

INDICATORS OF TRANSNATIONAL GENTRIFICATION ON COZUMEL ISLAND, MEXICAN CARIBBEAN

Marimar Hernández-Jiménez*, Oscar Frausto-Martínez** & Alejandro Escalera-Briceño***

Abstract

This study aims to design transnational gentrification indicators to assess spatial and economic restructuring on the island of Cozumel, in the Mexican Caribbean. The study is grounded in the concept of transnational gentrification as a process of urban transformation driven by global real estate investment and foreign demand, drawing on evidence and discussion from recent literature. The research was conducted within the framework of Agenda 21 by developing pressure, state, and response indicators based on identifying key components of the phenomenon. As a result, seven components and twenty-five indicators were defined, revealing patterns of global capital pressure, changes in territorial conditions, and institutional responses, thereby enabling the characterization of the process in Cozumel. The study concludes that the indicator system conceptually operationalizes transnational gentrification and enables a systematic evaluation of spatial and economic restructuring on the island. As a theoretical contribution, it strengthens the operational definition of the concept in insular tourism contexts; in practical terms, it provides a useful tool for monitoring and decision-making in sustainable territorial management.

Keywords: Policy agenda; Tourism globalization; Migration flows; Real estate market; Urban growth.

INDICADORES DA GENTRIFICAÇÃO TRANSNACIONAL NA ILHA DE COZUMEL, CARIBE MEXICANO

Resumo

Este estudo tem como objetivo elaborar indicadores de gentrificação transnacional para avaliar a reestruturação espacial e econômica na ilha de Cozumel, no Caribe mexicano. O estudo fundamenta-se no conceito de gentrificação transnacional como um processo de transformação urbana impulsionado pelo investimento imobiliário global e pela demanda estrangeira, integrando evidências e debates da literatura recente. A pesquisa foi desenvolvida no âmbito da Agenda 21, por meio da construção de indicadores de pressão, estado e resposta, a partir da identificação de componentes-chave do fenômeno. Como resultado, foram definidos sete componentes e vinte e cinco indicadores que evidenciam padrões de pressão do capital global, mudanças nas condições territoriais e respostas institucionais, permitindo caracterizar o processo em Cozumel. Conclui-se que o sistema de indicadores operacionaliza conceitualmente a gentrificação transnacional e possibilita avaliar, de forma sistemática, a reestruturação espacial e econômica na ilha; como contribuição teórica, fortalece a definição operacional do conceito em contextos turísticos insulares e, em termos práticos, fornece uma ferramenta útil para o monitoramento e a tomada de decisões na gestão territorial sustentável.

Palavras-chave: Agenda política; Globalização turística; Movimentos migratórios; Mercado imobiliário; Crescimento urbano.

INDICADORES DE GENTRIFICACIÓN TRANSNACIONAL EN LA ISLA DE COZUMEL, CARIBE MEXICANO

Resumen

Este estudio tiene como objetivo diseñar indicadores de gentrificación transnacional para evaluar la reestructuración espacial y económica en la isla de Cozumel, en el Caribe mexicano. El estudio se fundamenta en el concepto de gentrificación transnacional como un proceso de transformación urbana impulsado por la inversión inmobiliaria global y la demanda extranjera, integrando la evidencia y discusiones de la literatura reciente. La investigación se desarrolló en el marco de la Agenda 21, mediante la construcción de indicadores de presión, estado y respuesta a partir de la identificación de componentes clave del fenómeno. Como resultado, se definieron siete componentes y veinticinco indicadores que evidencian patrones de presión del capital global, cambios en las condiciones territoriales y respuestas institucionales, lo que permite caracterizar el proceso en Cozumel. Se concluye que el sistema de indicadores operacionaliza conceptualmente la gentrificación transnacional y permite evaluar de manera sistemática la reestructuración espacial y económica en la isla; como contribución teórica, fortalece la definición operacional del concepto en contextos turísticos insulares, y en términos prácticos, proporciona una herramienta útil para el monitoreo y la toma de decisiones en la gestión territorial sostenible.

Palabras clave: Agenda política; Globalización turística; Movimientos migratorios; Mercado inmobiliario; Crecimiento urbano.

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1 INTRODUCTION

Gentrification, as originally defined by Ruth Glass in the 1960s, refers to a process of urban transformation in which low-income neighbourhoods undergo valorization, resulting in the progressive displacement of working-class populations by higher-income groups with the capacity to access real estate ownership.

Although this concept was initially formulated in the context of cities in developed countries, recent research argues that gentrification is neither an isolated nor strictly local phenomenon, but rather a structural manifestation of capital dynamics that takes multiple forms at a global scale, often linked to processes of neoliberal reconfiguration.

Within this framework, the literature has identified a wide range of gentrification typologies, reflecting the heterogeneity of its manifestations. Among these, transnational gentrification has gained relevance in tourist destinations, where lifestyle migration and the mobility of global capital shape new territorial dynamics.

This type of gentrification is characterized by the arrival of high-purchasing-power foreign populations who not only reshape real estate markets but also transform consumption patterns, spatial practices, and social relations in receiving territories.

From an analytical perspective, this process can be understood as a chain of interrelated transformations in which foreign capital investment and lifestyle migration are associated with land valorization, changes in land use, the concentration of services oriented towards new residents and tourists, and both direct and indirect forms of displacement affecting local populations. In this context, socially vulnerable groups tend to become progressively disconnected from emerging economic and symbolic circuits, leading to processes of socio-spatial exclusion and cultural reconfiguration.

Despite these theoretical advances, significant methodological challenges remain for the empirical identification of transnational gentrification. There is a limited availability of analytical tools capable of translating this phenomenon into observable variables and comparable indicators, both quantitative and qualitative. The most consistent efforts have relied on statistical and cartographic data; however, further progress is needed to develop operational frameworks that enable systematic analysis across contexts.

In this regard, the present article is guided by the following research question: How can transnational gentrification be operationalized as a replicable system of indicators for analyzing processes of spatial and economic restructuring in tourist destinations?

Based on this question, the objective of the study is to design a system of indicators to assess the economic-spatial restructuring associated with transnational gentrification on the island of Cozumel, Quintana Roo, Mexico. The article has a threefold scope: (1) it proposes a conceptual operationalization of the phenomenon, (2) it develops an indicator-based analytical tool, and (3) it applies this tool to a case study as an illustrative exercise.

The case of Cozumel is particularly relevant due to its positioning as an international tourist destination and its

integration into global dynamics of mobility and consumption. These characteristics make it a suitable context for observing the dynamics associated with transnational gentrification in Latin America, in line with other documented cases in both the Global South and developed countries, such as Seville, Spain.

Methodologically, the study adopts a qualitative approach based on critical discourse analysis and content analysis to identify the main dimensions of the phenomenon and construct corresponding indicators. Additionally, the Agenda 21 framework is used to classify indicators by pressure, state, and response, thereby structuring an analytical system oriented toward decision-making.

Overall, this study seeks to contribute to the development of methodological tools that facilitate the generation of empirical evidence and its articulation with urban planning processes and public policy formulation, particularly in tourism contexts where transnational gentrification is increasingly relevant.

2 THEORETICAL REVIEW

2.1 Indicators of Transnational gentrification

The state-promoted strategy, often referred to as “gentrification,” has been conceptualized as a key mechanism for attracting foreign capital by valorizing cultural and environmental amenities associated with higher-income groups (Smith, 2020; Carrillo et al., 2025).

However, the literature does not offer a single, unified explanation. While Smith (2020) emphasizes the active role of the state in urban restructuring, Carrillo et al. (2025) focus on the structure of the transnational real estate market, revealing a tension between institutional and economic approaches. Cocola-Gant (2023) expands this debate by framing urban space as a unit of consumption within a neocapitalist logic and highlighting the need for robust analytical frameworks.

In Latin America, particularly in tourism contexts, recent contributions have enriched this discussion by examining the links between capital, spatial production, and tourism dynamics.

In Brazil, studies by Carlos Henrique de Oliveira and Thiago Allis demonstrate how touristification and real estate valorization reconfigure urban territories, offering a relational perspective that complements Anglophone approaches and broadens the Latin American debate (Allis, 2019; Oliveira, 2020).

Private investments in this context not only provide growth opportunities but also drive territorial transformation, mobilizing capital and reshaping urban space at multiple scales (Corrales, 2024). However, as Urquiaga (2021) notes, the literature often approaches gentrification through isolated case studies or fragmented methodologies, thereby limiting the development of comparative frameworks that can identify patterns and divergences across diverse urban contexts.

This fragmentation has also been noted in Latin American urban tourism studies, emphasizing the need for comparable analytical frameworks that integrate multiple scales (Allis, 2019), a critical issue given the dynamic and heterogeneous nature of gentrification.

Globally, there is some consensus regarding the link between the displacement of vulnerable populations, urban transformation, and real estate investment, yet systematic empirical evidence remains limited. Transnational gentrification has been identified as the most recent and intensified phase of this phenomenon (Hayes & Zaban, 2020), driven by the mobility of a new global upper-middle class (Dávila et al., 2020; Freire-Medeiros & Moraes, 2022). Nevertheless, these approaches often develop in parallel, without sufficiently connecting global dynamics to specific territorial outcomes.

This analytical fragmentation is particularly evident in the intersection of transnational gentrification, tourism, and lifestyle migration. While lifestyle migration – especially by retirees or near-retirement populations – is recognized as a key driver of change in tourist cities (Romagosa et al., 2020; Zepeda, 2025), studies typically describe these processes without exploring the mechanisms linking local inequalities with global dynamics (Delgadillo et al., 2015; Salinas-Arreortua, 2013; Navarrete, 2022). A recurring limitation is the scarce explicit articulation of these mechanisms, complicating their empirical operationalization.

Urban spaces with tourism potential tend to become commodities in global consumption circuits (Hayes & Celleri, 2023). Yet the literature pays less attention to tensions between economic development and social cohesion, particularly in contexts where transnational capital redefines the appropriation of urban space (Navarrete et al., 2025). Brazilian studies also highlight the need for multiscalar analyses that integrate tourism, inequality, and urban space production (Allis, 2019).

The settlement patterns of foreign populations in tourist areas are associated with both economic dynamism and increased socio-spatial segregation (Dávila, 2022). Jover and Díaz-Parra (2020) note that tourism can generate displacement without necessarily improving local social conditions, challenging narratives that equate gentrification with urban development. Transnational gentrification is thus understood as a process driven by capital investment aimed at leisure and consumption demands (Noriega & Gómez, 2018), resulting in multiple territorial contradictions.

These include intensified social segregation, displacement of vulnerable populations to peripheral areas (Castro-Noblejas et al., 2022), pressure on basic services, environmental deterioration due to urban expansion (UN, 2023; POEL, 2017), and the concentration of services oriented toward higher-income groups, often at the expense of local economies (Liévanos, 2022).

Rising living costs linked to real estate valorization further limit local populations' capacity to maintain their livelihoods (González-Argote & Maldonado, 2024). These dynamics show that the effects of transnational gentrification are not uniform but vary according to territorial specificities (Alexandri & Janoschka, 2020; Delgadillo, 2022).

Despite this, the literature continues to rely on global models, particularly the Anglophone city model, as a general explanatory framework (Hernández & Díaz, 2022), often overlooking local adaptation processes. This gap limits understanding of how global dynamics are reconfigured in specific contexts. Transnational gentrification must be recognized as a complex socio-spatial restructuring process

that involves cultural, symbolic, and emotional dimensions (Hayes & Celleri, 2023).

Interactions among tourists, migrants, and local actors produce forms of spatial appropriation that integrate capital flows, consumption practices, and cultural meanings (Bianchi, 2021), a phenomenon that remains underexplored. The growing integration of real estate markets and urban production intensifies spatial reconfiguration and reshapes the normative and functional frameworks of urban space, highlighting the complex socio-economic nature of gentrification (Jolivet & Alba-Carmichael, 2021; López-Morales et al., 2023). This phenomenon cannot be understood linearly; its evolution reflects a multifaceted configuration encompassing temporal, spatial, and disciplinary dimensions.

While recent approaches have attempted to link these dimensions to sustainable urban models (Hayes & Zaban, 2020), a tension persists between normative perspectives and empirical evidence showing unequal socio-spatial outcomes. Positive framings of gentrification (Rodríguez, 2020) have contributed to its discursive legitimization, obscuring negative impacts (Benavides & Olaya, 2023) and hindering both critical assessment and empirical measurement.

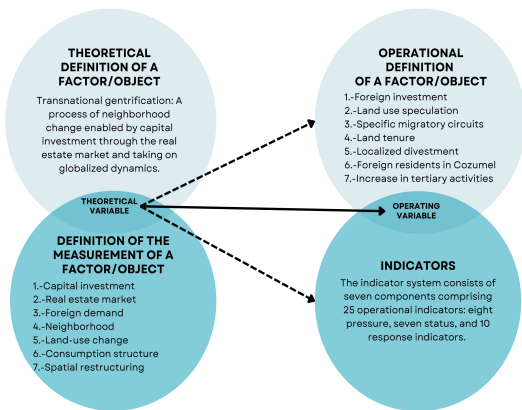
Given these limitations, tools enabling systematic visualization, analysis, and evaluation of the phenomenon are urgently needed. The lack of robust empirical evidence has hindered both validation and refutation of different interpretations of transnational gentrification. Indicator development thus emerges as a key strategy for linking theoretical conceptualization to empirical observation. Unlike previous approaches, this study proposes a systematic construction of indicators based on recurring concepts in the literature to enhance replicability and comparability.

Indicator design operationalizes the phenomenon through observable dimensions, facilitating its analysis in specific contexts, such as Cozumel Island. Indicators must meet criteria of objectivity, relevance, measurability, and comparability (Frausto et al., 2018; Frausto et al., 2019) and align with international efforts to strengthen urban metrics in decision-making (UN-Habitat, 2024). This approach moves beyond the predominantly descriptive nature of previous studies toward more integrative analytical frameworks.

The proposed indicators were derived through content analysis and critical discourse analysis, which systematically identified key dimensions of the phenomenon and addressed the ad hoc variable selection found in other studies.

Although gentrification research has expanded to incorporate qualitative, quantitative, and GIS-based methodologies (Orellana-Alvear et al., 2024), significant gaps remain in the generation of comparable, systematic empirical evidence. Indicator-based approaches using census data exist (Díaz-Parra & Apaolaza, 2020) but often reproduce theoretical frameworks without critically assessing their contextual suitability. This underscores the need for methodological approaches that explicitly document the construction and conceptual validation of indicators, rather than merely adapting existing ones.

Figure 1. Framework for conceptualizing the development of transnational gentrification indicators.



Source: Authors' elaboration based on Frausto et al., 2019.

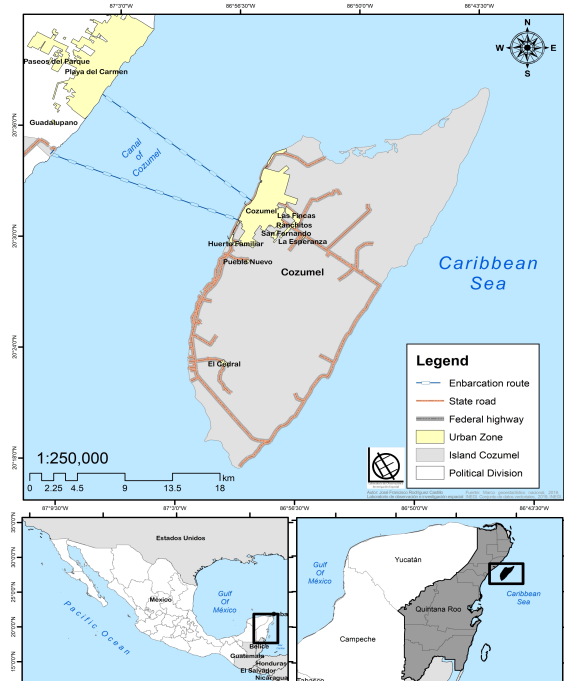
3 STUDY CONTEXT AND METHODOLOGY

3.1 Study area

Cozumel Island is located in the Mexican Caribbean, 19 kilometres off the coast of the state of Quintana Roo, in the western portion of the Yucatán Channel (see Figure 2) (Escalera et al., 2024). Cozumel has established itself as a pioneering tourist destination in the Mexican Caribbean by incorporating the guidelines of Agenda 21 and the 2030 Agenda for Sustainable Development into its public policies.

This strategic orientation aims not only at efficient natural resource management but also at mitigating tourism-related impacts, recognized as the primary economic driver of urban development (Tamayo & Martínez, 2023). Consequently, Cozumel's trajectory as a tourist destination makes it a relevant case study for understanding the territorial manifestation of processes such as transnational gentrification.

Figure 2. Cozumel Island in the Mexican Caribbean.



Source: Own elaboration.

Linking theoretical foundations with operational tools remains a central challenge. While globalization has been identified as a key factor in the expansion of gentrification (Sigler & Wachsmuth, 2016), other processes, such as disinvestment in low-income cities, also create favourable conditions for capital investment. This highlights the need for approaches integrating seemingly contradictory dynamics.

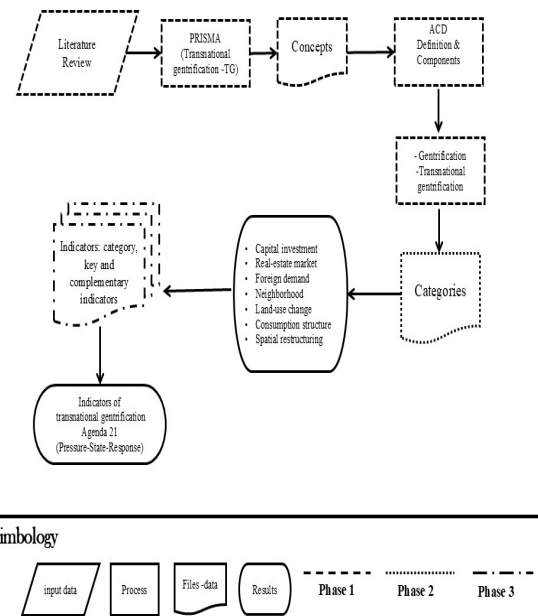
Finally, transnational gentrification is understood as a neighbourhood change process driven by real estate investment, the acquisition of globalized dynamics of foreign demand and capital, the generation of land-use transformations, and the promotion of spatial restructuring linked to new forms of consumption. This definition integrates the diverse theoretical perspectives reviewed, identifies gaps, and justifies an indicator-based approach to advance empirical and comparative understanding of the phenomenon.

3.2 Definition and operationalization of indicators

The research is structured into three interrelated analytical phases (see Figure 3), designed to ensure a systematic transition from theoretical conceptualization to the construction of empirical indicators. It is important to clarify that this study focuses on the design and operationalization of indicators, not on their empirical validation or implementation in monitoring systems, which fall under subsequent stages of research. In this sense, monitoring is considered a potential capability of the proposed system rather than a process developed in this work.

Figure 3. Methodological process.

Source: Own elaboration.



3.2.1 Systematic review and conceptual construction

The first phase involved a systematic literature review using the PRISMA method (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), consisting of 27 items to ensure transparency and systematic rigor (Page et

al., 2022). In this study, PRISMA was applied as a strategy to ensure traceability and replicability in constructing the theoretical corpus, rather than as an exhaustive meta-analytical exercise, thereby enabling the identification of relevant patterns, gaps, and conceptual recurrences in transnational gentrification research.

This study focused on essential components, organized into five analytical stages. First, inclusion and exclusion criteria were defined to integrate robust academic sources (articles, books, book chapters, and theses) addressing transnational gentrification from theoretical and empirical perspectives. Open-access sources were prioritized, without temporal restrictions, and searches were conducted in English and Spanish. Restricted-access documents, notes, and publications in languages with limited circulation were excluded.

Second, information retrieval and systematization were supported by Harzing's Publish or Perish software (v. 8.9.4), integrating records from Crossref, Google Scholar, PubMed, OpenAlex, Scopus, and Semantic Scholar.

Boolean operators were used to combine keywords such as gentrification, transnational gentrification, indicators, monitoring, and control.

Third, the data are organized in Excel for systematic analysis. Out of 4,059 documents, 410 were retained after filtering for relevance to ensure consistency and representativeness. Fourth, Critical Discourse Analysis (CDA) was incorporated as a methodological approach, structured into three analytical levels:

- **Textual Analysis:** Examined gentrification conceptualization, identifying heterogeneous approaches and the tendency to treat the phenomenon homogeneously. Thirty indicators were systematized in an analytical matrix.
- **Discursive Practice:** Evaluated the operationalization of indicators, revealing limited correspondence with transnational gentrification and highlighting the need for specific instruments.
- **Urban, Economic, Environmental, and Sociocultural Practice:** Examined the alignment between antecedents, conceptual definitions, and dimensions of the phenomenon, revealing gaps in existing indicators and opportunities for developing more precise tools.

CDA was employed to analyze not only definitions but also the discursive constructions that shape understanding of the phenomenon, thereby enabling the identification of tensions, omissions, and biases in the literature (Fairclough, 2023).

Additionally, content analysis was used as a systematic coding technique to identify conceptual recurrences in the corpus. This process facilitated the transition from discourse units to analytical categories, ensuring that the construction of indicators was not ad hoc, but an iterative procedure grounded in the literature.

These findings support the relevance of a transnational approach and justify the design of a specific, contextually grounded indicator system.

3.2.2 Conceptual proposal and delimitation of categories

Based on findings from the preliminary phase, the research advances to a second stage focused on constructing a robust conceptual framework for transnational gentrification. The primary goal is to identify and delimit specific analytical categories that capture the complexity of the phenomenon in globalized contexts, integrating both theoretical antecedents and current debates that articulate the transnational perspective.

Analysis of key authors (Sigler & Wachsmuth, 2016; Cocola-Gant, 2020; Navarrete, 2022; Dávila et al., 2022; Hayes & Zaban, 2020; Romagosa et al., 2020; Jover & Díaz-Parra, 2020; Alexandri & Janoschka, 2020) enabled the identification of conceptual patterns, gaps, and tensions in the literature that underpin this reformulation.

The proposal seeks to overcome generalist approaches by offering an integrative framework that links structural, spatial, and sociocultural dimensions, thereby strengthening the development of operational, contextualized indicators.

Analytical categories are not arbitrarily defined but derive from the coding process conducted in the previous phase, which grouped conceptual recurrences identified in the literature. This approach makes explicit the methodological transition from systematic review to conceptual construction, ensuring transparency in the derivation of categories.

Transnational gentrification is thus conceptualized as a neighbourhood change process driven by capital investment through the real estate market, acquiring globalized dynamics of foreign demand and investment, generating land-use transformations and promoting spatial restructuring linked to new forms of consumption.

To operationalize this conceptualization, the phenomenon is organized into seven interrelated categories: (1) capital investment, (2) real estate market, (3) foreign demand, (4) neighbourhood, (5) land-use change, (6) consumption structure, and (7) spatial restructuring (see Figure). Each category serves as an analytical component that reflects pressures, transformations, and emergent responses in transnational urban contexts, constituting an innovative framework that facilitates both empirical analysis and the construction of comparative, replicable indicators.

This proposal contributes to the literature by providing an integrative conceptual tool that connects theory and practice, enables systematic measurement of the phenomenon, and opens the door to comparative studies across different globalized cities, highlighting the interaction among transnational capital, urban dynamics, and sociocultural transformations.

3.2.3 Indicator design under the PSR Model

To operationalize the complexity of transnational gentrification, a system of indicators was designed using the PSR model (Pressure-State-Response), differentiating among the pressures driving the phenomenon, the state of the territory, and the responses modulating it. The DPSIR model was selected for its ability to structure complex phenomena through analytical relationships among causes,

conditions, and responses, thereby enabling the coherent organization of indicators and facilitating interpretation in urban contexts.

Foreign investment was identified as the central pressure, measured by annual direct investment recorded in official sources to ensure verifiability and alignment with the phenomenon's globalized nature.

Other transnational components, including real estate market dynamics, foreign demand, neighbourhood, land-use change, consumption structure, and spatial restructuring, also act as pressures, reflected in observable changes in the urban environment, spatial reorganization, and consumption patterns. These dynamics generate concrete responses, such as resource redistribution, displacement of local communities, and new forms of urban occupation.

The system comprises 25 indicators, classified as core, complementary, and verification, and is documented through technical datasheets to ensure coherence, traceability, and applicability. Although the methodological approach is primarily qualitative, the indicators incorporate both qualitative and quantitative dimensions. This allows the operationalization of the phenomenon into measurable variables, integrating formulas and quantifiable indicators where data availability permits. The quantitative component is thus an extension of qualitative analysis toward empirical measurement, not a methodological contradiction.

Aggregation criteria and data availability differentiate between indicators with direct access, complex indicators, and those requiring fieldwork. Empirical application, validation, and monitoring are recognized as future stages of research, but this does not diminish the system's value as a conceptual and methodological tool for analyzing the phenomenon.

This framework translates the conceptualization of transnational gentrification into an operational analytical instrument that integrates theory, empirical evidence, and methodology, facilitating understanding of its socio-spatial impacts in globalized urban contexts.

4 RESULTS ANALYSIS

4.1 Conceptual definition and structure of the indicator system

Transnational gentrification is defined as a neighbourhood change process driven by capital investment through the real estate market, which acquires globalized dynamics of demand and foreign investment, generating transformations in land use and promoting spatial restructuring linked to new forms of consumption.

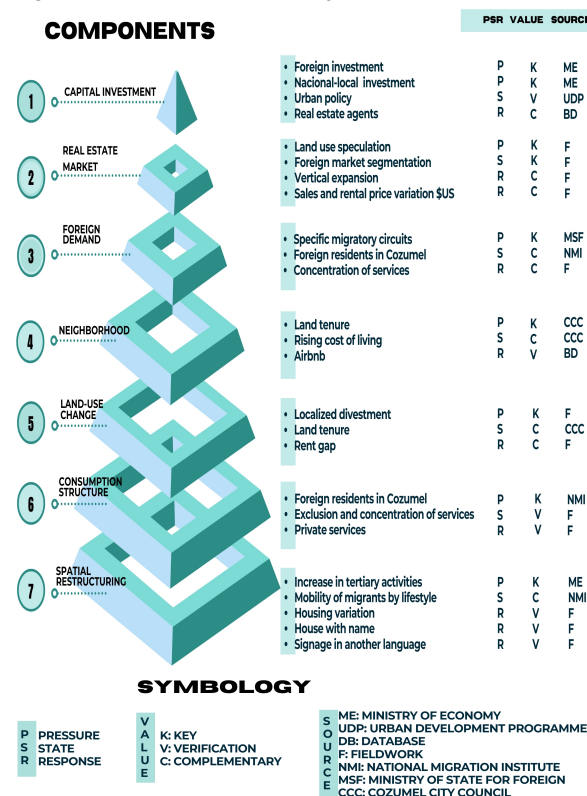
Based on this definition, seven key components are identified: capital investment, real estate market, foreign demand, neighbourhood, land-use change, consumption structure, and spatial restructuring. These components provide the conceptual foundation for the proposed indicator system.

4.2 Proposal for monitoring the indicators system

The design of the model is structured according to the Pressure–State–Response (PSR) framework, enabling an

analytical organization of processes associated with transnational gentrification (see Figure 4). Within this framework, pressures relate to foreign investment, states refer to urban environment conditions, and responses correspond to institutional and real estate market transformations.

Figure 4. Indicators of transnational gentrification.



Source: Own elaboration.

The system integrates a total of 25 indicators: eight for pressure, seven for state, and ten for response. Additionally, it incorporates key, complementary, and verification factors that reinforce its internal coherence.

It is important to clarify that this study does not aim to conduct an exhaustive empirical assessment of the phenomenon in Cozumel. Rather, it proposes a structured indicator system to facilitate its monitoring. Consequently, the model should be understood as a methodological tool intended to support the collection, organization, and analysis of information in future research.

Thus, the proposal should be interpreted as a programmatic framework, with its main contribution being the analytical structuring of the phenomenon rather than presenting conclusive empirical results.

The system is designed for application through fieldwork and the collection of quantifiable information from public and private sources. Each indicator is defined precisely, specifying its analytical function and information source.

However, data availability presents significant limitations. For instance, the capital investment component can be informed by official sources, allowing the construction of time-comparable series. In contrast, other components, particularly the real estate market, lack publicly accessible

and transparent databases, as this information is primarily managed by private actors.

This situation not only limits data availability but also constitutes a structural feature of the phenomenon in tourist destinations, where real estate market opacity is intrinsic to investment and land valorization dynamics.

Consequently, several methodological limitations are identified, including potential biases in the available information, heterogeneity among data sources, challenges

in replicability of analyses, and limitations in generalizing the results.

In this context, fieldwork is proposed as a complementary information-collection strategy. However, its implementation entails higher costs, longer execution times, and limited access to private information, reinforcing the system's progressive nature and its development over the medium and long term (Shen et al., 2015).

As a result, the indicators vary in aggregation level and information availability, which shapes their applicability.

Table 1. Definition and sources of the transnational gentrification indicator system.

No.	Definition of indicator	Source
Capital investment		
1.-	Foreign investment: Annual foreign direct investment amount	Ministry of Economy (ME)
2.-	Nacional-local investment: Annual amount of national-local investment	Ministry of Economy (ME)
3.-	Urban policy: Central document that breaks with the law to make way for capital investment	Urban Development Programme (UDP)
4.-	Real estate agents: % of foreign and local investment real estate agencies	Database
Real estate market		
5.-	Land use speculation: Number of plots of land offered by real estate agencies	Fieldwork
6.-	Foreign market segmentation: Offer aimed at the foreign market	Fieldwork
7.-	Vertical expansion: % of dwellings with residential structure (if referring to building height)	Fieldwork
8.-	Sales and rental price variation \$USD: % change in sales and rental prices	Fieldwork
Foreign demand		
9.-	Specific migratory circuits: Law allowing residence and work permits to foreigners	Ministry of State for Foreign (MSF)
10.-	Foreign residents in Cozumel: % of the total population of foreign residents in Cozumel	National Migration Institute (NMI)
11.-	Concentration of services: Number of gourmet services targeting the foreign market	Fieldwork
Neighborhood		
12.-	Land tenure: % of dwellings unoccupied and in a state of abandonment	Cozumel City Council (CCC)
13.-	Rising cost of living: Shift from local trade to gourmet business	Cozumel City Council (CCC)
14.-	Airbnb: % of dwellings offered on Airbnb by local and foreign investment	Database
Change of land use		
15.-	Localized divestment: Property (house or local business) in abandonment	Fieldwork
16.-	Land tenure: % of homes owned by local and foreign residents	Cozumel City Council (CCC)
17.-	Rent gap: disparity of potential land rent and current capitalized rent under the present land use	Fieldwork
Consumption structure		
18.-	Foreign residents in Cozumel: % of the total population of foreign residents in Cozumel	Ministry of State for Foreign (MSF)
19.-	Exclusion and concentration of services: % of businesses (restaurants, hospitals, coffee shops, laundries, commodity shops) targeting foreign demand	Fieldwork
20.-	Private services: % of private services	Fieldwork
Spatial restructuring		
21.-	Increase in tertiary activities: % of businesses (buying and selling) and services for the satisfaction of foreign residents	Ministry of Economy (ME)
22.-	Mobility of migrants by lifestyle: Number of people transiting through public spaces	Fieldwork
23.-	Housing variation: Number of houses with foreign-style facades	Fieldwork
24.-	House with name: Number of houses with Spanish and foreign names with foreign ownership	Fieldwork
25.-	Signage in another language: Number of houses with some indication in another language	Fieldwork

Source: Own elaboration.

While some can be implemented in the short term, others require more complex data construction processes.

4.3 Example of the transnational gentrification indicator

To illustrate the system's operationalization, an example is presented for the "Neighbourhood" component, using the "Airbnb" indicator for Cozumel Island (see Figure 5).

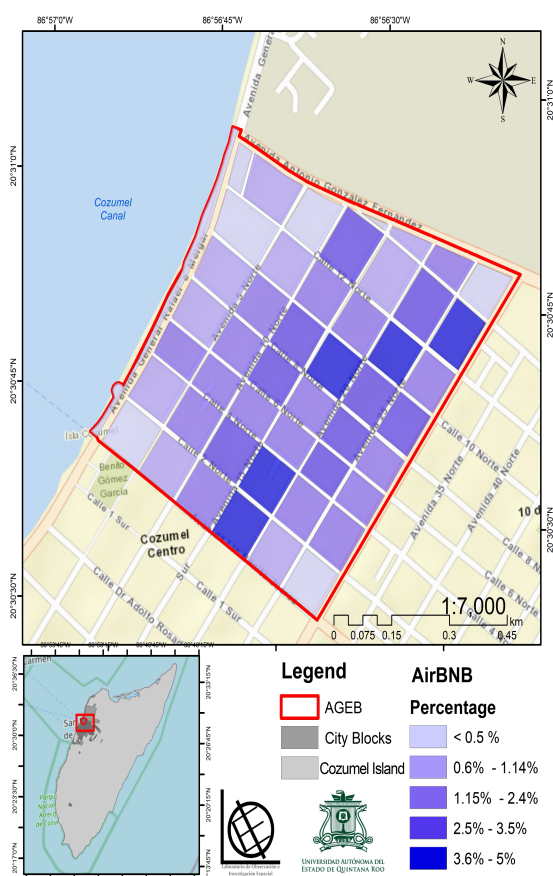
This indicator is defined as the percentage of housing units offered on the Airbnb platform by local and foreign

investors. Its relevance is linked to Sustainable Development Goal 11, which relates to access to adequate, safe, and affordable housing.

- Comment: The impact of Airbnb has been debated across different spatial and social perspectives (Yrigoy, 2017).
- Importance: Its role within contemporary capitalist dynamics positions it as a relevant actor in transnational gentrification processes (Sequera & Nofre, 2020).

- Methodology: A proprietary database was used, constructed due to the lack of available official data for analysis.

Figure 5. Airbnb indicators in Cozumel Island.



Source: Own elaboration.

While this exercise demonstrates the construction and application of a specific indicator, it does not constitute a comprehensive empirical validation of the system. Rather, it provides an exploratory application illustrating its potential implementation in concrete contexts.

5 DISCUSSION

The literature on transnational gentrification has advanced efforts to identify the phenomenon as a specific form of urban transformation. However, much of this research has focused on its empirical validation using traditional socioeconomic indicators, such as age, education level, nationality, income, and housing costs, typically derived from census data (Lin et al., 2021).

Despite these advances, methodological systematization in this field remains limited. In particular, the diversity of approaches and indicators complicates cross-case comparisons and limits the replicability of findings.

Within this context, the present study does not aim to empirically verify transnational gentrification in Cozumel but rather seeks to contribute to the literature by proposing a standardized indicator system that captures the

phenomenon's complexity from a multidimensional perspective.

The proposal builds on previous theoretical contributions. The concept of transnational gentrification has been developed in studies such as Sigler & Wachsmuth (2016), who highlight the connection between redevelopment capital and housing demand at a transnational scale. Other works have explored specific dimensions of the phenomenon, including lifestyle mobility (López-Gay et al., 2021), the role of elites and the state (Navarrete, 2022), and socio-spatial transformations in tourist destinations (Cocola-Gant & López-Gay, 2020; Hayes & Zaban, 2020; Romagosa et al., 2020; Jover & Díaz-Parra, 2020; Alexandri & Janoschka, 2020).

However, the scope of this study is primarily methodological and programmatic. Regarding classical gentrification models, such as Neil Smith's rent-gap theory, the system developed in this study does not intend to replace these approaches but to engage in dialogue with them. While the rent-gap model focuses on differential land valorization, the present proposal incorporates additional dimensions, including foreign investment, global demand, consumption transformation, and spatial restructuring in tourist contexts.

It is also necessary to acknowledge the limitations associated with data availability and quality. The opacity of the real estate market, fragmented information, reliance on private sources, and the absence of systematic public databases pose structural challenges to implementing the system, particularly in tourist destinations. These conditions may introduce measurement biases and limit the generalizability of the results without broader empirical validation.

Moreover, recent literature has highlighted the interrelation between transnational gentrification, residential mobility, and processes of touristification (Cocola-Gant, 2023; Romagosa et al., 2020). Accordingly, the proposed indicator system seeks to maintain analytical flexibility to incorporate variables associated with these dynamics, recognizing that, in tourist destinations, these processes often overlap and reinforce one another.

In this context, the indicator system should be understood as a work in progress, whose empirical application requires additional processes of data collection and systematization. Its main contribution lies in providing a structured foundation to guide future research rather than delivering a definitive diagnosis of the phenomenon.

Consequently, this study positions itself as a methodological contribution to advancing the standardization of transnational gentrification analysis and laying the groundwork for subsequent empirical studies to validate and refine the proposed system.

6 CONCLUSIONS

Urban restructuring is often driven by various forms of distortion, including spatial, social, economic, political, and environmental factors. Recognizing these dimensions is essential for classifying urban development and ensuring its holistic sustainability. The concept of sustainable development entails effectively integrating key stakeholders

and acknowledging the challenges cities face in involving residents in urban planning.

Consequently, measures are required to promote compact, inclusive, resilient, and economically sustainable cities. However, it is important to note that achieving this ideal may be constrained by the dynamics of the neoliberal system and pressures from foreign investment, which often create a disconnect between residents and spatial restructuring strategies (Velázquez-Castro & Cepeda-Arellano, 2023).

Transnational gentrification has emerged as a key phenomenon for understanding social segregation and spatial redistribution in tourist urban contexts. According to the New Urban Agenda, analyzing this process helps identify mechanisms that may exacerbate or mitigate socioeconomic inequalities (UN, 2016). Implementing spatial development strategies that integrate urban renewal and accessible infrastructure planning is a fundamental mechanism for promoting social integration and inclusion in marginalized areas, aligning with the Sustainable Development Goals, particularly SDG 11 on sustainable cities and communities.

Within this framework, the research was guided by the question: "How can transnational gentrification be operationalized through a replicable indicator system that allows the analysis of spatial and economic restructuring processes in tourist destinations?" The study aimed to design an indicator system to evaluate the economic-spatial restructuring associated with transnational gentrification on Cozumel Island, Quintana Roo, Mexico.

In response, a system of indicators is proposed to identify transnational gentrification processes at both the local and island scales, based on the principles of Agenda 21 and the Pressure–State–Response (PSR) model. It is crucial to emphasize that this system is intended as a methodological and conceptual tool, designed to facilitate future data collection and analysis, but it does not constitute a full empirical validation of gentrification processes in Cozumel.

The development of these indicators required a comprehensive understanding of transnational gentrification and careful design of each indicator to represent the phenomenon's multifaceted nature in a measurable and understandable manner. The indicators enable monitoring of global spatial restructuring, provide a theoretical framework that can be replicated in other destinations, and acknowledge the need for empirical data collection for validation.

The proposed system comprises twenty-five quantitative and qualitative indicators, selected for their relevance to the data, clarity, predictive capacity, and applicability for immediate or future use. Although their application in this study is illustrative and partial, the system provides a solid methodological structure for future research, enabling the systematization of transnational gentrification and guiding inclusive and sustainable urban planning.

The conclusions highlight that the main contribution of this article lies in the construction of a conceptual and methodological indicator system, which organizes and makes visible the process of transnational gentrification, providing a structured response to the research question and fulfilling the stated objective, without intending to replace comprehensive empirical analyses or offer definitive results for the case of Cozumel.

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CRediT author statement

Term	Definition	Author 1	A2	A3
Conceptualization	Ideas; formulation or evolution of overarching research goals and aims	x	x	
Methodology	Development or design of methodology; creation of models	x	x	x
Software	Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components	x		
Validation	Verification, whether as a part of the activity or separate, of the overall replication/ reproducibility of results/experiments and other research outputs	x	x	x
Formal analysis	Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data	x	x	x
Investigation	Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection	x	x	
Resources	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools	x	x	x
Data Curation	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later reuse	x		
Writing - Original Draft	Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation)	x	x	x
Writing - Review & Editing	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages	x	x	x
Visualization	Preparation, creation and/or presentation of the published work, specifically visualization/ data presentation	x	x	x
Supervision	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team	x	x	
Project administration	Management and coordination responsibility for the research activity planning and execution	x	x	x
Funding acquisition	Acquisition of the financial support for the project leading to this publication	x	x	x

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