Design of a Geomarketing Model for the Competitiveness of MSMEs in Tijuana, Baja California

Claudia Angélica Castro Olivas*[1] Blanca Estela Bernal Escoto[2] and Pollett Cancino Murillo[3]

Universidad Autónoma de Baja California (UABC) Calzada Universidad 14418, Col. Parque Industrial Internacional Tijuana, C.P. 22390, Tijuana, B.C.
acastro21@uabc.edu.mx[1],blancab@uabc.edu.mx[2],cancinop@uabc.edu.mx[3]

Abstract. This study aims to design a geomarketing model oriented toward strengthening the competitiveness of micro, small, and medium-sized enterprises (MSMEs) in Tijuana, through the integration of public databases and the use of open-access geographic information systems. This model seeks to serve as a strategic tool that facilitates market knowledge and contributes to informed decision-making, reducing reliance on intuition and favoring the formulation of more effective strategies. In its first phase, the main information needs of MSMEs are identified, particularly regarding the detection of business opportunities, competitive environment analysis, and risk reduction. Subsequently, a review and selection of public data sources providing relevant variables to address these needs is conducted, considering their availability, accessibility, and relevance. The model incorporates various geospatial analysis techniques applied to the business domain, such as territorial segmentation, location analysis, and market pattern identification. Additionally, factors associated with business competitiveness that can be linked to variables available in official sources are analyzed, enabling a comprehensive interpretation of the environment. Finally, this model is proposed as a significant contribution to the democratization of access to market analysis tools, business intelligence, and spatial analysis, facilitating their adoption by MSMEs. This is expected to boost their competitive capacity and improve their positioning in highly dynamic local markets.

Keywords: Geomarketing, spatial analysis, public databases, competitiveness.

1 Introduction

In a business environment characterized by high competitiveness, globalization, and digital transformation, MSMEs face significant limitations in accessing strategic information and adopting technological tools that strengthen their decision-making. In Tijuana, these companies represent a key economic pillar due to their contribution to employment and productive dynamism; however, their low utilization of tools such as geomarketing places them at a disadvantage compared to organizations with greater resources.

Geomarketing integrates territorial analysis tools that facilitate the detection of market opportunities, the strategic selection of locations, and the understanding of consumer behavior. Nevertheless, its adoption is often limited by costs and technical requirements. In

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this regard, the use of public databases and freely accessible digital platforms represents a viable alternative for democratizing access to business intelligence, reducing economic and technical barriers.

In general terms, economic geography analyzes the territorial distribution of productive activities and interactions between economic actors, recently incorporating spatial analysis tools and big data that allow understanding complex patterns in urban and digitalized environments [1]. Complementarily, spatial economics explains how factors such as accessibility, infrastructure, and location influence consumer and business decisions, highlighting that proximity and connectivity continue to be determinants in the configuration of contemporary markets [2].

In this context, marketing has evolved toward a digital, relational, and multidisciplinary approach. Kotler et al. [3] argue that contemporary marketing focuses not only on transactions but also on value creation through consumer behavior analysis, incorporating spatial variables that allow for more precise segmentation. From this convergence, geomarketing emerges as a strategic model that integrates georeferenced data, analytical tools, and technologies such as Geographic Information Systems (GIS) to optimize location and commercial expansion decisions [4].

Regarding competitiveness, the classical approach proposed by Porter [5] establishes that it is grounded in productivity and the ability of companies to generate value in their environment. He proposes that competitive advantage is achieved through generic strategies such as cost leadership, differentiation, and focus, while through the five forces model, he explains how industry structure determines competitive intensity. These contributions remain relevant and have been adapted to digital and highly dynamic contexts [6].

Complementarily, the resource-based view (RBV) indicates that sustainable competitive advantage depends on possessing valuable, rare, inimitable, and well-organized resources [7]. Furthermore, the systemic competitiveness model [8] broadens the analysis by integrating the meta, macro, meso, and micro levels, emphasizing that competitiveness is not solely the result of the firm but of interactions among institutions, public policies, and the socioeconomic environment.

Spatial analysis models constitute a central component of the study. From a microeconomic standpoint, agents are assumed to make rational decisions; however, recent research has shown that incorporating spatial variables significantly modifies these decisions, especially in urban contexts where accessibility influences demand [9]. Along these lines, central place theory, proposed by Christaller, explains the hierarchical organization of services across territory; contemporary studies have shown that digital technologies are transforming this hierarchy by expanding market reach and redefining urban centralities [10].

Spatial interaction theory, based on gravitational models, explains flows of people and goods between localities. Chen et al. [11] empirically validate this theory using big data, demonstrating that urban consumption patterns can be predicted with high accuracy by considering variables such as distance, population density, and connectivity. Urban land auction theory helps understand how competition for land use determines the location of economic activities. Recent research shows that factors such as gentrification, public policies, and transportation infrastructure significantly influence land valuation and commercial distribution [12]. Taken together, these models and empirical studies show that

spatial analysis has evolved toward integrated approaches combining classical theories with advanced technological tools, such as geointelligence and data analytics. This integration enables a more precise understanding of the relationship between territory, market, and competitiveness, providing a solid foundation for strategic decision-making in highly dynamic environments.

The relevance of this research lies in proposing an accessible model that integrates these tools to strengthen MSME competitiveness, also considering the strategic context of Tijuana, characterized by its economic dynamism, border location, and high business concentration.

1.1 General Objective

Design a geomarketing model based on the integration of public databases that contributes to the competitiveness of MSMEs in Tijuana, Baja California.

1.2 Specific Objectives

- Identify geospatial information needs.
- Define key variables for the model.
- Select relevant public databases.
- Design the geomarketing model.

1.3 Hypothesis

H^1: Georeferenced public databases make it possible to develop an effective geomarketing model to improve the competitiveness of MSMEs in Tijuana, B.C.

H^0: Such databases do not provide sufficient information to strengthen business competitiveness through geomarketing in Tijuana, B.C.

2 Research Method

This research is developed under an applied approach, focused on micro, small, and medium-sized enterprises (MSMEs) in Tijuana, with the purpose of designing a geomarketing model that contributes to strategic decision-making and the strengthening of their competitiveness. The object of study corresponds to these economic units, while the subjects of study are their owners, managers, or those responsible for them.

Based on information sources, the study combines documentary and field research. On one hand, secondary sources are analyzed through the review of public databases, official

documents, and georeferenced records, which serve as key inputs for the model design. On the other hand, primary data are collected through a structured survey distributed in digital format (Google Forms), directed at MSMEs in the locality. The data collection instrument consists of a structured questionnaire of 20 items, organized into four sections: general data, use of geomarketing, competitiveness factors, and application of marketing strategies. The instrument was validated by experts to ensure its relevance, clarity, and reliability. The questionnaire was composed primarily of 20 multiple-choice and dichotomous items, facilitating the systematization and analysis of information. To ensure the quality of the instrument, an expert judgment validation process was implemented. Three specialists

evaluated aspects such as clarity, relevance, coherence, and item sequencing. They generally agreed that the questionnaire is appropriate and aligned with the research objectives; however, they made specific observations aimed at improving wording, conceptual precision, and language adaptation to the profile of participants—owners and managers of MSMEs. Based on these observations, adjustments were made to optimize comprehension and applicability. In terms of analytical level, the research is descriptive and explanatory in nature, as it first seeks to characterize geospatial information needs and subsequently analyze their relationship with business competitiveness, providing a basis for formulating the proposed model. The study population consists of 58,797 MSMEs registered in the National Statistical Directory of Economic Units [13]. Non-probability sampling was used, with a sample size of 385 companies determined at a 95% confidence level and a 5% margin of error, using the formula for finite populations (see Table 1).

Table 1. Sample Size Calculation.

Data	Values
N	58,797
Z^2	3.84
p	0.5
q	0.5
e^2	0.0025
n	**385**

Note: Own elaboration.

3 Results

The research conducted in Tijuana identified relevant characteristics of MSMEs and their relationship with the use of spatial analysis tools and strategic decision-making. From a sample of 385 companies, a predominance of microenterprises was observed: 46% have between 1 and 5 employees, confirming the local business structure centered on small-scale economic units.

In terms of organizational profile, 64.7% of companies are family-owned, which influences their management processes and adoption of technological tools. Business longevity shows a concentration in enterprises between 3 and 8 years old, reflecting entrepreneurial dynamism but also vulnerability in early stages.

Regarding technology use, 67.5% of MSMEs regularly use digital maps, with Google Maps being the primary tool (84.3%). However, the strategic use of this information is limited, as a considerable proportion does not use geospatial data for decision-making. This is reinforced by the finding that only 16.9% use structured databases to analyze the market.

In terms of decision-making, commercial strategies are found to be based primarily on traditional factors such as costs (61.3%), competition (57.9%), and owner experience, reflecting an empirical approach. Additionally, 60% of businesses base their competitive advantage on meeting customer needs without systematic use of analytical tools. In the documentary phase, various relevant public databases were identified (INEGI, IMPLAN, COPLADE), providing georeferenced information on sociodemographic, economic, and territorial variables, highlighting their accessibility and usefulness for business analysis.

Based on these findings, a geomarketing model was designed comprising five components: identification of information needs, consultation of public databases, geospatial analysis, strategic integration, and decision-making. This model integrates the marketing mix (4Ps), the systemic competitiveness approach, and spatial analysis tools, facilitating the generation of data-driven strategies.

Figure 1 represents a geomarketing model designed to strengthen the competitiveness of MSMEs (Micro, Small, and Medium-sized Enterprises) in Tijuana, structured as a sequential and interrelated process that integrates five key components oriented toward strategic decision-making. First, the model begins with the identification of information needs, where the company's specific requirements are determined based on interviews and internal process analysis.



Note. Own elaboration with the support of artificial intelligence through ChatGPT developed by OpenAI (2025), based on the prompt: “Design a geomarketing model for MSMEs using public databases, considering location, market, and decision-making variables."

Figure 1. Geomarketing Model for MSMEs through Public Databases.

This phase allows for the recognition of demands such as market knowledge, location of potential clients, competitor analysis, and logistics optimization. Subsequently, the consultation of georeferenced public databases is carried out, in which official sources such as INEGI, IMPLAN, DATA México, and DATOS BC are identified and selected. At this stage, data is collected, organized, and prepared as input for spatial analysis, ensuring its relevance, accessibility, and free availability.

The third component corresponds to geomarketing analysis, where geospatial tools like QGIS, Google My Maps, or Tableau Public are employed to identify territorial patterns, opportunity zones, and market behaviors. This analysis allows for the integration of various information layers and the generation of strategic visualizations. In this phase, the marketing mix (4Ps) is incorporated, adapting product, price, place, and promotion based on geospatial findings. This enables the design of differentiated strategies by geographic segment, increasing their effectiveness. Likewise, the micro and meso levels of systemic competitiveness are integrated, strengthening internal capabilities such as innovation and operational efficiency, as well as external collaboration through business networks.

All of this converges on the formulation and implementation of data-driven marketing strategies, which facilitates more precise decision-making, reduces uncertainty, and improves business competitiveness. The fourth component corresponds to the formulation of marketing strategies, where the analyzed data is consolidated to generate strategic insights and design specific actions aimed at improving competitiveness, aligning the 4Ps with the characteristics of each geographic segment.

Finally, the fifth component corresponds to the decision-making and strategy implementation process, in which actions are prioritized, strategies are executed in the identified markets, and their results are monitored, allowing for continuous adjustments to optimize performance. Together, the model integrates spatial analysis, business intelligence, and strategic management, establishing itself as an accessible tool that enables MSMEs to reduce uncertainty, improve their positioning, and strengthen their competitiveness in dynamic environments.

4 Discussion

The results reveal a significant gap between the perceived importance of the geographic environment and its practical application in business management. While more than 60% of MSMEs recognize the relevance of location in their decisions, the limited use of geospatial analysis tools confirms an incipient adoption of geomarketing, which aligns with studies highlighting economic, technical, and knowledge-related constraints in this segment [14]. Recent research underscores that limited digital literacy and restricted access to advanced technologies continue to be determining factors in the low adoption of analytical tools in MSMEs ([15] & [16]).

Furthermore, dependence on traditional methods-such as owner experience or empirical market analysis-limits the generation of sustainable competitive advantages. Nevertheless, the high use of social media and digital platforms reflects an openness to digitalization, representing an opportunity to integrate more advanced tools such as geographic information systems, which have proven to be key in generating organizational competitive advantages ([17] & [18]).

According to the OECD [19], the progressive digitalization of MSMEs facilitates the adoption of business intelligence solutions, particularly when these tools are accessible and low-cost. The proposed model addresses this problem by offering an accessible alternative based on public data, contributing to reducing barriers to the use of business intelligence. Its implementation can strengthen strategic decision-making, improve market segmentation, and optimize commercial location, increasing MSME competitiveness in dynamic environments [20]. Recent studies confirm that the use of open data and digital tools increases strategic analysis capacity in small businesses, enabling them to compete in more complex markets [21].

Overall, the findings validate the proposed hypothesis by demonstrating that public databases constitute a viable resource for developing effective geomarketing models adapted to the local context, reducing uncertainty in business decision-making [22]. The World Bank [16] notes that access to structured and georeferenced information significantly improves the resilience and adaptability of MSMEs in highly competitive environments.

5 Conclusions

First, the study results show that while MSMEs recognize the importance of the geographic environment in decision-making—particularly regarding location and market-there is limited application of geospatial analysis tools. This gap confirms that geomarketing is still in an incipient stage within these types of organizations, consistent with findings pointing to structural constraints in knowledge, technological resources, and analytical capabilities [15].

Second, a high dependence on traditional analysis methods-such as the entrepreneur's empirical experience-was identified, limiting the generation of sustainable competitive advantages. However, the widespread use of social media and digital platforms reflects a transition toward digitalization, representing a strategic opportunity for the adoption of more sophisticated business intelligence tools [18].

Third, the findings confirm that georeferenced public databases constitute a viable, accessible, and low-cost source for strengthening strategic analysis processes in MSMEs. As international organizations note, access to open data can significantly improve decision-making and business competitiveness in dynamic contexts ([21] & [16]).

In this context, the proposed geomarketing model represents a relevant contribution by integrating spatial analysis, the marketing mix, and the systemic competitiveness approach into a structured and adaptable tool. Its design reduces barriers to the use of business intelligence, facilitating the identification of market opportunities, geographic segmentation, and optimization of commercial location.

The research contributes to the fields of strategic management and business intelligence by proposing an integrated geomarketing model adapted to micro-, small-, and medium-sized enterprises (MSMEs). The model articulates spatial analysis, the marketing mix (4Ps), and systemic competitiveness. This integration broadens the understanding of geomarketing as a strategic tool aimed at generating competitive advantages in local contexts. Furthermore, empirical evidence is provided regarding the relationship between the use of georeferenced data and decision-making processes, reinforcing the importance of data analytics in organizational competitiveness. In this regard, [15] highlights that the adoption of digital tools is essential for the transformation of MSMEs, while UNCTAD [21] emphasizes the

value of open data as a mechanism for innovation and the democratization of access to business intelligence.

From a practical perspective, the model constitutes an accessible tool based on public data and free digital platforms, reducing costs and facilitating implementation. Its application enables the identification of market opportunities, optimization of location decisions, improvement of market segmentation, and the design of more effective territorial strategies, thereby fostering the transition toward data-driven decision-making. Moreover, its replicable nature extends its usefulness across different sectors and contexts, contributing to the strengthening of MSMEs, in line with the World Bank's [16] assertion regarding the importance of accessible digital tools for business resilience. In addition, future research avenues are proposed to validate the model through probabilistic studies, assess its impact using longitudinal research designs, and adapt it to specific sectors. Likewise, the incorporation of emerging technologies such as artificial intelligence and big data is suggested to enhance its analytical capabilities [18], as well as the examination of the role of public policies in promoting the use of open data among MSMEs [15].

Finally, it is concluded that the implementation of the model can strengthen the competitiveness of MSMEs in Tijuana by promoting data-driven decision-making, reducing uncertainty, and improving their capacity to adapt to highly dynamic environments. In this sense, the research validates the proposed hypothesis by demonstrating that public georeferenced databases can be effectively integrated into a functional geomarketing model that is relevant and aligned with the local context.

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