going, I don't know, to a store. So I used to go downtown a lot. I don't go downtown as much anymore. Sometimes you find the same prices in stores nearby as you do downtown. There are more options for us now.(...) Since more supermarket competitors arrived, we can choose. Where it is cheaper, where it is more expensive, and in the end they play that promotion game. One has promotions on Sunday, another on Monday and	Opposite

	Tuesday, another on Wednesday and Thursday. And we have to adapt and chase the cheapest one on promotion day. There is competition now that didn't exist before.	
4	No, [those stores] are not really cheap. In fact, I really want to get a job at a gym around here and... the prices are very expensive. There are several gyms, right? I need to do strength training, but I still haven't started because I'm waiting to retire so I can have some money to pay for it. But I don't think the prices are very affordable, no.	Smoking-gun
5	Some people tend to shop at the large supermarkets for their monthly grocery purchases, right? And for everyday purchases—small things that people sometimes need when supplies are running low—they buy them here in the community itself, you know? (...) I don't think people visit [the commercial complex] very much, you know?	Hoop test
6	[When asked about price compatibility] It depends on the audience. Who are you talking about? Like... the person? The people in the community? Ah... it's not possible, girl. (...) Around here... it's just passing by, looking at, and bye. It doesn't fit the reality of the people who live in the community.	Smoking-gun
	Since there is competition too, right? There are several supermarkets nearby. That also makes life easier for the people in the community, in that sense, you know? But apart from those little promotions and things like that, it's mostly fruits and vegetables.	Opposite
	Here it is very different from the reality of the periphery, right? If you look at it, it is another level. (...) Apart from those promotions, it is another reality.	Straw-in-the-wind
7	Because of the location, which is considered a Class A area of Fortaleza, right? Of the city. Prices are high, right? Because if you go to a peripheral area, like Messejana or Siqueira, I believe prices are lower.	Straw-in-the-wind

	Of course we do our research, right? We look online, check prices, compare prices, and sometimes it isn't even worth traveling from here to another neighborhood to buy something. So it ends up being more worthwhile to buy around the community, near the community.	Opposite
8	Well... I don't go to the beauty salon nearby, right? I go to one over there... not very far away, across from Integral [school], on Santos Dumont Avenue. The price there is good.	Smoking-gun
	Accessible... For us who live in the community, not really, you know? Because there are neighborhoods where things are more affordable than here. It's different for people who live in a neighborhood like this. Our income, for those of us in the community... we don't earn as much as they do... so we need to stretch a bit to make it work, right?	Smoking-gun
9	I don't even go to the gym, you know? Because it still doesn't fit in my budget. In a more distant neighborhood, it would actually be better to look for one. But because of time and accessibility, you end up paying a little more because it's more convenient. In another neighborhood, though, gym memberships are more affordable than they are here.	Smoking-gun
	[To buy clothes] I go to another neighborhood. Not here... before New Year's Eve I walked all around here and couldn't find anything.	Hoop test
	Restaurants around here are not very affordable for us.	Straw-in-the-wind
10	We go, right? To Frangolândia, Pinheiro, Guará. We go to all of them, depending on which one has promotions that day.	Opposite
11	I think things are more expensive around here. Personally, if I only need a few things, I walk a little farther to buy them. If it's a larger purchase, I prefer going farther away because it isn't worth buying around here.	Smoking-gun

12	Here you can find anything you're looking for. On the other hand, you need at least a medium-to-high income. The prices are outrageous. Very expensive. The price difference [compared to other areas], I would dare say, is striking.	Hoop test
13	Because this is the heart of Aldeota, an area considered upscale, prices here are very high. That's natural because of the purchasing power. It seems they think there are no communities in Aldeota, right? But purchasing power here is very high, you know? So supermarkets, clothing stores, restaurants, self-service restaurants, pharmacies—they all charge much higher prices. We do use them, yes. My wife goes to the gym every day. I'm the one who keeps putting it off, right? I get lazy, but she goes every day. And we go... we usually go to nearby restaurants. There's a pastry shop there that we sometimes visit, a delivery pizza place called To Go, which is really nice. We buy from there often, you know? So we do engage with these services. Pharmacies too, right? We use them.	Straw-in-the-wind
	A gente frequenta sim. A minha esposa vai na academia diariamente. Eu estou devendo, né? Dá uma preguiça, mas ela vai diariamente. E a gente vai... a gente costuma ir para restaurantes aqui perto, tem uma pastelaria ali que às vezes a gente vai, uma pizzeria delivery aqui, a To GO, que é bastante bacana. A gente sempre compra lá, entendeu? Mas a gente tem um envolvimento sim, farmácia, certo? A gente frequenta sim.	Opposite
14	<i>Around here, there is everything... There's a gym, there are grocery stores, everything is close by. For those who have money, who can afford it, they go, right? So, we just stay here, at our public gym.</i>	Smoking-gun
	[Nowadays] I shop at that market over there, Frangolândia. Because around here it just doesn't work, no.	Smoking-gun

	The restaurants? Oh, I've been there. I've gone with some neighbors, right? Because my own pocket paid for it. I live according to my means. It worked out fine for me.	Smoking-gun
15	Here, if it's not to buy food in the supermarkets when there are promotions... The other things, we just can't afford. At least, I can't afford the other things. I always go downtown, and the price is ridiculously different. It's like... My mom's medicine costs R\$ 28 here, and in downtown it costs R\$4.50	Smoking-gun
	We used to depend on the little grocery stores, right? Because supermarkets were very far away for us. Now they're more accessible. We buy things at better prices because we have access to these supermarkets.	Opposite
16	Man, it's very expensive, right? So, when do we buy? When there are sales, when there are promotions. We practically only go to supermarkets when there are promotions, especially for meat. (...) And what else is there? Beauty salons, right? Also only when there are promotions. But overall, everything here is very expensive, very expensive, very expensive	Smoking-gun
	Everything is close by. Restaurants nearby, the mall, because I have a teenage daughter, right? And she likes eating at the mall. So we mostly go to the mall or to these cheaper restaurants nearby. Well... I don't go all the time, but we try to manage to go once a month, you know? After the new degree, that improved a bit	Opposite
17	Oh, the prices of things are sky-high. Everything is expensive, right? Meat, fish, everything, everything, everything is expensive.	Hoop test
	We go in... sure, we go in. Nobody knows whether we're actually going to buy anything.	Straw-in-the-wind

18	For us to buy things... we have to compare prices. (...) The prices are not very affordable. We have to look around to find where things are cheaper, where we can afford to buy them. We buy one thing in one place, another thing at the supermarket. That's how we manage, right? Sometimes we go to the street market. But then we have to get there by Uber or bus. We have to travel.	Hoop test
19	Things... things are more expensive. The actual prices, though, I couldn't tell you. (...) I think supermarket prices have gone up a lot. Gym memberships too. What else? That's mostly what I remember... Clothing stores as well. Nowadays I save up money and go downtown, right? It's better, cheaper, right?	Smoking-gun
20	Well... regarding prices... I'm used to shopping at Frangolândia. We just wait for the big sales at home. We do the main grocery shopping during the big sales, and during the week, for fruits and vegetables, I shop at Frangolândia because I think the prices are more affordable. On those sale days, I think it's really good.	Opposite
	It's because, whether we like it or not, this neighborhood doesn't have those stores that other neighborhoods have—those ten-real stores, twenty-real stores. So we travel somewhere else where the prices are better.	Smoking-gun
21	To be honest, I'm not really the type to shop around here. My thing is going downtown, right? (...) So we... we do most things downtown, right? We look for prices that are affordable for us.	Smoking-gun
	As someone who lives here and, whether I like it or not, is also a resident of Quadra—because my mother-in-law lives there—the prices here, compared to the prices in Quadra... in Quadra, local businesses are essential. So, like... every corner, every street inside the community has businesses. Here, not so much. Here things are very expensive.	Straw-in-the-wind

22		
23	Around here things are more expensive. Like... clothing, I buy it at Marisa, right? It's expensive there. But it's the only place where we can actually find clothes. Another place where I buy cheaper clothes is those twenty-real stores around Messejana. There are also twenty-real stores downtown. That's what I do. Sometimes... I go to Beira-Mar to buy a blouse. Oh, I always look for the cheapest option, right? My thing is finding the cheapest option.	Straw-in-the-wind
24		
25	The prices? Very expensive. Look... downtown, the difference is huge. Here in Aldeota, you even pay a toll, so to speak. For example, cleaning supplies are much more expensive here, at places like Normatel. Everything is expensive, construction materials too. Then you go downtown and the difference becomes much smaller.	Hoop test
26	That little shopping center over there has lots of things... There's a beauty salon, they also opened a Cobasi store there, right? A gym. And there are several other little stores there that we don't even know because we don't go there. (...) Around here, because it's Aldeota, because it's Aldeota, everything is more expensive. But they forget that people like us live here too, right? Poor people.	Smoking-gun
27	We who live here in Aldeota... everything is expensive, right? Anyone who lives here, anyway... but things are always cheaper in other neighborhoods, right? (...) I don't really have the habit of shopping outside this area, you know? In other neighborhoods, I mean. Because since I live here, I try to buy things closer to home, right? (...) I buy things within the community, right? But when I need to do a larger grocery shop, then I go to the supermarket, right?	Opposite

	Now... clothes? Clothes are bought at Beco da Poeira [low-standard area], right?	Straw-in-the-wind
28	Let me tell you something... I go where things are cheaper. Because, look, if you go grocery shopping at Lagoa, you take R\$100 and come back with four or five little things. When you shop elsewhere... Maracanaú, for example, or other more distant peripheral areas, you can buy things much more cheaply.	Smoking-gun
29	For me personally, considering the neighborhood, the prices are fair enough for the people who live here, since they are upper class, right? (...) We who are lower-income always try to shop on promotion days, right? (...) I've even gone shopping downtown in Fortaleza, right? That's where commerce is more geared toward ordinary people, right?	Smoking-gun

Source: Author.

APPENDIX G – PIECES OF EVIDENCE FROM THE INTERVIEWS (HYPOTHESIS 4)

Resident	Piece of evidence	Process tracing test
1	<i>Near our home, when the houses on the other side were still there, we had everything. Whatever we needed... it was all there. Now we need to go to another neighborhood, Verdes Mares [neighborhood], right? To buy things. Because the prices are better there.</i>	Smoking-gun
	I travel to Atacadão or Frangolândia because they are cheaper for us financially. Our money goes further there.	Smoking-gun
	I used to work at Padaria Romana. [Now] I work in Cambeba. (...) I had to leave... the bakery closed.	Smoking-gun
2	Here I shop at Center Box, Lagoa, Frangolândia, and Cometa supermarkets. I stay around here, you know? (...) In the past, we used to go to São Luís [supermarket], beyond Santos Dumont Avenue.	Opposite
3	I changed too, because... before, we only had one option for shopping, for going to the mall, for going, I don't know, to a store. So I used to go downtown a lot. I don't go downtown as much anymore. Sometimes you find the same prices in stores nearby as you do downtown. We have more options now. (...) Since more supermarket competitors arrived, we can choose. What's cheaper, what's more expensive, and they end up playing that promotion game. One has promotions on Sunday, another on Monday and Tuesday, another on Wednesday and Thursday. And we have to adapt and go after the cheapest one on the promotion day. There's competition now that didn't exist before.	Opposite
4	Well, look... when we go out, we go to Cidade 2000 because prices are good there. We go for açaí, for a barbecue skewer. There are restaurants and pizzerias there too, in Cidade 2000. (...) We've been going there for about five years now.	Smoking-gun

	People tend to shop more at supermarkets such as Center Box and Lagoa. These supermarkets are more accessible, and sometimes the prices are too, right? Because there are promotions, there is Fruit Day, Vegetable Day. So when there are promotions, people go. There is Frangolândia too. So people end up going more to the larger supermarkets.	Opposite
	I consume very little within the community itself, you know? Sometimes I buy an açaí, right? I eat a lot of açaí. Sometimes I come to Renato here. Sometimes my car has a problem, and I come to Renato, the mechanic, you know? (...) But my actual shopping is done at the large supermarkets, at Frangolândia, which is in Varjota.	Smoking-gun
5	As I told you, some businesses left because of the tunnel, right? And that shopping center was actually heavily used by the community, right? The prices were very affordable, right? Parkside. And it closed, right? Because of that, the community had to start using other shopping centers, which are more expensive, newer, and farther away.	Hoop test
	Nowadays... there isn't much food culture within the community anymore. Only when people organize some event promoted by the community itself. (...) People often buy things elsewhere, right?	Smoking-gun
6	<i>It's not [affordable]. I can even give you an example. On weekends, we really like to go out to have barbecue, to relax a bit with my partner, you know? But do you know where we go? To the outskirts: Luciano Cavalcante [neighborhood], Lago Jacarey [area], and other more distant neighborhoods</i> (Resident 6; Example of a positive smoking-gun test).	Smoking-gun
	Since there is competition too, right? There are several supermarkets nearby. And that makes life easier for people in the community as well, you know? In that sense. But apart from those little promotions and things like that, it is mostly fruits and vegetables.	Opposite

	I'm not working farther away anymore, right?	Opposite
	[For some products] I go farther away to buy them. I can give you an example (...). I renovated a house that I bought with a lot of effort in Cidade 2000. We checked prices at Normatel around here and at nearby building-supply stores... very expensive. So we ended up buying in more distant neighborhoods as well.	Smoking-gun
7	[Today] <i>the places where we shop are right next to our home, you know? Before, we had the logistics and the cost of... going all the way to Bom Preço</i> [supermarket] Right, I was working downtown during that period, around 2010. I think the place farthest away where I worked was downtown. After that, I always worked nearby. RioMar, Iguatemi. It has always been close to home, thank God.	Opposite
8	Well, beauty salons... I don't go to the nearby one, right? I go to one over there... not very far away, across from Integral [school], on Santos Dumont Avenue. The price there is good. [The cost] Well, it depends, right? Sometimes promotions increase, right? Since Center Box is on the other side, we keep comparing prices. Because there's Center Box over there, Lagoa here, and Guará as well. So we keep comparing.	Smoking-gun Opposite
9	We used to go down to Frangolândia. (...) But now we have Lagoa [supermarket], which is very close. It's a new option, right? [To buy clothes] I go to another neighborhood. Not here... I walked all around here the night before New Year's Eve... it doesn't work here. Restaurants around here are not very affordable for us.	Opposite Smoking-gun
10	[Nowadays], I go to other places, like Mercado São Sebastião or the market near Praça das Flores, to spend some leisure time.	Straw-in-the-wind

11	I think things are more expensive around here. Personally, if I'm only buying a few things, I'll walk a little farther to buy them. If I'm buying a lot of things, I'd rather go farther away because it's not worth it.	Smoking-gun
12	Since I don't have my own means of transportation, there's no point in traveling to somewhere farther away. For example, take supermarkets. It isn't always worth going somewhere farther away to shop because it doesn't pay off. Since it's just me and my husband, only two people in the household, sometimes it doesn't make sense for me to go all the way to a more distant place, pay for transportation, and end up spending about the same amount.	Straw-in-the-wind
13	[Today] I always work close to home. Always close. Always around here. Since I'm a cook and there are many restaurants here, I always work nearby as a freelancer, either on daily shifts or short-term contracts.	Opposite
14	[Nowadays, I shop] at that market over there, Frangolândia. Because around here it just doesn't work. (...) We go to places farther away because they're cheaper. Around here everything is expensive.	Smoking-gun
	We usually go around Cidade 2000, beyond Verdes Mares. Places like that. Around here everything is expensive.	Smoking-gun
	The LRT doesn't go downtown. That's where we need to go, downtown, right? The LRT only goes to the beach and to Mucuripe. Or to Parangaba, over that way.	Straw-in-the-wind
15	Around here, if it's not food, or things from the small grocery stores when they're on sale, the other things are out of reach for us. At least I can't afford to buy those other things. I always go downtown, and the price difference is enormous. My mother's medication costs 28 reais here and 4.50 downtown.	Smoking-gun

	(...) [When asked about leisure options] I don't go anywhere outside the community. Not at all, nowhere. The only place I go is Maracanaú, to visit my cousin.	
16	We used to have options within the community itself, right? Hairdressers, people who made cakes, snacks. When times were tough, we bought from them. There were more small grocery stores. There were always people doing nails, waxing, there was always some kind of service available. Then, after the LRT, many people left and nowadays there is practically none of that.	Hoop test
	There used to be a little shopping center here called Parkside, right? (...) I used to do a lot of my shopping there too. Only when there were sales, of course, but there were always sales. It was a place where we could shop, at least in my case.	Hoop test
17	We shop by going downtown, going to those cheaper street markets and comparing prices and everything. That's how we shop.	Smoking-gun
18	We have to look around to find where things are cheaper, where we can afford to buy them. We buy one thing in one place, another thing at the supermarket. That's how we manage, right? Sometimes we go to the street market. But even then, we have to get there by Uber or bus. We have to travel.	Smoking-gun
	I used to work on Abolição Avenue, but I left there and stayed closer to home.	Opposite
	For clothes, we go downtown. Sometimes to Messejana. Or to Itaitinga, which also has a downtown area with nice clothes, and that's where my daughter lives. We have to travel, right? Because Iguatemi... we can't afford it. And that's how we get by.	Smoking-gun
19	Nowadays I save up money and go downtown. It's better, cheaper, right?	Smoking-gun

	[Regarding work] Now I'm working at a school. It's here on Santos Dumont Avenue. It's new. It just opened. I changed jobs. I did. Now I'm working at the school. It's here on Santos Dumont Avenue. It's new. It just opened.	Opposite
20	<i>Because, whether you like it or not, there aren't these kinds of stores in our neighborhood, you know? Stores that sell things for R\$ 10 or R\$ 20, like in other neighborhoods. So we go to another place where the prices are better</i>	Smoking-gun
21	<i>To be honest, I don't really go around the stores here. My thing is going downtown, you know? (...) So we... We go downtown for pretty much everything, right? We look for prices that are affordable for us, you know?</i>	Smoking-gun
22	I changed jobs. Today I work here with my mother.	Opposite
23	At first, for shopping, I used to go mostly to Center Box, right? But once I started shopping at Frangolândia and saw the difference in prices, now I only shop there. [Other stores] Another place where I buy cheaper things is those twenty-real stores around Messejana. There are twenty-real stores downtown too. That's what I do. Every now and then I go to Beira-Mar to buy a blouse. Oh, I always look for the cheapest option, right? That's my thing: the cheapest option.	Smoking-gun
24	[When I buy things for myself] No... I mostly go downtown. I used to work in a concrete testing laboratory, carrying out analyses. It was farther away. In Cidade 2000.	Smoking-gun Opposite
25	As for leisure, it's become difficult for me now. For us, really, for those of us who live here. We have to go far away to...	Smoking-gun
	[As for clothes] I usually buy them downtown.	Smoking-gun
	I was transferred to Parangaba Shopping Mall, but I never really used the LRT much.	Opposite

26	[Now] we're split between Lagoa and Center Box because they're closer.(...)	Opposite
26	[Regarding work] I used to work only from home. Then I started working at other beauty salons. And now I've opened a salon together with two friends. It's a little farther from home, in Varjota.	Smoking-gun
27	Actually, I don't really have the habit of shopping outside this area, you know? In other neighborhoods, I mean. Since I live here, I try to buy things closer to home. (...) I buy most things... well, I buy them within the community. But when I need to go to a larger grocery shop, then I go to the supermarket.	Opposite
28	I don't have a car. I have a motorcycle. Sometimes it's not practical for us to go farther away, but if I could, I would shop at Atacadão. Since I live nearby, though, I shop at Lagoa or Center Box because they're more affordable. Sometimes Center Box is cheaper than Lagoa. But sometimes I'm too lazy to cross the pedestrian bridge, so I end up shopping at Lagoa, even though it's more expensive.	Straw-in-the-wind
29	<i>I even ended up buying things downtown Fortaleza, you know? That's where the market is more popular. I go... I usually go from here to downtown Fortaleza. (...) Before I started going downtown, I always bought things here, in the local shops</i>	Smoking-gun

Source: Author

APPENDIX H – PIECES OF EVIDENCE FROM THE INTERVIEWS (HYPOTHESIS 5)

Resident	Piece of evidence	Process tracing test
1	I hardly ever take the bus anymore <i>you know? Thanks to God, I bought a car. But I used to think it was better for us to get around, you know... by bus. That changed because of that.</i>	Hoop test
	I used to take the bus a lot to go to school and courses. [Today] I drive to work and take an Uber back home. If there were an LRT route, I would take it, but there isn't. There isn't, and there never will be... not to that neighborhood.	Straw-in-the-wind
2	But when I go downtown, to my mother's house, to my brother's house, I always go by bus. I take the LRT when I go to the CRAS or when I go to Parangaba. Then I take the LRT because it works for those trips.	Smoking-gun
3	I hardly take the bus anymore because either I use MotoUber... or, if the LRT works for the trip, I take the LRT.	Straw-in-the-wind
4	To get around, I sometimes call my daughter to take me places, right? Or I take an Uber too, sometimes. But most of the time my children accompany me wherever I go.	Straw-in-the-wind
	I don't leave home very often, and when I do, I usually go out with my family. I tag along with them. Either in the car with them, right? Unless I'm going downtown to do some shopping. Then I go by Uber. If my grandson can't take me, then I go by bus. Or I just take the bus, right? Sometimes, when it's somewhere closer, I take the bus.	Smoking-gun

5	Nowadays I mostly get around by motorcycle. Everything I need to do, I do on the motorcycle. I think it's been more than... ten years? Actually, I've had a motorcycle for about fifteen years now. So I do everything on the motorcycle... wherever I go, I go by motorcycle.	Straw-in-the-wind
6	Ten years ago I always got around by bus or bicycle because we didn't have any means of transportation. Our transportation was a little bicycle. My partner would pick me up and drop me off. Anyway, since I work as a domestic worker, doing cleaning jobs in people's homes, my jobs are all nearby, right? Because this is the heart of the... right? The elite area. (...) On foot and by bus... by bus, right? I don't take the LRT anymore. I'm not working farther away anymore, right?	Opposite
	[Talking about other trips] I used to get around on foot or by bicycle. And now... now it's by bus, right? Or by car.	Hoop test
7	[I used to get around] by bus, before 2010. By bus, right? (...) Then I managed to get a motorcycle and started riding it. I began getting around by motorcycle, with my own vehicle, right? So... that's what changed. Just that.	Straw-in-the-wind
8	[Before] by bus. It was awful, you know? By bus. Thank God they invented Uber. (...) None of my jobs are convenient by LRT. Well, one of them is... but I'd rather take Uber.	Straw-in-the-wind
9	I switched from the bus to Uber, right? Uber and UberPOP.	Straw-in-the-wind
10	It changed because I started using Uber, right? But I still mostly walk. I like walking.	Hoop test
11	I rarely use public transportation because I prefer riding a bicycle. If I don't take my car, I go by bicycle.	Straw-in-the-wind
12	[I get around] by public transportation, by bus. Back in 2010 and now as well. It's actually the same route, exactly the same.	Straw-in-the-wind

13	My daily travel has always been by bus whenever it's a regular trip, right? Or, since I work nearby, most of my jobs are so close that I can walk there, you know?	Opposite
	(...) And on weekends, to go out or do something for leisure, it's Uber.	Straw-in-the-wind
14	When we used to travel from here, we went by bus, right? And now it's Uber or motorcycle.	Straw-in-the-wind
	I also walk to Frangolândia. It's a little far, but it's still possible to walk there.	Straw-in-the-wind
15	We always used to get around by bus, exposed to robberies and things like that. Nowadays, when we have some money, it's better to go out by car.	Straw-in-the-wind
16	I used to get around a lot by bus and on foot. So, I walked a lot around here... I took care of everything here. For example, I used to shop a lot at Maia, so I often walked there, right? There was a little shopping center here called Parkside, right? (...) And I used to do a lot of shopping there too. Only when there were sales, of course, but there were always sales. It was a place where we could shop, at least in my case. And I used to walk there a lot.	Hoop test
	After that [the LRT works], unfortunately, I had to start taking a lot of Ubers. (...) And also by car, right? My own car. Taking the kids to school, right? Then I come back and catch a ride.	Hoop test
	I used to take the bus a lot to get to work in Luciano Cavalcante, as I told you. Because the trip was easy: I just had to cross the street, walk a little, catch the bus, and go to work.	Straw-in-the-wind
17	By bus. We used to go downtown, right? [Today] By bus, right?	Straw-in-the-wind
18	We used to walk a bit. By bus too. (...) [Today] I take public transport. Uber as well.	Hoop test
19	Well... I used to get around by bus. Girl, after Uber came along, I never took the bus again, only Uber. So when it's not Uber by car, it's Uber by motorcycle. It's been a long time since I've known what a	Straw-in-the-wind

	bus is. (...) Yeah, girl, my job is really close by and I still take Uber. It's because it's at seven in the morning, girl, and I get too lazy to walk.	
20	I used to take the bus to work, right? When I didn't, I went by bicycle. Before 2010, that's how it was. (...) [Today] I like using all kinds of transport. I walk to work. Sometimes I take an Uber, depending on whether I have a client and I'm running late. Otherwise, I prefer walking.	Opposite
21	I used to take the bus back when I worked [outside the home]. (...) Today... today I get around more by car and motorcycle because I have my own car.	Straw-in-the-wind
22	[Before] By bus. By bicycle. Now it's by car, Uber... Uber and UberPOP, those kinds of services.	Straw-in-the-wind
23	Back then, I used to travel by bus. But now I can afford Uber.	Straw-in-the-wind
24	I only [use the LRT] when I go to Parangaba. Then I still use it. Usually on weekends, sometimes on Sundays, when I'm at home, you know?	Smoking-gun
25	Ah, it used to be really good here... we could walk everywhere. We could just cross the tracks here, there wasn't this wall, and we could catch the bus nearby. (...) It changed a lot for me. I take the bus, and sometimes I use UberPOP as well.	Hoop test
	<i>I was transferred to the Parangaba Mall, but I never really used the LRT much. I was really upset, man. I was upset because many families ended up leaving here, you know. A lot of people died, and some elderly people became depressed</i>	Smoking-gun
26	<i>In the past, we used to get around a lot on foot or by bike, you know? That's how it was. Nowadays, it's mostly Moto Uber or our own car, or a motorcycle, you know? That's it. That's what changed</i>	Hoop test

27	[Before] By bicycle. (...) Ah, it changed because nowadays we work through app-based services, right? We don't walk anymore.
28	We used to do all our trips on foot. [Now] I go by motorcycle. We use Uber. Hoop test
29	[Before] By bus. (...) Today I actually intend to cycle. I've adapted a lot to cycling, you know? For me, cycling and physical activity are essential. Opposite
	[For longer trips] I'm using Uber, ride-hailing apps. Smoking-gun

Source: Author