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FRAGMENTED OR DISINTEGRATED CITY? URBAN MODELS APPLIED TO INTERMEDIATE MEXICAN CITIES FROM THE PERSPECTIVE OF GEODEMOGRAPHY [1]

¿CIUDAD FRAGMENTADA O DESINTEGRADA? LOS MODELOS URBANOS APLICADOS A LAS CIUDADES INTERMEDIAS EN MÉXICO DESDE LA GEODEMOGRAFÍA

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1 This work is part of the Research Project, registered with the Research and Postgraduate Secretariat of the National Polytechnic Institute: 20230596, called: “Residential segregation in the Context of Polycentrism and Urban Dispersion in Mexican Cities

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Los modelos urbanos son fundamentales en la discusiones teóricas y empíricas de las ciudades. Sin embargo, los modelos de la ciudad latinoamericana propuestos por geógrafos alemanes no han sido muy cuestionados a pesar de su empleo y, por otra parte, existen pocos estudios fuera de las grandes áreas metropolitanas de Latinoamérica. Por ello, se busca identificar si existe un patrón de la estructura residencial de las *ciudades intermedias* del Sistema Urbano Nacional de México por medio de la geodemografía. Esta propuesta metodológica busca traer nuevas herramientas de los métodos de análisis espacial, enfocados en estilos de vida, y centrase en el estudio de una de las grandes capas que tienen los modelos urbanos, la de su estructura residencial. Los resultados muestran en primer lugar que, utilizando los modelos y sus temporalidades como caleidoscopio, se pueden identificar los múltiples patrones de las ciudades, y no un único modelo. En segundo lugar, aparece un nuevo patrón desintegrado donde no son reconocibles los modelos clásicos de la Escuela de Chicago y donde la ciudad fragmentada quedó desintegrada.

Palabras clave: ciudades utópicas, ciudades intermedias, análisis de datos, segregación residencial, modelos urbanos.

Urban models are fundamental in the theoretical and empirical discussions about cities. However, the Latin American city models proposed by German geographers have not been questioned much despite their use, and there are few studies outside the large metropolitan areas. Therefore, this article, using geodemography, seeks to identify whether there is a residential structure pattern in the intermediate cities of Mexico's National Urban System. This methodological proposal looks to use new spatial analysis tools focused on lifestyles and the study of one of the great layers that urban models have: their residential structure. The results show that, firstly, using the models and their temporalities as a kaleidoscope, it is possible to identify the multiple patterns of cities and not just a single model. Secondly, a new disintegrated pattern appears where the classical models of the Chicago School are unrecognizable, and the fragmented city is left disintegrated.

Keywords: Utopian cities, intermediate cities, data analysis, residential segregation, urban modeling.

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I. INTRODUCTION

Urban models were fundamental elements in both theoretical and empirical discussions in the 20th century (Szupiany, 2018, p: 102). These had three fundamental connotations, according to Janoschka (2005): a *constructive utopia*, such as the *garden city*; others generated by *deductive logic*, such as those of Christaller or von Thünen; and the models that emerged from the simplification of complex realities, known as city structural models. The latter are mainly associated with the work the Chicago School of Human Ecology carried out in the 1920s: the concentric ring model, the sector model, and the multi-core model (Linares, 2012, p:16).

At the end of the 20th century, emerging models were called into question due to the crisis of modernity. However, Borsdorf (2003) affirmed their methodological validity, defending their usefulness to the specificities of the Latin American city. At the beginning of the 21st century, some urban models applied to Latin American cities were developed, in particular, proposed by researchers from other latitudes who used these cities as analysis (Borsdorf, 2003; Borsdorf et al., 2002; Ford, 1996; Janoschka, 2002). Sometime later, some urban researchers became concerned about adopting these models. From Mexico, Álvarez (2010) questions the applicability of the theoretical currents based on the study of cities in North America, Europe, and Oceania to the context of Mexican cities. This approach coincides with the perspective of Delgadillo (2019), who argues that "the adoption of concepts and theories developed by researchers studying different urban realities and in other linguistic contexts can provide a limited understanding of local urban processes" (p.62).

In particular, on the models developed by German geographers in Latin America, Orellana (2020) points out that there is no further analysis despite being a widely used reference by urban studies. Therefore, the author argues that it is essential to question and refute its applicability, for example, in intermediate urban systems. In the same sense, Álvarez (2010) points out that studies tend to focus on metropolitan areas, with limited attention to medium-sized cities.

In this context, this research aims to identify whether there is a pattern of the residential structure of the Intermediate Cities of the national urban system of Mexico through geodemography. This methodological proposal seeks new tools to "analyze people according to the place where they live" (Harris et al., 2005, p. 2). In this way, with the data sources of the National Institute of Statistics and Geography (INEGI) of 2020, and together with the spatial analysis methods focused on lifestyles, it is sought to have a sound methodology for the study of one of the great layers that urban models have, that of their residential structure.

II. THEORETICAL FRAMEWORK

The models of the Latin American city are up for debate

The urban models applied to Latin America at the end of the 20th century and the beginning of the 21st century were developed by researchers from other latitudes, who used these cities as analysis (Ford, 1996; Borsdorf, 2003; Janoschka, 2002). The first was Ford (1996), who presented an urban model at the end of the 20th century that retains the basic structure of rings and sectors of the Chicago School models but introduces six significant modifications. The second model is the joint proposal of Borsdorf et al. (2002), which Borsdorf (2003) presents as the historical development of Latin American cities up to the fragmented city. However, the model that had the most significant impact on academia was that of Janoschka (2002), highlighting the emergence of insular urban forms that differ from traditional city models in the region.

After these publications, a large number of studies appeared that sought to find out if these proposed models followed the reality of Latin American cities in different geographies such as Chile (Valdebenito, 2014; Orellana, 2020), Argentina (Linares, 2012; Buzai, 2014; Buzai & Montes (2020) or Mexico (Alvares, 2010; Göbel, 2015; Aguilar & Mateos, 2011). Other studies only mentioned them to frame their conclusions about the transformation of the Latin American city without any robust analysis or questioning the interpretative delimitation of these models.

In particular, in Mexico, a study of 32 cities developed based on three indicators found that these cities do not entirely conform to the theoretical models of a monocentric urban structure and, in addition, over time, cities tend to be less concentric and develop another type of spatial organization (Álvarez, 2010). Another study in Mexico notes that "the Latin American city model by Bähr, Borsdorf and Mertins describes many development trends that occur in the process of the metropolization of the urban agglomeration of Querétaro" (Göbel, 2015, p. 59). However, Querétaro today represents a typical city where tradition, modernity, and poverty are directly confronted (Göbel, 2015). Another study that related urban models and residential segregation sought to identify demographic differentiation in the Metropolitan Area of Mexico City. It found that they followed the

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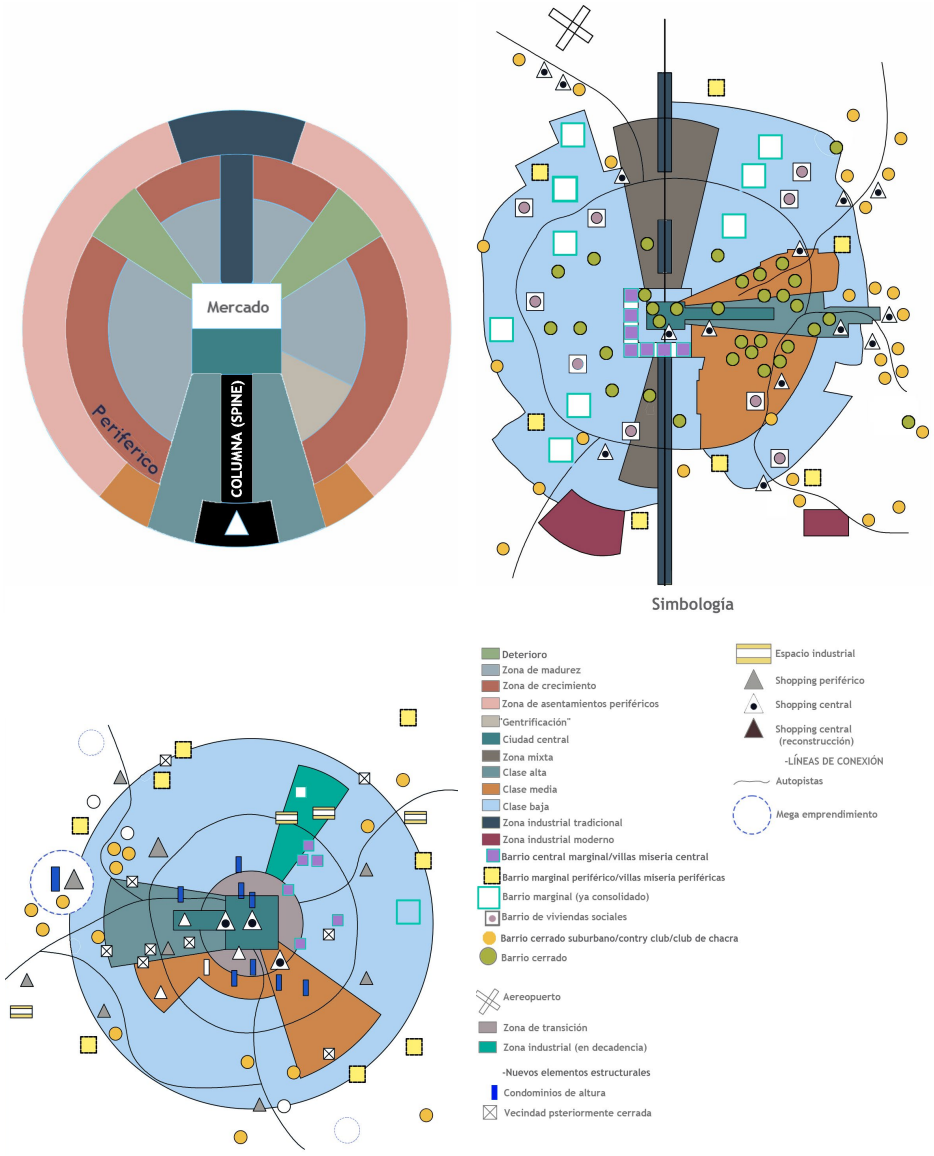

Figure 1. Theories of the internal structure of the Latin American city. Source: Author's elaboration based on Ford (1996), Borsdorf (2003), and Janoschka (2002).

traditional residential segregation model regarding the spatial distribution of socioeconomic groups (Aguilar & Mateos, 2011). However, there are indications of a more recent model of urban dispersion and fragmentation of space, with the presence of socio-economic groups such as the peripheral proletariat and the marginal urban-rural periphery. In addition, office workers in housing units tend to be located in interstitial areas and along main road accesses (Aguilar & Mateos, 2011). This analysis generated locations similar to those found in the study associated with the pattern of residential segregation in Latin American cities (Gómez-Maturano & Kunz, 2020)

As for the validity of the models of German geographers, some authors find many trends that occur in the city's metropolization process (Göbel, 2015; Aguilar & Mateos, 2011). Other researchers, in addition to the signs of the German models, identify that the structural elements are synthesized together with other models and that they sometimes represent a historical evolution of city organization (Linares,

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Figure 2. Intermediate Mexican cities. Source: Prepared by the author based on the United Nations list of cities (2018).

2012; Buzai & Montes, 2020). Ultimately, with a more critical perspective, it is concluded that the models of German geographers do not explain the entire Latin American city (Valdebenito, 2014) since cities do not entirely conform to the theoretical models of a specific urban structure (Alvarez, 2010). This is because there may be particularities in cities, such as political and social processes and even urban phenomena, such as conurbation, that modify them (Orellana, 2020).

IV. METHODOLOGY

The object of study is the *intermediate cities* of Mexico, considering what has been pointed out by authors such as Alzate (2023), that its conceptualization is under construction. In this sense, the characterization of a study by Navarro et al. (2023) is returned to, where intermediate cities in Mexico are defined as "those included in the metropolitan context, with a population range between 500,000 and one million inhabitants, that are not part of a higher-ranking metropolitan system" (p. 8). These cities coincide in their characteristics with the UN list of cities (2019), where Mexican cities are classified into three groups: large metropolitan areas, metropolitan areas, and medium urban areas (Table 1) (Figure 2). In this case, the so-called metropolitan areas are considered *intermediate cities* in this study.

As for the methodology, geodemography was returned to,

Urban agglomeration	2015 Population
Culiacán	754.000
Xalapa	719.000
Oaxaca de Juárez	655.000
Celaya	640.000
Durango	573.000
Pachuca de Soto	570.000
Ciudad Juárez	1.423.000
La Laguna	1.313.000
Querétaro	1.214.000
San Luis Potosí	1.126.000
Mérida	1.064.000
Mexicali	1.026.000
Aguascalientes	1.017.000
Cuernavaca	998.000
Chihuahua	950.000
Tampico	928.000
Acapulco de Juárez	920.000
Saltillo	901.000
Morelia	888.000
Veracruz	864.000
Villahermosa	825.000
Reynosa	810.000
Cancún	802.000
Hermosillo	789.000
Tuxtla Gutiérrez	763.000

Table 1. List of intermediate Mexican cities. Source: Prepared by the author based on the United Nations list of cities (2018).

which is the "analysis of people according to the place where they live" (Harris et al., 2005, p. 2), i.e., knowing where someone lives provides valuable information about how that person lives. This spatial analysis method has the following structure. First, data from the 2020 Population and Housing Census (INEGI, 2020) were collected and input, from which the analysis variables were selected, which refer to the people and places where they live. Secondly, regarding the statistical techniques, a Principal Components Analysis (PCA) was performed, the primary objective of which was to reduce the dimensions and synthesize the data input information into the procedure. Along with this analysis, a correlation analysis was performed to reduce the database's dimensions, which comprised 61 variables (Table 2).

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Short name of Variable	Description of the Variable
GRAPROES	Average level of schooling
HOGJEF_F	Census households with female reference.
HOGJEF_M	Census households with a male reference.
OCUPVIVPAR	Occupants in inhabited private dwellings.
REL_H_M	Male-female ratio
P12YM_SEPA	Population aged 12 and over who were married or cohabiting.
P12YM_CASA	Population aged 12 and over who are married or cohabiting
P12YM_SOLT	Population aged 12 and over who are single or never cohabited.
P18YM_PB	Population aged 18 and over with secondary education and above
P3YM_HLI	Female population aged 3 years and over, who speak an indigenous language.
PAFIL_IPRIV	Population affiliated with private health services.
PAFIL_OTRAI	Population affiliated with another institution.
PAFIL_PDOM	Population affiliated in PEMEX, Defense, or Navy
PCON_DISC	Population with disabilities
PDER_IMSS	Population affiliated with the IMSS.
PDER_ISTE	Population affiliated with the ISSSTE.
PDER_SEGP	Population affiliated with the Health and Welfare Institute.
PEA	Population aged 12 and more who are economically active.
PNACENT	Population born in the entity.
PNACOE	Population born in another entity.
POB0_14	Population from 0 to 14 years.
POB15_64	Population from 15 to 64 years old.
POB65_MAS	Population aged 15 to 64
POBTOT	Total population.
POCUPADA	Population aged 12 and over who are employed.
PRES2015	Population aged 5 and over residing in the entity in March 2015
PRESOE15	Population aged 5 and over residing in another entity in March 2015
PROM_OCUP	Average number of occupants in dwellings
PSINDER	Population without affiliation with health services
PROM_HNV	Average number of children born alive
TVIVHAB	Total number of inhabited dwellings
TVIVPAR	Total number of private dwellings
VIVPAR_DES	Uninhabited private homes.
VIVTOT	Total number of dwellings
VPH_1CUART	Private dwellings inhabited with only one room
VPH_1DOR	Houses with one-bedroom
VPH_2CUART	Houses with two bedrooms.
VPH_2YMASD	Houses with two or more bedrooms.
VPH_3YMASC	Houses with three or more bedrooms.
VPH_AGUADV	Homes that have piped water in the housing area.

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Short name of Variable	Description of the Variable
VPH_BICI	Homes with a bicycle as a means of transport.
VPH_C_ELEC	Homes with electricity.
VPH_CEL	Homes with cell phone
VPH_CISTER	Homes with a cistern or tank
VPH_CVJ	Homes with video game consoles.
VPH_DRENAJ	Houses with drainage.
VPH_EXCSA	Housing with toilet.
VPH_INTER	Homes with Internet.
VPH_NDACMM	Homes with a car or van, not a motorcycle or scooter.
VPH_PC	Homes with a computer, laptop, or tablet.
VPH_PISODT	Houses with floors made of materials other than earth.
VPH_SINCINT	Homes without a computer or Internet
VPH_SINTIC	"Housing without information and communication technologies (ICT)"
VPH_SNBIEN	Houses without any assets
VPH_SPMVPI	Homes with paid movie, music, or video streaming service
VPH_STVP	Homes that have to pay for TV service.
VPH_TELEF	Homes with a landline.
VPH_TINACO	Houses with water tank.
VPH_TV	Homes with TV
VPH_SINRTV	Homes without radio or television
VPH_SINLTC	Homes without a landline or a cell phone

Table 2. List of the variables selected for cluster analysis. Source: Prepared by the author based on the 2020 Population and Housing Census (INEGI, 2020), some names were abbreviated.

The second statistical process was the cluster analysis, which aims to group individuals with similar characteristics and is assisted by a dendrogram. Thus, in addition to creating groups, this analysis sought to hierarchize the datasets to have a predetermined order in which similar observations are grouped using the spatial analysis units called Basic Geostatistical Areas (BGA), the census areas in Mexico.

Finally, in conceptual terms, this study will refer to geodemographic groups as the groups that, in the classical models, were called the upper, middle, and lower classes.

V. RESULTS

Who are the geodemographic groups, and how do they live?

The cluster analysis and the dendrogram based on Harris et al. (2005) showed three groups in almost all cities as the fewest groupings. Each group has specific characteristics in their housing, such as the degree of urbanization, the satisfaction with housing, certain types of people from the educational point of view, family status, life cycle, socioeconomic characteristics, access to health, and migration. In particular, clusters one and three are opposite in their characteristics, and cluster two is a mixture of both. In some cases, the difference between the two main groupings is not very high, for example, in Cancun, Merida, Aguascalientes, Oaxaca, Acapulco, and Cuernavaca. However, in another, it shows considerable differences, as is the case of Culiacán, Saltillo, Durango, Mexicali, Xalapa, Morelia, and Pachuca (Figure 3).

As for the characteristics of the housing, cluster three has more private homes; in general, they have more rooms, they have a floor that is not the earth, toilets, and a water tank; on the contrary, those in cluster one are not private homes, in general, they have fewer rooms, there are more unoccupied homes, and they have less infrastructure. As for the degree of consolidation of urbanization, number three has drainage, water, and electricity; on the contrary, number one has a lower degree of consolidated urbanization.

In addition, regarding the satisfiers of everyday life, cluster three mostly has the internet, computers, laptops or tablets, video game consoles, landlines, paid TV services, and paid-for movie, music, or video streaming services. On the contrary, cluster one is characterized by not having these satisfiers of everyday life. Finally, regarding mobility, cluster three has a car, van, motorcycle, or scooter, while cluster one uses bicycles more as a means of transport.

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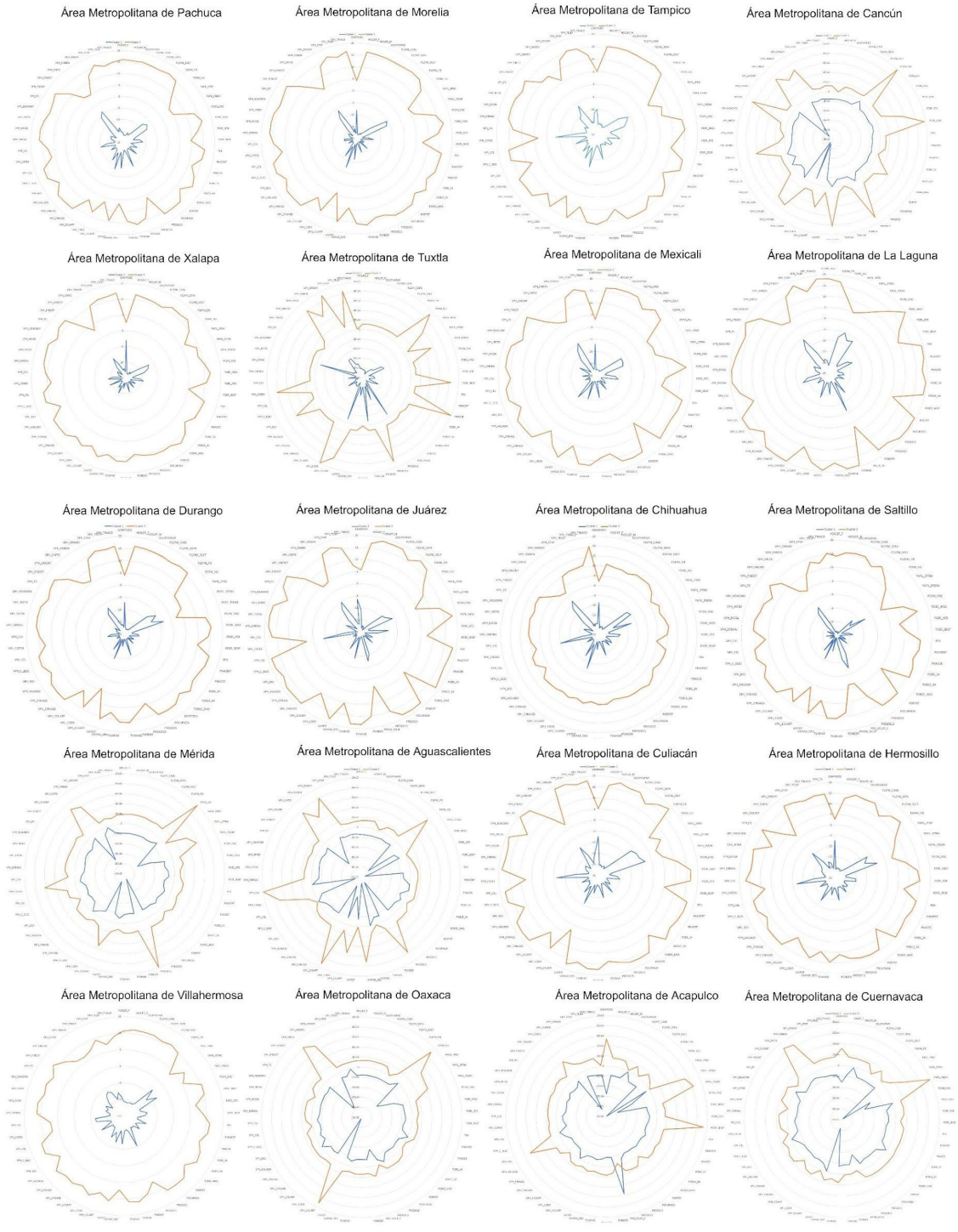

Figuea 3. Radar graph of clusters 1 (blue line) and 3 (orange line) of the Intermediate Cities of Mexico with selected variables. Source: Preparation of the authors based on the geodemography methodology described in Harris et al. (2005).

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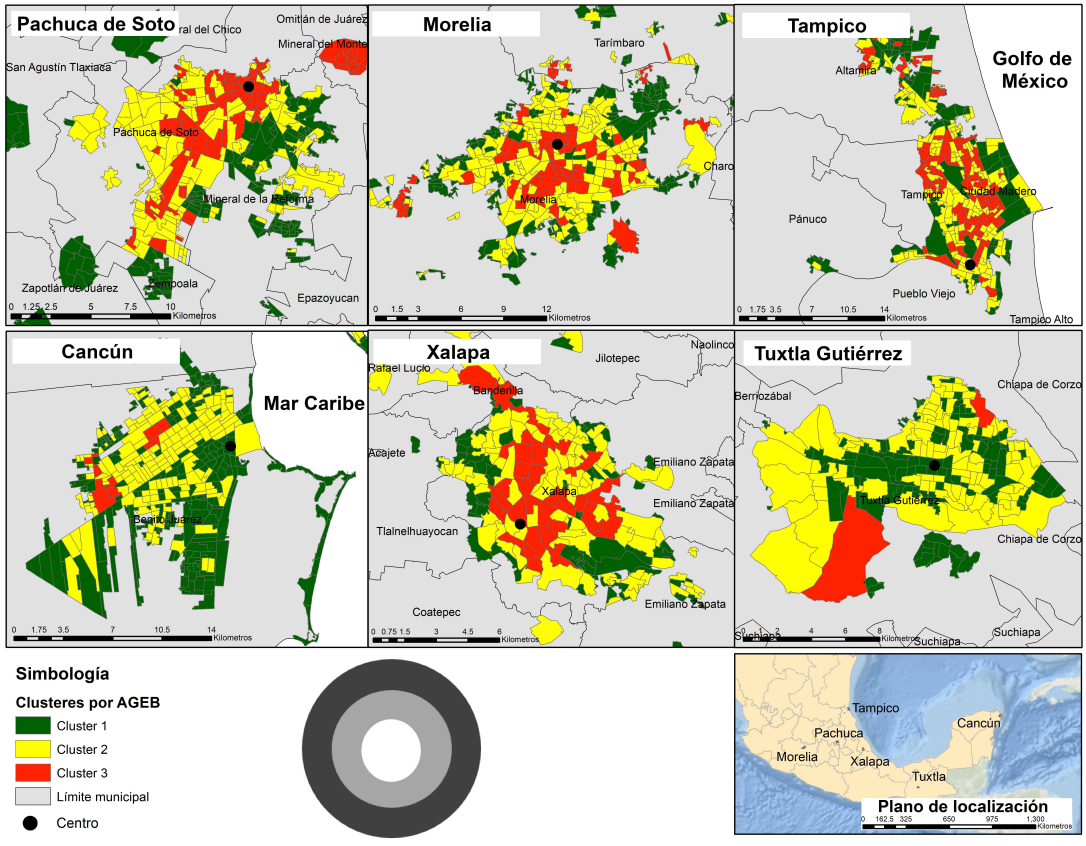

Figure 4. The geodemographic pattern of concentric circles. Source: Author's elaboration.

Cluster three is characterized, from an educational point of view, by having a higher preparation; that is, they have at least high school studies; cluster one generally has a lower education. In terms of household types, cluster three has more married people, with more male heads of household, and they are larger families; cluster one has fewer married people, more separated people, and more female heads of household. For the life cycle, cluster three has a mixture of children, young people, adults, and older adults, and the one has a more young and adult population than children and older people.

In the socio-economic category, Cluster Three has a higher economically active population and a higher employed population, while Cluster One is less connected to the labor market. In health, cluster three, in general, is more affiliated with health services; on the contrary, those in cluster one are not affiliated with these health services but are more affiliated with the Health Welfare Institute (social health model); therefore, they are characterized by being a population with more people with some disability. As for migration, cluster three has a larger population born in the entity; on the contrary, cluster one is characterized by having a migrant population.

Some cities do not necessarily respond to these characteristics from a demographic point of view. However, in some specific cases, there are differences, such as tourist cities, and others are considered typical cities in their characteristics.

The geodemographic patterns of Mexican intermediate cities.

From the spatial point of view, the *intermediate cities* of Mexico were classified into different geodemographic patterns. The first is the pattern of concentric circles; examples are Pachuca, Morelia, Tampico, Cancun, and Xalapa. In these cities, the high geodemographic group is characterized by having better housing, living in spaces with a better degree of urbanization, and more satisfactory

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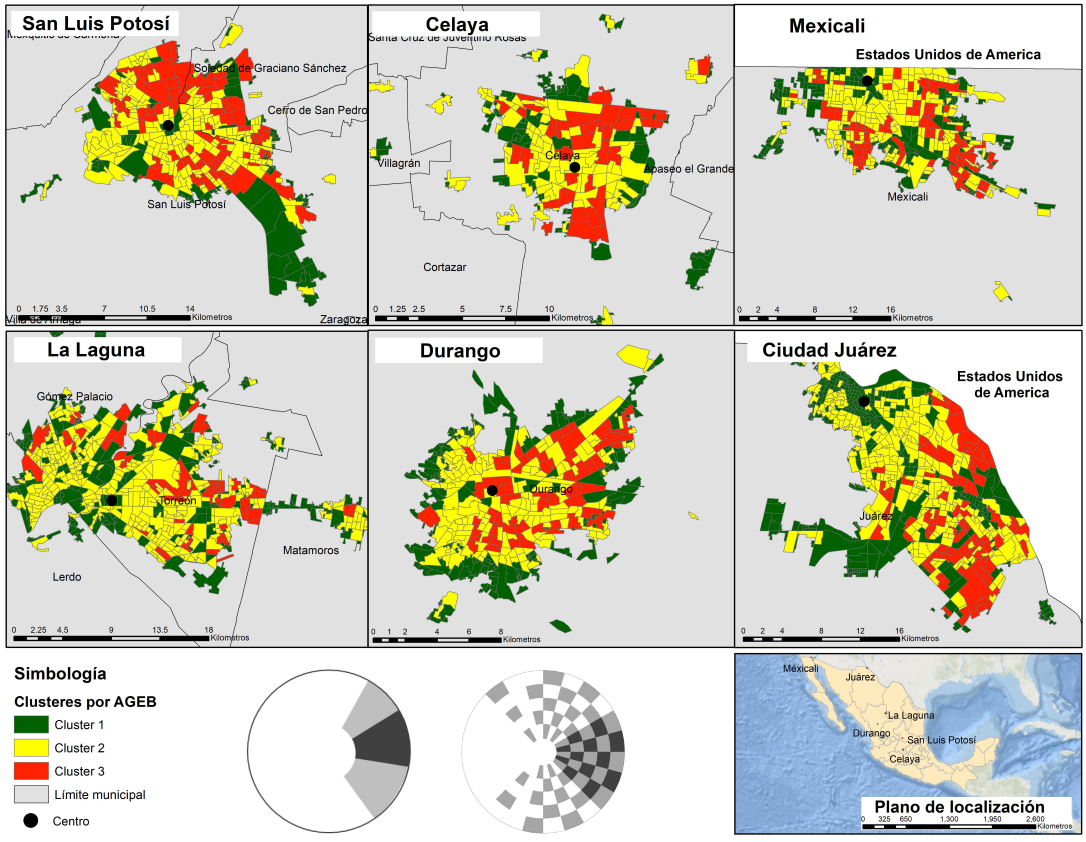

Figure 5. The geodemographic pattern of concentric circles and sectors and the polarized pattern in concentric circles and fragmented sectors. Source: Preparation by the Author.

housing (cluster three). They are located in the center, and their presence decreases as one moves away from the center. The middle geodemographic group, characterized by a mixture (cluster two), occupies the second ring, and the lowest is located in peripheral sectors (cluster one). On the other hand, another city in concentric circles, but where the low geodemographic group is located in the center of the city, is Tuxtla in Chiapas, where the middle groups are located in the second ring and the high ones on the periphery. Interestingly, most of these cities are in central and southern Mexico (Figure 4).

The second pattern is concentric circles and sectors in San Luis, Celaya, and Mexicali. In this, it can be seen that the highest income geodemographic groups (cluster 3) are located in the third ring on the periphery but grouped into sectors in the city. Those with low incomes (cluster 1) are located both on the peripheries and in the central part of the city in small fragmented sectors. Finally, the middle occupies the second ring, sharing space with the upper class in some cases (Figure 5).

The third geodemographic pattern is that of fragmented sectors in La Laguna, Durango, and Juárez. In this case, the geodemographic groups with the highest incomes are located in the so-called high-income cone, but in a fragmented way, mixing with the middle and lower classes. On the other hand, the lower income groups are scattered throughout the city, mainly in the center, in the second contour, and on the periphery, but with emphasis on one sector of the city. On the other hand, the middle groups are found as the space that brings the city together (Figure 5).

The fourth pattern is the city fragmented into concentric circles, represented by Chihuahua, Saltillo, Merida, Aguascalientes, Culiacán, and Hermosillo. In this case, the geodemographic groups with the highest incomes are located mainly on the periphery of cities in the form of concentric circles but in a fragmented way without generating sectors. In the second contour, the middle class is present, which allows for the location of many fragments of low and high groups. Generally, the sectors

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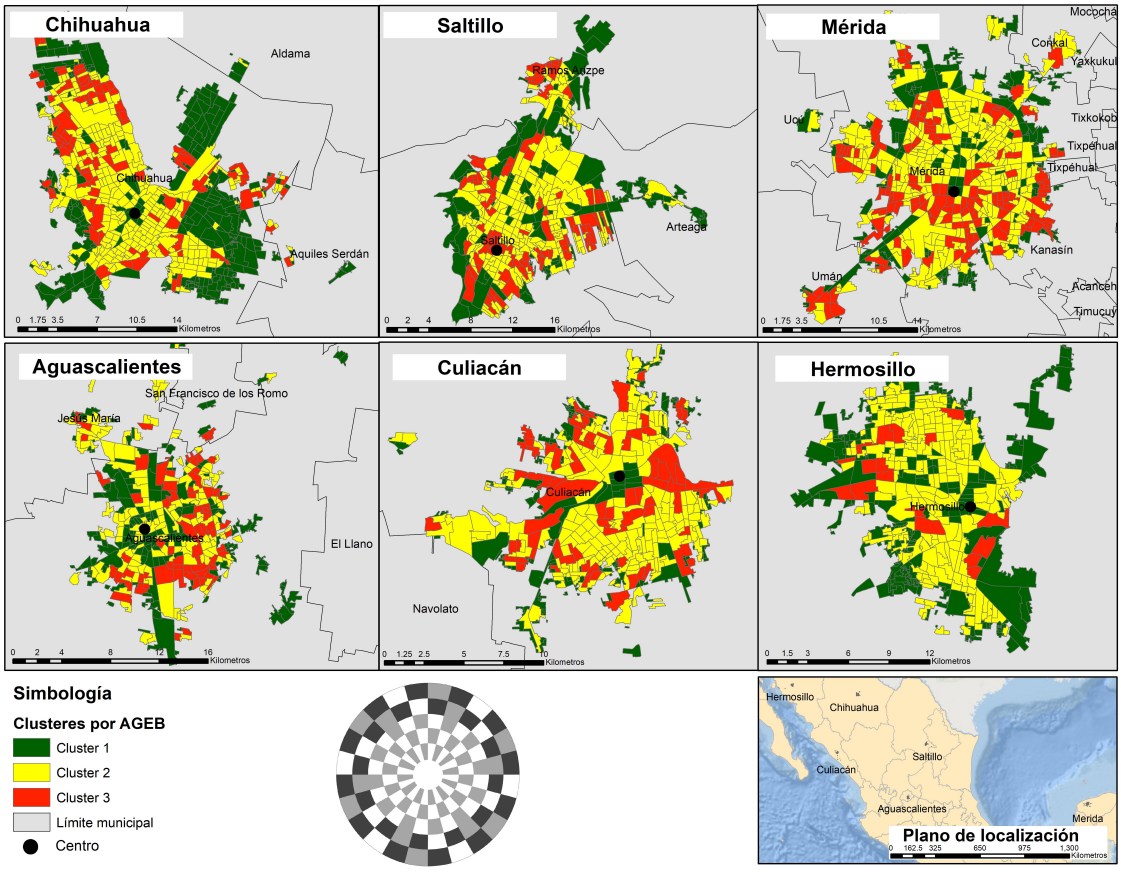

Figure 6. The geodemographic pattern fragmented into concentric circles. Source: Preparation by the author.

with the lowest incomes are located in a fragmented way in the center, in the second contour, and on the periphery of the city (Figure 6).

The fifth geodemographic pattern is the disintegrated one, where the large sectors referred to in the fragmented city models are not identified; this pattern seems pulverized. Examples are the cities of Querétaro, Villahermosa, Oaxaca, Acapulco, Cuernavaca, and Veracruz. These cities are determined by having multiple nuclei, not sectors, similar to the different socio-demographic groups, high, medium, and low (Figure 7).

VI. DISCUSSION

The results show that the city models of German geographers do not explain all Latin American cities from the geodemographic point of view, which is evidenced by the first patterns identified in concentric circles and sectors. These cities are related to the model of Burgess, Hoyt of the Chicago School, and Ford (1996). However, in these cities, except for Tuxtla, the central parts are still used by the urban elites, as was identified by Borsdorf et al. (2002), but for the colonial city that they called compact, from 1550 to 1810, and the city of the first phase of urbanization until 1920, which they called a sectoral city.

The patterns where the affinity with the current models begins to be identified are the so-called fragmented sector and the fragmented pattern in concentric circles. In these, it is possible to identify that pointed out by Linares (2012) and Buzai and Montes (2020), who synthesize patterns together, as these cities are a mixture of Burgess' concentric circles' models, the sectors of Hoyt, that of Ford (1996) and the so-called polarized city identified by Borsdorf et al., (2002), for the seventies, where the groups are located in opposite sectors of the city, but in this case in a fragmented way as was identified in the models of

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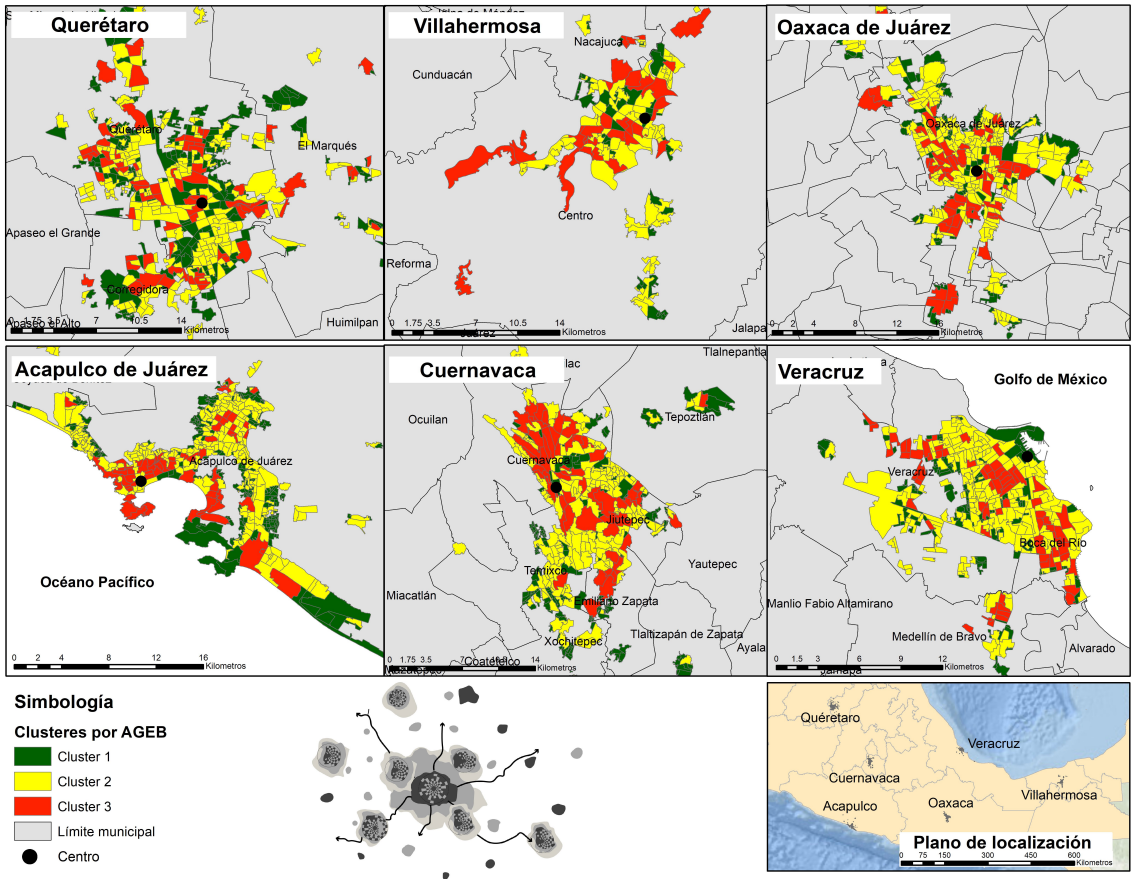

Figure 7. The disintegrated geodemographic pattern. Source: Preparation by the Author.

German geographers (Borsdorf et al., 2002; Janoschka, 2002; and Borsdorf, 2003).

Finally, in the disintegrated pattern, the sectors and concentric circles that are still identified in the Ford (1996), Borsdorf (2003), and Janoschka (2002) models no longer appear. This pattern seems closer to the new Urban Sprawl models in studies worldwide (Seevarethnam et al., 2021) and in Latin America (Silva & Vergara-Perucich, 2021). This could be explained by the conurbation phenomenon identified by Orellana (2020) or because the city grew dispersed along the main roads. Therefore, sectors that gather social groups are not identified but appear fractured throughout the territory. In these cities, the fragmented city seemed disintegrated; this new pattern needs to be analyzed in greater depth in future studies.

The study carried out had limitations in proposing an urban model. On the one hand, only one of the layers of the urban structure was worked with, the residential structure that allowed identification of the geodemography, which left aside other factors, such as the road network, the location of industry, commercial activities, centralities, the existence of closed neighborhoods, degradation processes, informality, and gentrification. On the other hand, the previous models are based on the analysis of the evolution of large cities, so it refers to the processes.

This study considered only the situation in 2020. Therefore, intermediate cities and the possibility of proposing some models could be considered future lines of research. Finally, the applied methodology allowed us to identify how they live and who, in the classical models, are generically called upper, middle, and lower class. The high-income geodemographic group lives in their own homes, they have more rooms for family members, and generally, they will have their housing finished with all the necessary additions. They live in the consolidated areas of the city, and in those newly created with all the urban services, they have most of the satisfactory ones, from the typical ones

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like pay television to having all the ICTs; their mobility is supported with automotive means. These people generally have university studies, live in nuclear families, where men exercise greater domination, in diverse spaces in the life cycle, have greater integration into work, have health services, and are generally a native population. The low-income geodemographic group often presents a duality of these characteristics.

VII. CONCLUSIONS

The results show that no urban model explains all the geodemographic patterns without considering a unique pattern in the intermediate cities in Mexico. However, as a whole, all the models allow us to understand complex cities, combining patterns and temporalities and perhaps identifying a pattern in that kaleidoscope that allows us to understand the cities. This is in order not only to identify the model to which a city belongs, but to the city that would be transformed in the future: a polarized city, a city segregated into sectors, a fragmented city, a scattered city, or that new pattern that seems to be emerging from the disintegrated city.

This is not the diffuse city or the Urban Sprawl that was looking for a new, less hierarchical spatial organization. Nor is it a fragmented city, since it is not only broken and separated, but the disintegrated city seems to be the dissolution and decomposition of the city, losing spatial unity and social cohesion that could have severe consequences for the quality of life for people by dismembering community relations, replacing them with highly individualized spaces where the weakening of the community is appreciated. At the moment, these data provide a basis for future research. However, it is essential to explore this new vein to increase knowledge about the urban and metropolitan phenomenon in Mexico.

VIII. REFERENCES

Aguilar, A. G., & Mateos, P. (2011). Diferenciación sociodemográfica del espacio urbano de la Ciudad de México. *Eure,* 37(110), 5-30. http://dx.doi.org/10.4067/S0250-71612011000100001

Álvarez, (2010). El crecimiento urbano y estructura urbana en las ciudades medias mexicanas. Quivera. *Revista de Estudios Territoriales*, 12(2), 94-114. https://www.redalyc.org/pdf/401/40115676006.pdf

Alzate, J. G. V. (2023). Consideraciones teórico-metodológicas para el estudio de ciudades intermedias en sus atributos socioespaciales. *Jangwa Pana: Revista de Ciencias Sociales y Humanas*, 22(1), 1. https://doi.org/10.21676/16574923.4736

Borsdorf, A. (2003). Cómo modelar el desarrollo y la dinámica de la ciudad latinoamericana. *Eure,* 29(86), 37-49. http://dx.doi.org/10.4067/S0250-71612003008600002

Borsdorf, A., Bähr, J., & Janoschka, M. (2002). Die Dynamik stadtstrukturellen Wandels in Lateinamerika im Modell der lateinamerikanischen Stadt. *Geographica Helvetica*, 57(4), 300-310. https://gh.copernicus.org/articles/57/300/2002/

Buzai G. & Montes G. (2020). El mapa social de la ciudad de Córdoba (Argentina). *Cuadernos Geográficos,* 59(1), 299-315. http://dx.doi.org/10.3082

Buzai, G. (2014). El mapa social de la ciudad de Luján, 2010. Modelo socioespacial basado en Linkage Analysis. https://ri.conicet.gov.ar/handle/11336/105072

Delgadillo, V. (2019). Metáforas de las ciudades latinoamericanas ¿Conceptos y adjetivaciones importadas, neutras y despolitizadas?. *Revistarquis,* 8(2), 49-65. https://revistas.ucr.ac.cr/index.php/revistarquis/article/view/37924

Ford, L. (1996), "A New and Improved Model of Latin American City Structure", The Geographical Review (3° ed., Vol. 86) American Geographical Society. https://www.jstor.org/stable/215506

Göbel, C. (2015). Una visión alemana de los modelos de ciudad. El caso de Querétaro. *Revista Gremium*, 2(4), 47-60. https://doi.org/10.56039/rgn04a06

Gómez Maturano, R., & Kunz Bolaños, I. (2020). Tipología de barrios para un aporte metodológico desde la segregación residencial en Zona Metropolitana del Valle de México (ZMVM). *Revista de urbanismo*, (42), 72-87. http://dx.doi.org/10.5354/0717-5051.2020.54781

Harris, R., Sleight, P. & Webber, R. (2005). *Geodemographics: neighbourhood targeting and GIS*. (pp. 1-289) John Wiley and Sons.

Instituto Nacional de Estadística y Geografía (INEGI). (2020). Censo de Población y Vivienda 2020. https://www.inegi.org.mx/programas/ccpv/2020/

Janoschka, M. (2002). El nuevo modelo de la ciudad latinoamericana: fragmentación y privatización. *Eure,* 28(85), 11-20. http://dx.doi.org/10.4067/S0250-71612002008500002

Janoschka, M. (2005). El modelo de ciudad latinoamericana. Privatización y fragmentación del espacio urbano de Buenos Aires: el caso Nordelta: En, M. Welch (Ed.). *Buenos Aires a la deriva. Transformaciones urbanas recientes* (pp. 96-131). Editorial Biblos.

Linares, S. (2012). Aportes de la ecología urbana y modelos neoclásicos para analizar la diferenciación socioespacial en ciudades medias bonaerenses. Pergamino, Olavarría y Tandil (2001). *Revista Huellas,* (16), 13-35. https://repo.unlpam.edu.ar/handle/unlpam/2782

ONU (Organización de las Naciones Unidas). (2019). *World Urbanization Prospects: 2018 Revision, File 12: Population of Urban Agglomerations with 300 000 Inhabitants or More in 2018, by Country, 1950-2035 (thousands*), Department of Economic and Social Affairs, Population Division. https://esa.un.org/unpd/wup/Download/7/cuadgeo.v59i1.8643

Navarro, J., Muñiz, I., & Gómez-Maturano, R. (2023). El policentrismo se impone a la dispersión en el proceso de descentralización del empleo de las ciudades intermedias mexicanas. *Eure*, 49(148). http://dx.doi.org/10.7764/eure.49.148.05

Orellana, A. (2020). Conformación metropolitana desde la fragmentación. El proceso de conurbación del Gran La Serena. *Urbano*, 23(41), 58-83. http://dx.doi.org/10.22320/07183607.2020.23.41.04

Seevarethnam, M., Rusli, N., Ling, G. H. T., & Said, I. (2021). A geo-spatial analysis for characterising urban sprawl patterns in the Batticaloa Municipal Council, Sri Lanka. *Land*, 10(6), 636. https://doi.org/10.3390/land10060636

Silva, C., & Vergara-Perucich, F. (2021). Determinants of urban sprawl in Latin America: evidence from Santiago de Chile. *SN Social Sciences*, 1(8), 202. https://doi.org/10.1007/s43545-021-00197-4

Szupiany, E. (2018). La ciudad fragmentada: una lectura de sus diversas expresiones para la caracterización del modelo latinoamericano. *Revista de Estudios Sociales Contemporáneos*, 19, 99-116. https://ri.conicet.gov.ar/handle/11336/89153

Valdebenito, C. E. (2014). La huella socioeconómica y demográfica en la estructura residencial de las ciudades medias de Latinoamérica: el caso de Viña del Mar–Chile en la década 1992-2002. *Revista Electrónica de Geografía y Ciencias Sociales*, 18. https://revistes.ub.edu/index.php/ScriptaNova/article/view/15078

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