

RESIDENTIAL SEGREGATION IN A MEXICAN INTERMEDIATE CITY: SOCIO- SPATIAL IN-EQUALITY IN CULIACÁN ROSALES

SEGREGACIÓN RESIDENCIAL EN UNA CIUDAD INTERMEDIA MEXICANA: DESIGUALDAD
SOCIOESPACIAL EN CULIACÁN ROSALES

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La segregación residencial constituye un mecanismo central en la reproducción de la desigualdad socioespacial en las ciudades contemporáneas y adquiere una expresión particular en las ciudades intermedias latinoamericanas, donde la proximidad física entre sectores sociales no necesariamente se traduce en integración. Este artículo analiza los patrones de segregación residencial en Culiacán Rosales, México, a partir de la distribución espacial de la condición socioeconómica a escala de manzana censal. Con información del censo de población y vivienda de 2020, se construyó un índice sintético de condición socioeconómica mediante análisis de componentes principales y se evaluó su distribución territorial mediante el índice de Moran global y los indicadores locales de asociación espacial, técnicas que permiten identificar la tendencia de los valores similares a agruparse en el territorio. Los resultados muestran una organización espacial fuertemente estructurada, con clústeres de alta y baja condición socioeconómica que concentran el 46,66 % de las manzanas analizadas, mientras que las configuraciones de mezcla socioeconómica local resultan estadísticamente excepcionales. Esta evidencia indica que la desigualdad en Culiacán se organiza en una geografía de fragmentación microterritorial, donde la proximidad física entre enclaves contrastantes no produce integración. El estudio aporta al debate sobre la fragmentación urbana en ciudades intermedias latinoamericanas al mostrar que esta escala urbana no reproduce mecánicamente el patrón centro-periferia de las metrópolis, sino que configura una lógica espacial específica, relevante para el diseño de políticas de equidad territorial.

Palabras clave: segregación residencial, desigualdad socioespacial, ciudades intermedias, fragmentación urbana, Culiacán Rosales

Residential segregation is a key mechanism in the reproduction of socio-spatial inequality in contemporary cities. It takes on a particular form in Latin American intermediate cities, where physical proximity between social groups does not necessarily translate into integration. This article analyzes the residential segregation patterns in Culiacán Rosales, Mexico, based on the spatial distribution of socioeconomic conditions at the census block scale. Using data from the 2020 population and housing census, a synthetic index of socioeconomic conditions was constructed via principal component analysis, and its territorial distribution was assessed using Global Moran's I index and local spatial association indicators, which identify the tendency for similar values to cluster across the territory. The results show a strongly structured spatial organization, with high- and low-socioeconomic clusters accounting for 46.66% of the analyzed blocks, while configurations of local socioeconomic mixing remain statistically marginal. This evidence indicates that inequality in Culiacán is organized by a geography of micro-territorial fragmentation, where physical proximity between contrasting settlements does not produce integration. The study contributes to the debate on urban fragmentation in Latin American intermediate cities, showing that this urban scale does not mechanically reproduce the metropolis center-periphery pattern, but rather a specific spatial logic relevant to the design of territorial equity policies.

Keywords: residential segregation, socio-spatial inequality, intermediate cities, urban fragmentation, Culiacán Rosales

I. INTRODUCTION

Residential segregation is one of the structural features of contemporary cities and a central mechanism in the reproduction of socio-spatial inequality (Rodríguez Vignoli & Arriagada, 2004; Sabatini, 2006). In the 21st century, its expressions have become more complex than those associated with classical segregation based on the physical distance between social groups: today, economic, symbolic and territorial mechanisms operate that produce separation even in conditions of immediate spatial proximity (Janoschka, 2002; Sposito, 2024).

In this scenario, intermediate cities acquire analytical relevance distinct from that of large metropolises, since they allow us to observe more clearly the coexistence of physical proximity and social distance between adjacent sectors. Recent literature has identified them as areas where urban fragmentation manifests in a specific way, rather than as a reduced replica of the metropolitan pattern (Bellet Sanfeliu & Lasala Fortea, 2025; Gómez-Maturano, 2024). This configuration challenges traditional analysis models based on center-periphery gradients (Borsdorf, 2003).

Culiacán Rosales is a relevant case study to examine these processes in the Mexican context. Previous research has documented its transition from a dual urban structure to progressively fragmented configurations (Pérez-Tamayo et al., 2017) and has identified territorial inequalities in access to housing and services (Rodríguez González et al., 2018; Valle Campos, 2025). This background information has mainly addressed the morphological dimension of fragmentation or the sectoral aspects of urban backwardness. A question remains less developed about what the socio-spatial organization of the socioeconomic condition reveals about contemporary modes of segregation in Mexican intermediate cities: whether they reproduce the classic center-periphery pattern, whether they configure a geography of specific fragmentation, or whether they require interpretative frameworks different from those developed for metropolises.

Addressing this issue requires an analysis that connects the multidimensionality of the socioeconomic condition and its territorial expression at a fine intra-urban scale, integrating Principal Component Analysis (PCA) with spatial statistical techniques (Anselin, 2020).

Under these premises, the article analyzes the residential segregation patterns in Culiacán Rosales from the spatial distribution of socioeconomic status at the census block scale. The central argument is

that segregation in Culiacán does not follow a linear center-periphery pattern, but rather a logic of micro-territorial fragmentation, in which clusters of high and low socioeconomic status coexist in physical proximity without producing integration. The contribution consists of offering disaggregated empirical evidence, interpreting this configuration as an expression of urban fragmentation in a Mexican intermediate city, and discussing its implications for planning oriented to territorial equity.

II. THEORETICAL FRAMEWORK

Socio-spatial inequality and residential segregation

Socio-spatial inequality refers to the systematically differentiated distribution of opportunities, resources and living conditions in urban space, produced by mechanisms that combine the organization of the territory with the social relations that configure it (Pérez-Campuzano, 2011; Ziccardi & Dammert, 2021). As a relational phenomenon, it is not limited to expressing a social hierarchy on the cartographic plane, but rather it operates as a mechanism of its own reproduction: the place where one resides conditions access to infrastructure, services, labor markets and urban goods, which generate neighborhood effects on collective trajectories (Fernández Tapia, 2020; Cruz-Sandoval et al., 2025). Residential segregation constitutes a particular—and particularly dense—expression of this inequality: the modality by which social groups are spread across the territory, forming patterns of internal homogeneity and external differentiation (Rodríguez Vignoli, 2001; Rodríguez Vignoli & Arriagada, 2004).

The critical literature has placed the production of these patterns in the modes of social and economic organization of urban space (Castells, 1974), which recognizes that the social division of space in Latin American cities operates through the connection between the land market, unequal provision of infrastructure, and the differentiation in the residential offer (Duhau, 2021; Schteingart, 2001). Segregation, therefore, is not a static state but a process by which inequalities are inscribed in the territory and contribute to reorganizing it.

The proposal by Sabatini (2006) operationalizes segregation in three dimensions: spatial concentration, social homogeneity, and prestige or territorial stigma. Spatial and statistical indicators can capture the first two, whereas the third concerns social assessments of the place of residence. This article addresses the objective dimensions of segregation, which are recognized as limitations, whereas the subjective dimension requires qualitative or mixed approaches.

From the dual city to the fragmented city

The classical reading of the Latin American model of urban organization described a center-periphery structure, based on the differentiation between better-served, consolidated areas, on the one hand, and popular peripheries with less urban development, on the other. However, this should not be interpreted as a mechanical or permanent correspondence between elites and the Historical Center. Since the mid-20th century, in several Latin American metropolises, higher-income groups have begun to move towards new centralities, suburban lines, and low-density residential enclaves, in a process linked to the expansion of the automobile, the selective valorization of land, and the private production of differentiated residential spaces. In this context, the urban literature of the early 21st century suggested that the center-periphery model had ceased to be sufficient as a single explanation of Latin American urban segregation, which proposes the fragmented city model: a geography of discontinuous enclaves where sectors of high and low socioeconomic status can coexist in physical proximity, but remain separated by material, symbolic and functional barriers (Borsdorf, 2003; Janoschka, 2002).

This conceptual transition does not imply the disappearance of the center-periphery pattern, but rather its superposition with a logic of fragmentation, expressed in the proliferation of closed subdivisions, the dispersion of centralities, and the intensive differentiation of residential spaces at fine scales (Rodríguez Vignoli & Arriagada, 2004). More recently, the literature has extended this discussion to the study of intermediate cities, showing that fragmentation is not restricted to large metropolises and that it takes specific forms at this urban scale (Bellet Sanfeliu & Lasala Fortea, 2025; Gómez-Maturano, 2024; Sposito, 2024).

In these contexts, the intermediate scale allows for greater clarity in observing the coexistence of physical proximity and social distance: enclosed enclaves, popular urbanizations, and consolidating peripheries are located at short distances, making fragmentation visible that, in metropolises, can be diluted into extensive gradients. Thus, micro-territoriality — socioeconomically homogeneous clusters of small size and sharp edges — acquires analytical centrality. This reading is consistent with Pérez-Tamayo et al. (2017), who documented a transition from the dual structure to fragmented configurations in Culiacán.

The empirical characterization of this fragmentation requires instruments capable of identifying groupings of spatial units with similar values and discriminating random configurations from structured ones. Spatial autocorrelation — the tendency of a variable's values to cluster spatially more frequently than expected by chance (Anselin, 2020) — offers this capability and links the theoretical debate on fragmentation to its

observable empirical expression, an operational translation developed in the methodological section.

III. CASE STUDY:

CULIACÁN ROSALES AS AN INTERMEDIATE CITY OF THE MEXICAN NORTHWEST

Culiacán Rosales, the capital of Sinaloa, is the state's main urban nucleus and an important intermediate city in the Mexican northwest. According to the 2020 Population and Housing Census of the National Institute of Statistics and Geography (INEGI), the city had a population of 808,416 inhabitants and its metropolitan area 1,003,530, positioning it as one of the main urban agglomerations in the country (INEGI, 2020). Its economy is based on agribusiness, commerce, services, and state public administration, giving it a regionally strategic urban profile.

In recent decades, the city has experienced unequal peripheral expansion, the proliferation of closed subdivisions, and a differentiated distribution of infrastructure and services (Rodríguez González et al., 2018; Valle Campos, 2025). Previous studies documented a transition from dual-city features to fragmented configurations between 2000 and 2010 (Pérez-Tamayo et al., 2017). The analysis using 2020 data allows us to examine whether this transition is consolidated within a geography of socioeconomic clusters at the block scale, making Culiacán a relevant case for discussing residential segregation in intermediate Mexican cities.

IV. METHODOLOGY

This article develops a quantitative research study of an exploratory-descriptive scope, based on multivariate spatial analysis of urban socioeconomic conditions at the intra-urban scale. The methodological strategy combines dimensionality-reduction techniques to construct a synthetic index and spatial autocorrelation techniques to evaluate its territorial organization.

Unit of analysis and data source

The unit of analysis is the census block, defined by the National Institute of Statistics and Geography (INEGI) as the smallest unit of territorial aggregation with publishable statistical representativeness. Its choice aligns with the hypothesis of micro-territorial fragmentation: larger units — Basic Geostatistical Areas (BGAs), neighborhoods, or sectors — could dilute local contrasts. In addition, working with small units mitigates, but does not eliminate, the effects of the modifiable area unit (MAUP) problem. The primary source is the 2020 Population and Housing Census (INEGI,



Figure 1. Methodological scheme of the analysis of residential segregation in Culiacán Rosales. Source: Prepared by the authors.

Category	Variables	INEGI Code	Absolute load
Education	Population 15+ with incomplete elementary education	P15BASIC_INCO	0.664
	Average grade of schooling	GRADO_EDU	0.739
	Population 15+ literate	P15YM_ALFA	0.465
	Population aged 6-11 years attending school	P6A11_AE	0.044
	Population aged 12-14 years attending school	P12A14_AE	0.035
Housing	Dwellings with more than 2.5 occupants per bedroom	VPH_2Y5_DORM	0.573
	Homes with a water tank	VPH_TINACO	0.556
	Housing with a toilet	VPH_EXCSA	0.490
	Housing with drainage	VPH_DRENAJ	0.429
	Homes with piped water	VPH_AGUADV	0.382
	Homes with electricity	VPH_C_ELEC	0.334
Goods	Homes with a car or van	VPH_AUTOM	0.797
	Homes with a washing machine	VPH_LAVAD	0.648
Technology and connectivity	Homes without internet	VPH_INTER	0.817
	Homes with digital services (streaming)	VPH_SPMVPI	0.784
	Homes with pay TV service	VPH_STVP	0.744
Health	Population affiliated with health services	PDER_SS	0.492
	Population affiliated with another health institution	PAFIL_OTRAI	0.397
	Population without affiliation with health services	PSINDER	0.068

Table 1. Variables with the greatest weight on the first main component. Source: Preparation by the Authors based on data from INEGI (2020).

2020). Statistical processing was performed in R, spatial autocorrelation in GeoDe, and mapping in QGIS. Figure 1 summarizes the methodological flow.

Construction of the synthetic index: Analysis of the main components

The socioeconomic condition was operationalized as a multidimensional construct comprising 19 indicators across

education, housing, goods, technology and connectivity, and health, in line with the Latin American literature on intra-urban measurement (Buzai & Montes, 2021). The PCA was applied to 13,531 blocks with complete information on the 19 variables. After statistical confidentiality, the spatial analysis was restricted to the 11,344 blocks that constitute the continuous urban sprawl. Table 1 reports the indicators used, grouped by category, along with their factor load on the first component.

The relevance of the procedure was evaluated using the Kaiser-Meyer-Olkin index (KMO) and the Bartlett sphericity test, statistical criteria for assessing whether the correlation matrix is suitable for Principal Component Analysis (PCA). These statistics are reported in the methodology to document the validity of the index construction procedure prior to its spatial analysis. The first component was used as a synthetic index because it captures the largest share of the variance and represents the dominant socioeconomic gradient among the variables analyzed. The factor scores were set up so that the higher values represented better socioeconomic conditions, since the sign of the component in PCA is arbitrary. The substantive interpretation of the factor loads and the resulting categories is presented in the Results section.

Spatial autocorrelation analysis

To assess whether socioeconomic status was randomly distributed or clustered spatially, global and local spatial autocorrelation analyses were conducted. The Moran's Global Index enabled estimation of the overall intensity of spatial clustering in the socioeconomic index. At the same time, the Local Indicators of Spatial Association (LISA) identified High-High, Low-Low, High-Low, and Low-High clusters. The analysis was performed in GeoDa using a spatial weight matrix based on the six Nearest Neighbors (k-Nearest Neighbors, KNN; $k = 6$), with 999 permutations. This choice made it possible to assign a fixed number of neighbors to each census block and to reduce problems arising from isolated units or geometric discontinuities in the urban fabric.

V. RESULTS

Spatial distribution of socio-economic status

The application of the PCA produced statistically consistent results. The Kaiser-Meyer-Olkin measure was 0.865, indicating adequate correlation structure among the variables; the Bartlett test was significant, $\chi^2(171) = 165\,133.2$, $p < 0.001$, confirming the relevance of the procedure. The first component presented an eigenvalue of 5.868 and explained 30.88% of the total variance. The indicators did not contribute with the same weight to the index: the highest absolute loads corresponded to internet availability (0.817), automobile (0.797), digital services (0.784), pay television (0.744), and educational level (0.739), which indicates that the component mainly synthesizes differences related to educational capital and the availability of goods and services in housing. A synthetic socio-economic condition index was constructed from this component, covering 11,344 blocks within the continuous urban area.

Category	Blocks	Percentage
Very low	1250	11.02%
Low	3,437	30.30%
Medium	3,410	30.06%
High	2,700	23.80%
Very high	547	4.82%
Total	11,344	100%

Table 2. Distribution of blocks according to socioeconomic condition (Culiacán Rosales, 2020). Source: Preparation by the Authors based on data from INEGI (2020).

To obtain the distribution presented in Table 2, the index was classified into five groups using the Jenks natural rupture method. This procedure identifies internal cut-off points that maximize homogeneity within each class and differentiation between classes. Therefore, the very low, low, medium, high, and very high categories do not constitute absolute thresholds of poverty or wealth, but relative positions within the socio-economic structure of Culiacán Rosales.

The distribution shows that the low and medium categories together account for 60.36% of the blocks, while the high and very high categories account for 28.62%. In substantive terms, the blocks classified as very high correspond to units in which the variables with the greatest factorial weight—internet availability, automobile, digital services, pay television, and educational level—have the greatest relative presence. In contrast, the blocks with very low condition show lower availability of these aspects and a greater association with indicators of educational and housing backwardness.

These results describe the socioeconomic composition of the area, but not its spatial organization; the subsequent autocorrelation analyses evaluate whether these categories form significant territorial groupings (Figure 2).

Global spatial autocorrelation of the socio-economic index

The calculation of Moran's Global Index on the socioeconomic index yielded a value of $I = 0.805$ (pseudo p -value = 0.001; 999 permutations). This result indicates a very high positive spatial autocorrelation, confirming a strong tendency for blocks with similar socioeconomic conditions to cluster territorially (Figure 3). The socioeconomic conditions of blocks are not randomly distributed but form a systematic and statistically significant spatial structure.

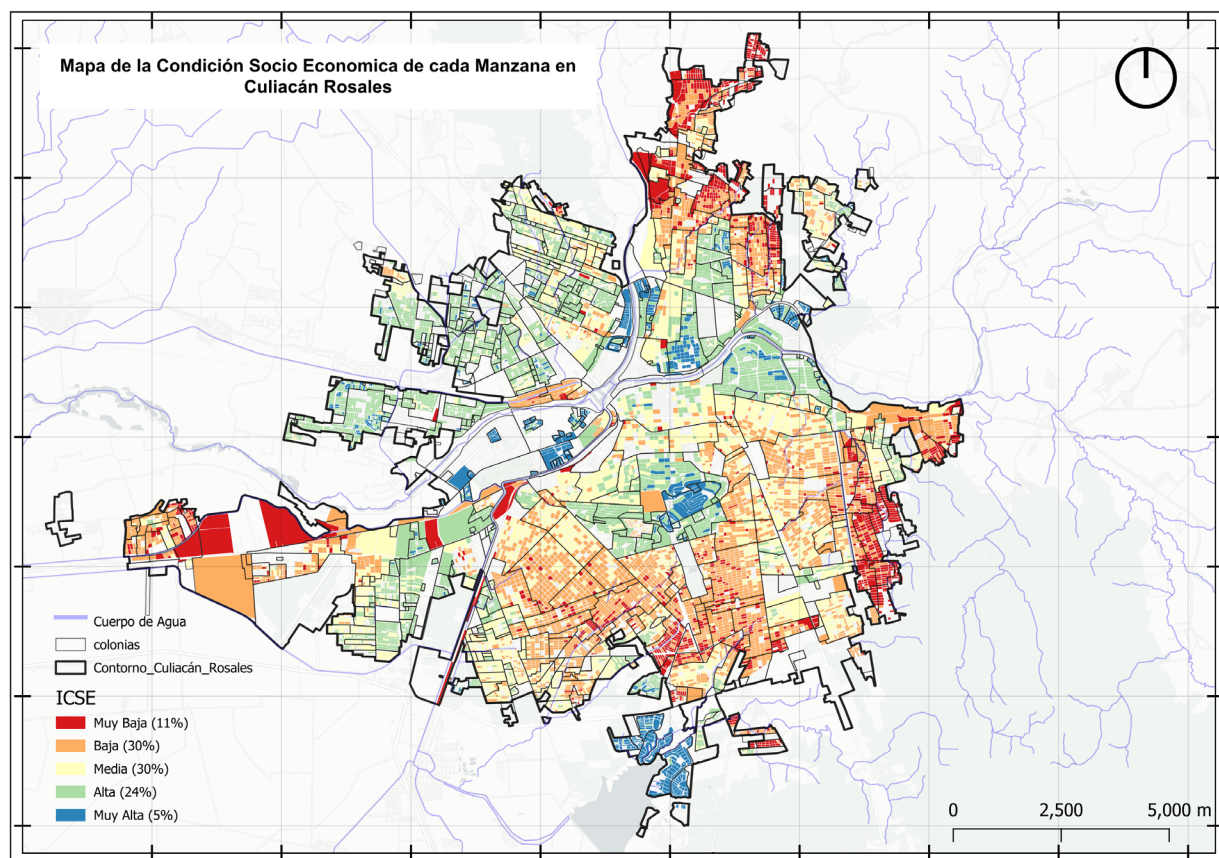


Figure 2. Spatial distribution of the socio-economic condition index (PCA) at the census block level in Culiacán Rosales, 2020. Source: Preparation by the Authors based on INEGI (2020).

Local geography of the fragmentation: LISA analysis

To identify the local geography of the spatial organization, the LISA procedure was applied, which decomposes Moran's Global Index into its contributions by spatial unit and classifies each block into one of five categories according to the relationship between its value and those of its immediate neighborhood: High-High (HH), Low-Low (LL), High-Low (HL), Low-High (LH) and not significant. Table 3 reports the resulting distribution.

Three features emerge as a central finding. First, the HH and LL clusters total 5,293 blocks (46.66% of the urban fabric), which express concentration with social homogeneity — the two objective dimensions of segregation. Secondly, the HL and LH clusters together account for less than 1%, indicating that situations of proximity without homogeneity are statistically exceptional; transitions between clusters occur by sharp edges. Thirdly, HH (23.28%) and LL (23.38%) are close in magnitude. However, the high and very high condition blocks (28.62% of the universe) are grouped in significant HH clusters at a higher

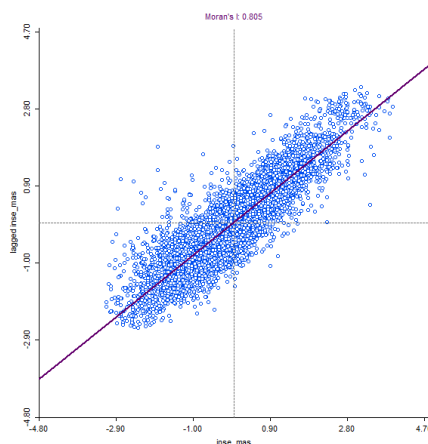


Figure 3. Moran scatter diagram for the socio-economic condition index (PCA) at the census block level in Culiacán Rosales. Source: Preparation by the Authors based on PCA results.

LISA Category	Blocks	Percentage
High-High (HH)	2 641	23.28%
Low-Low (LL)	2 652	23.38%
High-Low (HL)	56	0.49%
Low-High (LH)	49	0.43%
Not significant	5 946	52.42%

Table 3: Distribution of blocks according to the LISA category of the socio-economic condition index (Culiacán Rosales, 2020). Source: Prepared by the Authors based on the results of the PCA and LISA analysis in GeoDa.

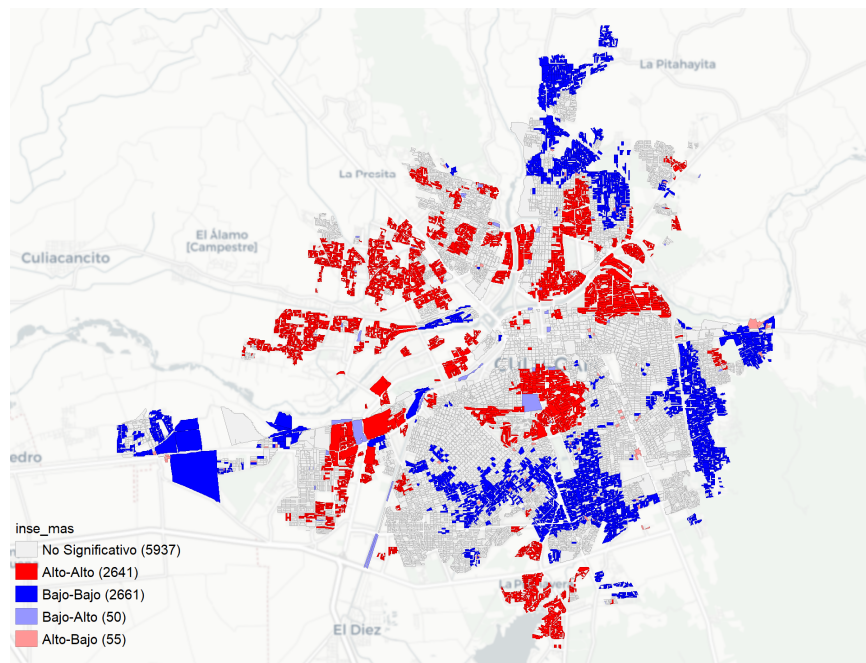


Figure 4. LISA Map (Local Moran) of the socio-economic condition index (PCA) at the census block level in Culiacán Rosales, 2020. Source: Preparation by the Authors based on PCA results.

proportion than the low and very low condition blocks in LL clusters, suggesting that the high condition sectors have a greater propensity for significant clustering.

Identification of local segregation clusters (LISA)

The LISA cartography (Figure 4) reveals three particularities of Culiacán that distinguish its pattern from the classical center-periphery model. The HH clusters do not form a continuous central nucleus, but are distributed as discontinuous enclaves in specific sectors of the north, southeast, and east, associated with high-end residential developments and closed subdivisions; this pattern approaches the fragmented city model (Janoschka, 2002), in which elites are redistributed to

exclusive peripheral enclaves. LL clusters are concentrated on urban edges with a tendency to dispersion, which make up a periphery that is distributed discontinuously along the fronts of recent expansion, where growth has operated by successive addition of social housing subdivisions, popular urbanizations in consolidation, urban voids, and closed developments of greater purchasing power (Ruiz López et al., 2021). The periphery of Culiacán is not a homogeneous strip of poverty but a fragmented one. Finally, the HH and LL clusters are located in nearby sectors without a gradual transition; the low percentage of local mix configurations confirms that this proximity does not produce socio-spatial integration but a coexistence of separate enclaves.

VI. DISCUSSION

The findings allow us to argue that residential segregation in Culiacán does not fully conform to the classic center-periphery model. Although socioeconomic inequality shows a strong spatial organization, its concrete expression does not correspond to a simple concentric pattern — with a continuous core of better conditions opposed to a homogeneous popular periphery —but to a geography of discontinuous enclaves where the sectors with the highest socioeconomic status appear in specific clusters distributed within the urban fabric. The HH clusters are located in specific sectors associated with recent residential developments and closed subdivisions, while the LL appear in scattered urban edges, linked to expansion fronts and popular urbanizations in consolidation. This configuration approximates the case to the fragmented city model, but with a characteristic feature of the intermediate scale: the physical proximity between contrasting clusters makes the socio-spatial separation more visible, without producing effective mixing.

This result is in direct dialogue with the recent literature on intermediate cities (Bellet Sanfeliu & Lasala Fortea, 2025; Gómez-Maturano, 2024; Sposito, 2024), which has pointed out that the intermediate scale can make the physical proximity between contrasting social sectors more visible. However, the Culiacán data nuance the idea that such spatial proximity alone favors socio-spatial integration: proximity exists, but it does not generate mixing. The intermediate scale produces a sharper visibility of the separation, not necessarily its overcoming. This morphological reading should be understood as partial, since urban integration also depends on symbolic barriers, practices of social distinction, and socio-cultural mechanisms that are not directly captured by the census data used in this study. The article thus provides evidence that urban fragmentation in Mexican intermediate cities should not be understood as a reduced version of the metropolitan pattern, but as its own configuration where the territorial proximity between contrasting enclaves coexists with material, symbolic, and socio-cultural barriers that maintain separation.

These patterns are consistent with previously documented urban processes for Culiacán. The discontinuous location of the HH clusters dialogues with the proliferation of closed subdivisions and with selective dynamics of real estate capital oriented towards sectors with greater potential for land valorization (Rodríguez González et al., 2018). The spread of LL clusters along urban edges, on the other hand, is consistent with a peripheral expansion in which social housing, popular urbanizations, urban voids, and developments with greater purchasing power coexist (Ruiz López et al., 2021). Thus, fragmentation operates not only between the center and the periphery, but also within the periphery itself.

Compared to previous studies on Culiacán that mainly addressed

the morphological dimension of fragmentation (Rodríguez González et al., 2018) or sectoral aspects of urban lag (Valle Campos, 2025), this work provides a spatially disaggregated and statistically formalized measurement of the socio-economic organization of the territory, which show that fragmentation is not limited to the presence of specific architectural types, but is translated into a geographical structure of significant socio-economic clusters at the block scale, and that the transition dual city to fragmented city documented by Pérez-Tamayo et al. (2017) that in 2000-2010 was consolidated in the most recent census.

The study has three limitations. The single timeline provides a synchronous snapshot that does not allow for trend analysis. The synthetic index captures the objective dimensions of segregation - concentration and homogeneity -but not the subjective dimension of prestige or stigma (Sabatini, 2006), which requires qualitative or mixed approaches. The analysis does not include variables such as land value or location of workspaces, whose incorporation would enrich the examination of the links between the real estate market and segregation patterns.

Future studies include the intercensal analysis of fragmentation dynamics, the articulation with land-market data, qualitative approaches to the subjective dimension of segregation, and the systematic comparison with other Mexican intermediate cities.

The contribution of the study is placed in three planes: it offers disaggregated empirical evidence on a Mexican intermediate city; it shows that this evidence is consistent with a logic of micro-territorial fragmentation specific to the intermediate scale; and it suggests that territorial equity policies in this urban type should assume that physical proximity does not guarantee integration.

VII. CONCLUSIONS

The study analyzed patterns of residential segregation in Culiacán Rosales using a synthetic socioeconomic status index at the census block scale and its spatial analysis. The results show that the socioeconomic conditions of the territory are not randomly distributed, but are organized into statistically significant, homogeneous clusters that cover 46.66% of the urban fabric. In comparison, the configurations of local socio-spatial mixture are statistically exceptional (< 1%). This evidence supports the central idea of the work: segregation in Culiacán does not follow a linear center-periphery pattern, but rather a logic of micro-territorial fragmentation.

Beyond the case, the study clarifies the recent hypothesis that the intermediate scale would favor socio-spatial integration by reducing the distances between social sectors. In Culiacán, the physical proximity between contrasting enclaves is real,

but it does not produce integration. The intermediate scale makes the separation visible; it does not dissolve it. Urban fragmentation in Mexican intermediate cities is not a reduced version of the metropolitan model, but a configuration of its own.

The scope of the study requires recognizing its limits. The measurement captures the objective dimensions of segregation, but leaves out territorial prestige; the synchronous cut does not allow for reading fragmentation as a temporal process; and the set of census variables does not incorporate the land market or the location of employment, mechanisms that literature has identified as central to contemporary fragmentation. These limits outline the agenda within which the work is inscribed, as a starting point, not as closure. The implications for territorial equity planning are direct: the micro-scale constitutes a relevant level of intervention, and public action must assume that proximity does not guarantee integration.

VIII. CONTRIBUTION OF AUTHORS CRediT:

Conceptualization, G. A. T. & R. G.-M. Data Curation, G. A. T. & R. G.-M.; Formal analysis, G. A. T.; Acquisition of financing, G. A. T.; Research, G. A. T.; Methodology, G. A.T.; Project Management, G. A. T.; Resources, G. A.T.; Software, G. A. T.; Supervision, G. A. T.; Validation, G. A. T.; Visualization, G. A. T.; Writing - original draft, R.G.-M.; Writing - revision and editing, R. G.-M.

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