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RESEARCH ARTICLE

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GEOMARKETING AS A STRATEGIC TOOL FOR THE EXPANSION OF THE SUPERMARKETS AND MINIMARKETS SECTOR IN CATOLÉ DO ROCHA- BRAZIL

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ABSTRACT

The growing competition in the market and the ease of access and availability of data has popularized the GIS - Geographic Information System. Researchers have sought to integrate data from different sources and new methods have been developed to carry out advanced spatial analyses, whose results help in the decision making of retail organizations. This research used the information generated by the spatial analysis to provide support and assistance for the implementation of supermarket and mini-market marketing strategies based on geographic and demographic variables in the Municipality of Catolé do Rocha, Paraíba, Brazil. From a set of data on road transport, location of competitors and sociodemographic data, scenarios were created using Fuzzy logic and AHP in a GIS environment, applying IDW interpolation (Inverse Distance to Square) to spatialize the demographic data. The analysis of all the integrated spatial data made it possible to locate the areas with the greatest potential for the location of new mini-markets and supermarkets, considering the greater flow of potential consumers and far from the main competitors.

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INTRODUCTION

The Geographic Information System (GIS), in its primary origin, seeks to use technology to support processes and methods of analysis based on geographic information. Marketing information, which every day becomes more important and challenging for business organizations, was the database called Geoanalytics. This is how, for example, digital marketing emerged, with the objective of meeting the need to adapt traditional marketing to new social networks and the growth of the internet. In this light, Geography followed the path of innovations in marketing and this path led to the emergence of Geomarketing (SILVA; MONTANHER, 2019). Originated in the 1980s, the discipline of Geomarketing emerged as an alternative to the needs of studying markets and their locations, since consumer behavior is changeable over time and it is necessary to improve diagnoses to improve the way in which decision-making takes place by companies (ALMEIDA, 2019).

According to Araújo (2017), although some Brazilian companies apply GIS tools for the planning and location of stores in the most diverse retail sectors, few organizations take advantage of the potential of GIS tools for strategic business management. Tools that have been applied in the retail market worldwide (ARAÚJO, 2017). A company that intends to develop a new market must collect as much information as possible about where it intends to invest in order to fully understand the area and what to expect from it, otherwise the risks of failure increase. Multicriteria Analysis is widely used to support decision-making because it allows the multiplicity of criteria and the relationship of preferences between the criteria (NEVES; PEREIRA; PORTUGAL, 2013). In this context, this research used the information generated by spatial analysis to provide support and assistance for the implementation of supermarket marketing strategies based on geographic and demographic variables. The study is a point of support for decision makers who need to define in which places in the city the implementation of these projects does not compromise the

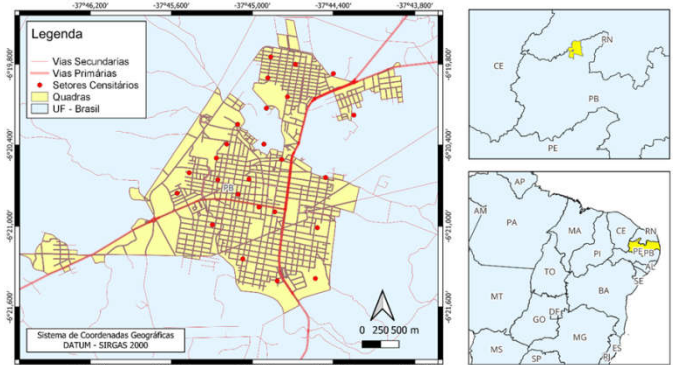
development of the company. By taking the Municipality of Catolé do Rocha, in the State of Paraíba, in the Northeast of Brazil, as the locus of research, since food retailers intend to expand the sales of their products, decision makers will need reliable information about the urban space. That said, for strategic planning in the search for new markets, it is necessary to understand some factors, such as urban residents' income, access, primary and secondary roads and proximity to competitors. It can be said that this is one of the most important strategies in the marketing process, as it allows the company to understand that consumers are different in their tastes and preferences and that they react differently to the efforts undertaken by the organization (OLIVEIRA, 2007). This is necessary for companies of any size, especially for micro and small companies, as their survival is more difficult than the large ones because they do not have the structure to help them grow (HASHIMOTO; NETO, 2019). In this study, an analysis of the market was carried out in a specific situation (in the city of Catolé do Rocha, in the State of Paraíba, Brazil), which was based on the application of a technique that allows the identification of the influence of geographic characteristics in the definition of the best location for installing new retail establishments. The importance of this study focuses on the fact that the performance of supermarkets depends a lot on their location. According to Parente and Kato (2001), most retail customers reside in a geographic area in the vicinity of the commercial establishment. Outlines of investigations on the location of retail establishments have been emphasizing the concept of region of influence. Investigating the location or distance of customers makes it possible to identify the geographic dimension of the consumer market of a particular company. For retail establishments, the geographic dimension is an analysis category that is difficult to control and planners and decision makers are hardly able to delimit the geographic limits that encompass their potential clientele. This study aimed to identify the expansion potential of supermarkets and mini-markets in the city of Catolé do Rocha, in the State of Paraíba, Brazil. The specific objectives were: (i) to identify the area of operation of supermarkets and mini-markets and, through spatial inference techniques, (ii) to find potential areas for expansion of establishments.

MATERIALS AND METHODS

Católé do Rocha is a municipality located in the micro-region of Catolé do Rocha-São Bento. According to the IBGE (2020), the Human Development Index (IDHM) of Catolé do Rocha in 2020 was 0.640. In 2020, its population was estimated at 30,684 inhabitants and a territorial area of 552 km² and a population density of 59.09 inhab/km² (IBGE, 2020). The municipality locus of this research has developed activities in several sectors: industrial, agricultural and commercial. In its agriculture of permanent and temporary crops, there is the production of herbaceous cotton, rice, banana, sweet potato, beans, mango and corn; and livestock (beef, buffalo, horse, swine, goat, sheep). Trade represents the third activity with the highest added value, the textile, footwear and aluminum industry is also important for the local economy, generating sustenance for its residents (SIDRA, 2021). It was necessary to create a database to store the information necessary to carry out the analysis. This was organized considering the census sector field as a spatial unit, which facilitated the interurban analysis. The map presented in Figure 1 identifies the 25 census sectors used, and their data were interpolated by the centroids in the QGIS 3.14 software, in the IDW interpolated (Inverse of the squared distance) in the processing toolbox.

Survey, data processing and analysis: The data used came from the 2010 Demographic Census, related to the last Census carried out in Brazil. Felini (2017) argues that while data values may change, the spatial structure changes slowly, maintaining a constant geographic configuration. This premise allows the use of data collected in 2010 to generate current maps. The data from the census sectors represent the surveys referring to each sector (polygonal feature), without any internal differentiation for each spatial unit. In order to obtain surfaces that presented continuous variation from this database, the centroids of each census sector (point features) were extracted, which

maintained the attribute table of the polygonal vector. Subsequently, the points were transformed with the IDW interpolation procedure in QGIS 3.22.



Created by the authors in QGIS 3.22.

Figure 1. Location of the study area

From the surface information generated by the interpolation, the data were incorporated into a Microsoft Excel spreadsheet, where the census sectors are the lines and the variables represent the columns. Through this, spatial statistics were performed to detect the distribution of variables by area.

Obtaining scenarios for the elaboration of expansion strategies for food establishments in the city of Catolé do Rocha, Paraíba, Brazil: The potential scenarios were developed through multi-criteria analysis, this process allocates areas based on a variety of attributes that the selected areas must possess. The variables were transformed using IDW interpolation techniques, creating continuous surfaces over the area. To determine the suitability scenarios for the elaboration of expansion strategies for food establishments in the study area, we used the AHP - Analytic Hierarchy Process method. In this study, attributes stored in polygons associated with geographic areas were analyzed using GIS methods referred to as buffer and overlay. The GIS software used was QGIS 3.22, its toolbox allowed the transformation of vector layer attributes into raster layers. The vector layers (primary and secondary) were transformed into raster data by rasterization, the competition layers (supermarkets and mini-markets) were obtained by geocoding their addresses and transformed into rasters, then converted into maps of distances in the QGIS toolbox. The variables in raster format were converted to apply Fuzzy logic, being linearly standardized for values within a range of 0 to 1. This standardization transforms the values of each layer into values close to 1 and with high potential, and values close to 0 with low potential. In Fuzzy-AHP spatial modeling, it is necessary to determine the degree of importance that each variable assumes in the potential, this procedure was carried out with the aid of the AHP Calculator website and takes into account the Analytical Hierarchy Process (AHP) methodology proposed by (SAATY, 1990) Tables 1 and 2.

Table 1. Weights assigned between variables by the AHP method

Category	Variable	Weight
Sociodemography	R	0.058
	M	0.286
	H	0.193
Ways	Primaries	0.092
	Secondary	0.052
Competitors	Supermarkets	0.317

Source: Prepared by the authors (2021).

For the supermarket expansion scenario, we use the expression:

$$\begin{aligned}
 & ("R" * 0.058) + ("M" * 0.286) + ("H" * 0.193) + ("Primaries" * 0.092) \\
 & \quad + ("Secondary" * 0.052) \\
 & \quad + ("Supermarkets" * 0.160)
 \end{aligned}$$

Table 2. Weights assigned between variables by the AHP method

Category	Variable	Weight
Sociodemography	R	0.088
	M	0.239
	H	0.357
Ways	Primaries	0.128
	Secondary	0.099
Competitors	Mini-markets	0.087

Source: Prepared by the authors (2021).

For the supermarket expansion scenario, we use the expression:

$$\begin{aligned}
 & ("R" * 0.088) + ("M" * 0.239) + ("H" * 0.357) + ("Primaries" * 0.128) \\
 & + ("Secondary" * 0.099) \\
 & + ("Mini - markets" * 0.087)
 \end{aligned}$$

RESULTS

Knowing the characteristics of the clusters in each area of influence facilitates the creation of individual strategies for each food retail in the city. Thus, for the elaboration of expansion strategies for supermarkets and mini-markets in the city of Catolé do Rocha-PB, the variables were operationalized by the Analytic Hierarchy Process method. The weight of each variable was calculated using the AHP Calculator for each category and integrated by the QGIS 3.22 raster calculator. The study selected categories with greater relevance for the process of spatial analysis and elaboration of a potential scenario, elaborated before layers with sociodemography, primary and secondary roads, and mini-markets and supermarkets for the establishments. The choice of these variables occurred because there was a significant correlation between income and demography data and the occurrence of food retail, especially population density and income (FELINI 2017). In the scenario of potential for mini-markets, it was found that the city has potential values up to 0.6, concentrated mainly in areas close to the state highway that cuts through the urban area of the city, especially at the entrance to Jericho - PB-317. PB-321 (Brejo do Cruz) and PB-325 (Catolé do Rocha), we also have 323 (Catolé do Rocha) – Div. PB/RN. These are regions further away from the city center where supermarkets are concentrated, as shown in Figure 2.

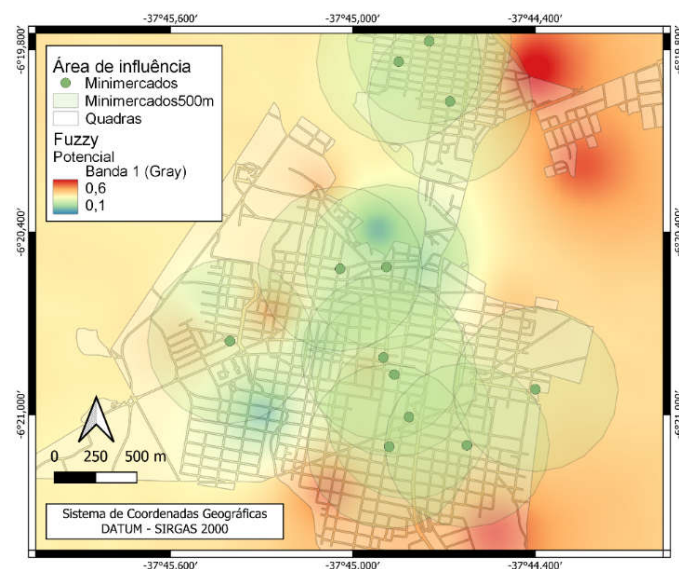


Figure 2. Scenario of potential installation of mini-markets
Created by the authors in QGIS 3.22

In the center we have the streets with the highest flow in the city, this fact must be taken into account in the spatial analysis and in the choice of new points for food retails in the city. Silva, Montanher and Silva (2018) observed the differences between the location of supermarkets and hypermarkets. Because a smaller area allows supermarkets to have a more simplified distribution, allowing them to

be located in areas with a large flow of people, such as large avenues or small streets or squares. As for supermarkets, as they have a wider sales area, and need ample spaces to enable the construction of parking areas, they would have to look for specific locations with adequate locational characteristics. In this way, the location of these commercial retails are areas close to the major road axes of metropolitan regions (SILVA; MONTANHER, 2019). To find locations with reasonable distance from the main competitors, whether supermarkets and mini-markets, it was necessary to formulate an analysis in which the ideal scenario would be to look for locations that present characteristics of concentration of people with high income and with variable distance from the main local competitors. Neves, Pereira and Portugal (2013) also recognize that competition is an important factor in determining commercial development projects. Although this does not seem to be a decisive factor in the Brazilian market, we have verified the existence of other large equipment and even competing supermarkets, thus increasing the flow of customers in the region.

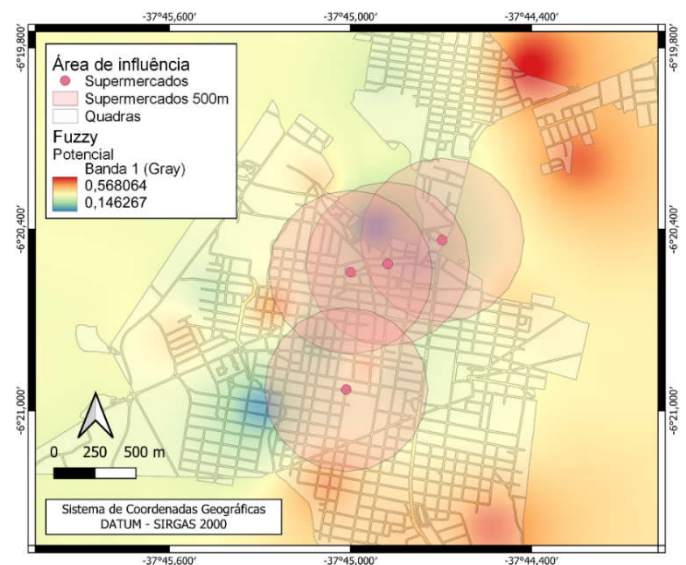


Figure 3. Cenário de potencial de instalação de supermercados.
Elaborado pelos autores no QGIS 3.22

When looking at Figure 3 of the potential scenario for the installation of supermarkets, it can be seen that competitors are concentrated in the center of the city of Catolé do Rocha and the neighborhoods with higher income and concentration of people have few or no food retail units. These areas have medium and high potential because the model has located areas with high income and a reasonable distance from the main competitors. These regions in orange and red indicate areas of high potential for the installation of this equipment. More recent studies, such as that by Kaar and Sary (2018), focus on planning marketing strategies for areas with high market potential. One of the current challenges is locating these areas. The methodology used opens space for application in this context. Other studies seek to solve locational problems related to the spatial location of supermarkets (BAVIERA-PUIG; BUITRAGO-VERA; ESCRIBA-PEREZ, 2016) and estimation and optimization of opportunities for new points of sale (DOUARD; HEITZ; CLIQUET, 2015; RODRÍGUEZ; OLARTE-PASCUAL; SACO, 2017; CHACÓN-GARCÍA, 2017). Recently, Castilhos, Dolbec and Veresiu (2014) and Giovanardi and Lucarelli, (2018) observed that the association between marketing and geography seems to have become more frequent in the literature. Despite the increase in the frequency of studies that use location as the main attribute, the recognition of the importance of the locational issue by marketing researchers is evident. We understand that the regional issue needs more attention.

DISCUSSION

Geomarketing is present in the commercial decisions of many retail establishments. This terminology is not always used. Often there is

not even a conception that the analysis is geospatial, but it still happens. It is possible to conclude that the largest supermarkets tend to be located close to the higher income population, on busy roads and that indicate the presence of good technical infrastructure and networks. Minimarkets are further away from these competitors, between the center and the outskirts of the city. Spatial analysis using the AHP method allowed us to infer and locate the scenarios with the greatest potential for installing mini-markets and supermarkets in the Municipality of Catolé do Rocha, Paraíba, Brazil. In that locus, the best scenarios are concentrated in the higher income neighborhoods, more populous and distant from the main competitors. In addition to this concentration in the city center, other areas of medium and high potential were identified where the number of residents and competition are low. In terms of location factors in the studied area, the existence of a consumer market is undoubtedly one of the most important factors, in addition to the availability of equipment and the income level of the local population, as well as the proximity of complementary stores and competition. Therefore, we propose that, in the future, a new survey is carried out with more direct data on the characteristics of all supermarkets and mini-markets, so that we can obtain safer and more complete information and decisions about the phenomenon studied.

REFERENCES

- ALMEIDA, A. R. F. S. (2019). Modelo geográfico de suporte à localização de estabelecimentos comerciais de proximidade. Projeto de Tese de Doutorado em Administração. Programa de Pós-Graduação em Administração. Universidade de São Caetano do Sul (SP), Brasil.
- ARAUJO, T. L. A. de. (2017). O geomarketing como sistema de apoio na tomada de decisões mercadológicas. Monografia de Administração. Faculdade de Administração. Brasília – DF.
- BAVIERA-PUIG, A.; BUITRAGO-VERA, J.; ESCRIBA-PEREZ, C. (2016). Geomarketing models in supermarket location strategies. *Journal of Business Economics and Management*, 17, pp. 1205-1221.
- CASTILHOS, R.; DOLBEC, P. Y.; VERESIU, E. (2014). Conceptualizing the space of markets: howspatiality influences market dynamics. *ACR North American Advances*.
- CHACÓN-GARCÍA, J. (2017). Geomarketing techniques to locate retail companies in regulatedmarkets. *Australasian Marketing Journal (AMJ)*, 25, pp. 185-193.
- DOUARD, J. P.; HEITZ, M.; CLIQUET, G. (2015). Retail attraction revisited: From gravitation topurchase flows, a geomarketing application. *Recherche et Applications en Marketing (English Edition)*, 30, pp. 110-129.
- FELINI, M. G. Geomarketing: o caso dos supermercados de Maringá – PR. (2017). Trabalho de Conclusão de Curso. Bacharelado em Geografia. Departamento de Geografia. Universidade Estadual de Maringá, Brasil.
- GIOVANARDI, M.; LUCARELLI, A. (2018). Sailing through marketing: A critical assessment ofspatiality in marketing literature. *Journal of Business Research*, 82, pp. 149-159.
- HASHIMOTO, F. H. N.; NETO, O. C. P. (2019) O Geomarketing como Instrumento para a Pesquisa de Mercado: estudo de caso do Supermercado Sacolão Big Dog em Londrina-PR. *Geografia. Londrina*, v. 28, n. 1, p. 133-149.
- IBGE. Censo demográfico. (2010). Disponível em: <<http://www.ibge.gov.br>>. Acessoem: 4 mar. 2021.
- KAAR, C.; STARY, C. (2018) Intelligent business transformation through market-specific value network analysis: Structured interventions and process bootstrapping in geomarketing. *Knowledge and Process Management*.
- NEVES, J. M. J.; PEREIRA, L. F.; PORTUGAL, L. S. (2013). Fatores Locacionais: o caso dos supermercados brasileiros. *Observatório Geográfico de América Latina*.
- OLIVEIRA, S. L. I. (2007) Desmistificando o Marketing. *NOVATEC*. São Paulo, Brasil.
- PARENTE, J. G.; KATO, H. T. (2001). Área de Influência: um Estudo no Varejo de Supermercados. *RAE-Revista de Administração de Empresas*, v. 41, n. 2, abr-jun, pp.46-53.
- RODRÍGUEZ, V.; OLARTE-PASCUAL, C.; SACO, M. (2017). Application of geographicalinformation systems for the optimal location of a commercial network. *European Journalof Management and Business Economics*, 26, pp. 220-237.
- SAATY, T. L. 1990. How to make a decision: the analytic hierarchy process. *European Journal of Operational Research*, v. 48, n. 1, pp. 9-26.
- SIDRA: sistema IBGE de recuperação automática. (2020). Rio de Janeiro. Disponível em: <<http://www.sidra.ibge.gov.br>> Acesso em: 4 mar. 2021.
- SILVA, R. B. L.; MONTANHER, O. C. (2019). Análise Espacial Aplicada ao Estabelecimento de Novos Varejos Alimentícios na Cidade de Maringá/PR: Estudo de Caso de Geomarketing. *Revista Brasileira de Cartografia*, v. 71, n. 4, pp. 1135-1155.
- SILVA, R. B. L.; MONTANHER, O. C.; SILVA, J. P. (2018). Geomarketing para supermercados Maringá/PR. *Anais do IV Encontro Regional de Geografia e XXVI Semana de Geografia, Paraná*, pp. 65-77.
