Papers

Location analysis of restaurants in the tourist destination of Varadero, Cuba

Análise da localização da oferta do restaurantes no destino turístico Varadero, Cuba

Análisis de la localización de la oferta restaurantera del destino turístico Varadero, Cuba

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Abstract

The main sun and beach destination in Cuba is Varadero, an adequate planning of the services offered is vital for its management. The growing variety of gastronomic offerings in its 22 km of extension, is not meeting the expectations of customers, for reasons such as the deficient location not only in the plan, but also according to the type of offerings that are provided. The objective of this research was to analyze the location of gastronomic services in Varadero. For the development of the work, an extensive documentary review was carried out, as well as interviews with the restaurant managers and the use of geographic information systems and cluster analysis. The analysis of the 43 restaurants in operation in the historic Varadero showed a concentration of 10 establishments per square kilometer. Eleven centroids were detected where the restaurants are located less than 100 meters away, where the majority ranges being from 30 to 200 meters. There was a significant imbalance in the location and in the supply of facilities in the area, with a clear impact on the variety perception of destination.

Resumo

Entre os principais destinos de sol e praia em Cuba fica Varadero, onde o planeamento adequado dos serviços oferecidos é vital para a sua gestão. A crescente variedade de ofertas gastronómicas nos seus 22 km de extensão, não está a satisfazer as expectativas dos clientes por razões como a localização deficiente não só no mapa, mas também de acordo com o tipo de oferta que estes oferecem. O objectivo desta investigação consistiu em analisar a localização dos serviços gastronómicos no destino turístico de Varadero. Para o desenvolvimento do trabalho, foi realizada uma extensa revisão documental, entrevistas com os administradores dos restaurantes e a utilização de sistemas de informação geográfica e análise de clusters. A análise dos 43 restaurantes em funcionamento no histórico Varadero mostrou uma concentração de 10 estabelecimentos por quilómetro quadrado. Foram detectados onze centróides onde os restaurantes se situam a menos de 100 metros de distância, com o alcance maioritário a ser de 30 a 200 metros. Houve um desequilíbrio significativo tanto na localização como no fornecimento de instalações na área, com um claro impacto na percepção da variedade do destino.

Resumen

Entre los principales destinos de sol y playa de Cuba, se encuentra Varadero donde una adecuada planificación de los servicios que se ofertan, resulta vital para su gestión. La creciente variedad de ofertas gastronómicas en sus 22 km de extensión, no está cumpliendo con las expectativas de los clientes por razones como la deficiente localización no solo en el plano, sino también de acuerdo al tipo de oferta que brindan. La presente investigación tuvo como objetivo analizar la localización de los servicios gastronómicos del destino turístico Varadero. Para el desarrollo del trabajo se realizó una amplia revisión documental, entrevistas a los administrativos de los restaurantes y el empleo de sistemas de información geográfica y análisis clúster. El análisis de los 43 restaurantes en operación en el Varadero histórico evidenció una concentración de 10 establecimientos por kilómetro cuadrado. Se detectaron 11 centroides donde los restaurantes se encuentran a menos de 100 metros,

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siendo el rango de distancia mayoritario de 30 a 200 metros. Se evidenció un significativo desbalance tanto en la localización como en la oferta de las instalaciones en el área, con una clara incidencia en la percepción de variedad del destino.

1 INTRODUCTION

Due to the complexity of tourist destinations it is essential to carry out an adequate planning (Diéguez Matellán, 2008) to optimize the profitability of the resources, to offer an equitable scheme of costs and benefits, to maximize the satisfaction of the tourist and to develop guidelines so that its development is according to the interests of its inhabitants. Transforming a destination to be competitive with the progress of others and taking into account its weaknesses to fill the gaps that exist are parts of the planning, but especially the monitoring of plans in execution (Medina Argueta y Rosado Varela, 2014).

According to Toro et al. (2015) while planning does not define the success of a tourist destination, it does increase the chances of hitting the target, as opposed to taking blind steps. Understanding tourism planning from the point of view of integral intervention in the destination allows us to understand development in a broad way, and to go beyond the profit and loss of a single sector.

Among Cuban tourist destinations, Varadero stands out for being the main offer of sun and beach, with a market share around 42% of the tourists that arrive to the country according to ONEI (2020). Located in the west of the island and on the north coast (figure 1), it belongs to the province of Matanzas and it is 140 km away from Havana (the capital of the country). The Hicacos peninsula covers 22 km of beaches that are favored by the warm waters of the Caribbean Sea. Its intensive exploitation began in the 1990s and continues to increase its housing plant.

Figure 1 - Geographic location of Hicacos Peninsula (Varadero)

Source: GoogleMaps (2020).

There are several restaurantes in Varadero, adding up to the extra hotel offer. Until 2016, it had a total of 30 state-run restaurants. Of these, 36% are specialized restaurants, 46% are international restaurants and 16% are restaurants that offer local food (Cuban food). However, there were not many restaurants where the tourist could feel motivated to eat. The offer was not enough and only 16% of the total corresponded to restaurants served traditional Cuban food. In 2016, the opening of private businesses was approved to increase the competitiveness of the destination (PCC, 2016).

With this approval, Varadero begins to open non-state gastronomic services. Today there are 13 private restaurants, (the total is 43). This has led to an increase in the number of restaurants that contribute 41.1% to the country's tourism-related income (ONEI, 2020), but not related to varied food, since most of them are international.

However, according to Velazco (2016), the planning has been deficient in the destination at the time of opening these restaurants and positioning them according to the offer they make in the geographical space, having as a result the concentration of services in certain areas.

In this regard, there is a concentration of restaurants in the areas between the South Highway and 40th Street, representing 51% of the total number of restaurants. The area from 40th to 20th Street has 25%, and in a lesser

concentration, the area from 20th Street to the Kawama neighborhood has 23% of the total number of restaurants (Figure 2). This situation has caused the decommercialization of restaurants and the lack of necessary supplies for their operation due to the similarity of offers, according to interviews held with the administration of Palmares S.A, a company dedicated to managing gastronomy in the destination.

Figure 2 - Concentration of the gastronomic offer in Varadero

Source: Authors.

Given the deficient planning in offer and location of the gastronomic services, the investigation proposed to analyze the distribution of the restaurant offer of Varadero.

2 THEORETICAL BACKGROUND

2.1 Tourism destination planning models

To Cooper and Fletcher (2003) a tourist destination is given by a set of components that are: a) Attractions: reasons for visiting the destination, which may be natural or artificial characteristics or events; b) Amenities or other support services and facilities other than attractions; c) Access: development and maintenance of efficient transportation connections with the issuing markets; also transportation in the destination itself and d) Ancillary services: those services provided to tourists and the tourism sector through local tourism organizations.

Tooth (2014) defines it as the combination of different elements, through which we try to offer an integrated experience to tourists traditionally reduced to well-defined geographical areas (country, island, city, town). It is an area that presents characteristics recognized by potential visitors, which justify its consideration as an entity and travel attraction, regardless of the attractions that exist in other areas.

According to Joseph A. Ivars (2003) four approaches to tourism planning can be identified: developmental, economic, physical and community. The developmentalist refers to the dominant tradition of tourism planning and its characterized by a favorable and uncritical position of tourism. The economic one conceives tourism as an export activity, with a potential contribution to economic growth, regional development and productive restructuring; it gives priority to economic purposes over environmental and social ones without analyzing how the benefits of tourism are socially distributed. It incorporates the territorial dimension to achieve an adequate distribution of tourist activities in space and to achieve rational land uses and also examines environmental aspects. The community one promotes a local control of the tourist development in order to benefit the population, emphasizing developments from down-up.

Throughout history, both authors and institutions have designed different models of tourism planning: Lawson and Baud-Bovy (1977), Kaiser Jr and Helber (1983), Hernández Díaz (1985), Pearce and Soriano Bello (1988), Bote Gómez (1990), Godfrey and Clarke (2000), Gunn (2002), Zamorano Casal (2002), Josep A. Ivars (2003), Boullón (2006), Vera Rebollo and Baños Castiñeira (2010), Duarte Pimentel (2016) and Molina Rodríguez (2019).

Models of Hernández Díaz (1985) and Molina Rodríguez (2019) respond to the developmental approach. Both are aimed at contributing to national and regional development through tourism activity. Although these models are aimed at comprehensive proposals, their scope was operationally limited.

Models of Kaiser Jr and Helber (1983) and Bote Gómez (1990) have an economic focus. Through these, the way of doing tourism allows economic activation and employment generation, but also generates negative economic, environmental and cultural impacts on local tourism spaces, through the development of master plans.

The spatial approach, also called urbanistic or physical, has been one of the most prolific in tourism planning. The model proposed by Boullón (2006) carries out an analysis of the physical environment as well as the economic profitability in order to elaborate the physical development plan. Pearce and Soriano Bello (1988), reflect the identification of potential development areas as a key point in the process.

Models of Lawson and Baud-Bovy (1977), Vera (1997) and Zamorano (2002) are conceived as the appropriate instrument to carry out the detection, organization and coordination of sustainable tourism development, under a participatory approach of local communities, bringing attention to aspects such as ecological sustainability, loading capacity, impact assessment and land management.

The models of tourism planning with a strategic focus introduce characteristics such as the definition of a philosophy, future scenarios, medium-term objectives and goals, choice of priorities, analysis of the environment to identify opportunities and threats, and the programming and participation of social actors (Osorio García, 2006).

In the models of Clarke (2000) and Ivars (2003) it is proposed a way to articulate tourism planning and marketing in favor of tourism development. However, there is a difference: the first model includes the participation of the population or social actors in such a process, while the second one doesn´t.

The territorial planning of tourism should be based on two different but interconnected levels of planning, a collective process: the responsibility belongs to the administration and the main field of action is the territory, and an individual one: whose fundamental fields are centered on the economic-business and the creation of marketable value (Barrado Timón, 2004).

In short, the process of creating and executing planning becomes more complex when spatial, environmental and market aspects are considered in the same model. Sustainability becomes the main aspect of tourism planning. It is not a question of carrying out a single planning, but an approach that allows to link the economic perspective of location of facilities, taking into account the individual interests of companies or groups of these, with the coherent and rational perspective of the destination as a whole for the enjoyment of the tourist.

2.2 Decisions on the location of facilities in tourist destinations

The scientific literature on location of facilities has been approached from different perspectives, but the authors adopt a conceptual definition that means the location of a facility as the process of choosing a geographic location among several to carry out the operations of a company, in this case those connected to the restaurant offer, (Carro & González, 2015). In this sense, the concept is used as a spatial variable, decisive in this case in the decision-making process, and as a part of a more comprehensive one that is geomarketing (Latour & Le Floc'h, 2001; Chascos, 2003; Alcaide, et.al., 2012; Baviera, Buitrago, & Rodríguez, 2013; Avellaneda, 2014; Syagnik, 2019).

Therefore, the authors refer mainly to the supply of restaurant locations or more concisely to the supply of restaurants, and not to other aspects related to competition and customer demand, since in their view it has been one of the least addressed in this type of study, criteria shared by authors such as Solsona Monzonís, y López Olivares, (2012); Carro Paz, & González Gómez; Li-Fei Chen & Chih-Tsung Tsai, (2015); He, Z., Han, et.al.; Jung, S., (2018) y Syagnik, (2019), among others.

Location decisions are a part of the strategic formulation process of a tourist destination. A good selection can contribute to the realization of business objectives, improve the quality of location decisions of a facility, attract more customers and substantially impact market share and obtain more profitability, (Li-Fei Chen & Chih-Tsung Tsai, 2015), consequently, it is one of the main considerations in an emerging or expanding market. On the other hand, an unsuitable location can lead to an inadequate performance of the operations (Molina Rodríguez, 2019; Rodríguez Sánchez, 2016).

The selection of the site where the facility will operate is a very important decision. The significance of its impact and the implications arising from it demand appropriate management attention and consideration. This importance is justified for several reasons (Estay & Chávez, 2015):

1. Unsuitable location decisions for facilities involve considerable long-term financial immobilization.
2. Poor location decisions affect the competitive capacity of the facility.

Location is part of the operations strategy, specifying how operations can help to implement the company's corporate strategy (Krajewski et al., 2002). The development of the operations strategy involves taking the decisions that allow the established objectives to be achieved. The great variety of decisions to be adopted makes necessary to classify them. In this sense, five decision areas are identified in relation to operations in accordance with a functional scheme, these are: process, capacity, inventory, workforce and quality (Metters & Pullman, 2014).

In accordance with Gaithes and Frazier (2000), Chase et al. (2005), Schroeder (2006) and Diéguez Matellán (2008) these are determined as a background for the localization decisions: the analysis of the market and the competition; since they are considered as the first steps to be taken for the establishment of the operations strategy.

Another important precedent according to Domínguez Machuca (1995) and López Morales and Ortega Ridaura (2016) is that the company must identify the options available to ensure that its threats, opportunities, strengths and weaknesses are adequately assessed.

The location decision often depends on the type of business. For industrial localization decisions, the usual strategy is to minimize costs, although innovation and creativity can also be critical. For retail or professional services organizations, the strategy focuses on maximizing revenue. The goal of the localization strategy is to maximize the benefit of the location to the company (Estay & Chávez, 2015). In this sense, the authors maintain that it is not only nor fundamentally this, but the reduction of search costs for consumers and the creation of conditions to reach high levels of quality perceived by the client, instead of reducing production costs (Jung, 2018).

When potential alternatives extend to different regions or countries, the decision must be systematized at the geographical level. In this sense, two or three levels are usually distinguished (Domínguez Machuca, 1995; Krajewski et al., 2002), although the difference is more in form than content; those who opt for three levels distinguish the regional/international level, that of the community or city, and that of the specific site, while those who distinguish two speak of macro-analysis, or evaluation of countries, regions, communities or cities, and micro-analysis, or evaluation of specific sites.

Besides, although several procedures are established for the location analysis, no significant differences between them can be seen with a tendency towards analysis by geographical areas or levels. In general, the location study has two stages: the macro and the micro location. The first one offers the possibility of limiting the number of possible solutions, determining the optimal region; the second one determines the definitive location of the project, starting from the region determined in the first stage. In both stages, it is necessary to analyze the factors associated with the localization process.

According to the mathematical models of location (González Becerril, 2004), both the metropolitan metric, as well as the Euclidean metric and the center of gravity method, analyze the possible location of a new business, based on the population or clients in the geographical area under study. For their part, Tzeng (2002) and Hsiao (2018), use multi-criteria decision analysis from the perspective of consumers to locate a new restaurant. With this same objective, Yang (2017) applies a negative binomial regression model and Wang and Yan (2017) carry out a cluster analysis by region, of the possible distribution of restaurants. The main procedures are based on mathematical models that combine the variables of interest in the geographical space in question.

However, they are not applicable to the analysis of already established services and in the case of tourism in particular it is complex to define the real population or clients, since the clients circulate freely in the destination, without taking into account the visitors who are also considered potential consumers.

However, it is useful to use Geographic Information Systems (Neteler & Misatova, 2013) which allow interactive consultation of digital geographic information (latitude, longitude, altitude), facilitating the combination and integration of multiple cartography (Taylor, 2013), managed as overlapping layers of data that are observed at the same time (Longley, 2015) and as characteristics of the same space, for the generation of information applicable to specific projects or issues (Jiménez Moya et al., 2016).

Although the problem of locating new restaurants in tourist destinations has been addressed in the literature, there are few references to studies that address the analysis of the distribution of the already established gastronomic offer. The need for this is based on the progressive growth of tourist destinations as they evolve, which consequently implies a reconfiguration of the services and their offer.

3 METHODOLOGY

The research was proposed as an objective to analyse the current location of restaurant services in Varadero, Cuba; based on the supply and geographical distribution variables, and its ocurrence in the perception of variety by tourists. Taking into account the factors related to customers satisfaction (Soulard et al., 2018) and their contribution to the destination's diversity (Torres Oñate et al., 2018).

The followed procedure is shown in figure 3. Its deployment is based on a field study, the use of GIS and statistical analysis tools for the identification of "hot spots" in the distribution of the offer.

3.1 Analysis method

According to Ávila Bercial and Barrado Timón (2005) and Medina Argueta and Rosado Varela (2014), in any location study it is essential to limit the area to which the analysis is limited. The definition of the geographic space implies its superficial delimitation, for which diverse variables can be taken into account, such as: previous delimitation of the area, pre-established geographic distributions, socio-demographic variables, administrative variables, economic and/or commercial interests, among others (González Becerril, 2004; Saarinen, 2017).

Figure 3 - Procedure for the analysis of gastronomic services´localization.
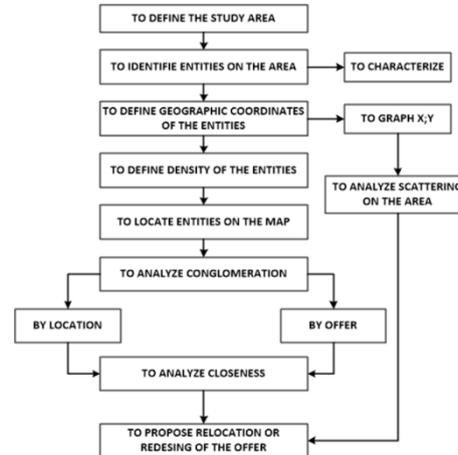
Source: Authors.

Varadero is located in the northernmost point of the island of Cuba, with 22 km of beach and it is located north of the province of Matanzas and in the peninsula of Hicacos. It has an area named historical Varadero (from its entrance to 60th Street) where most of the gastronomic offer is located and from this point to the end, the area of development of the largest hotel plant. The historical zone was selected as the area of study due to the high arrivals by the clients who travel most frequently through the pole. Besides, the clients´ complaints related to the little variety of gastronomic services refer to the restaurants located in this area. The space in question ranged from Kiki's Club restaurant located at 5th Street and Kawama Avenue to La Barbacoa restaurant located at 64th Street and First Avenue (Figure 4).

Figure 4 - Study area

Source: Authors.

The study covered all 43 restaurants located in the area, regardless of their management form. To obtain as much information as possible, in order to have a characterization of each entity that would facilitate further analysis, the administrations of each entity were interviewed and the data were tabulated in an orderly fashion: name of the restaurant, address, average customers per day and type of offer (International, Cuban or Specialized). Likewise, the cartographic coordinates (latitude and longitude) of each restaurant were recorded (table 1).

Table 1 - Data registry of study entities

Name	Address	Customers/day	Offer type	Coordinates

Source: Authors.

The determination of the coordinates of each entity led to its location on the map and the work with the GIS also constituted the reference to define the distance between the restaurants. The cartographic coordinates were recorded by means of the mobile application MapsMe, which is based on the GPS system with an approximation of five meters (figure 5). These were interpreted as Cartesian pairs (x;y), so that their graphic representation allowed the analysis of distribution gradients of the restaurants according to the variables of interest.

The determination of restaurants density offers a measure of their concentration in the area of study. For its calculation, the surface in Km² that covers the delimited area was defined. The determination of the surface area was made by means of the QGis software, which also offers a simple and friendly work environment (Jiménez Moya et al., 2016).

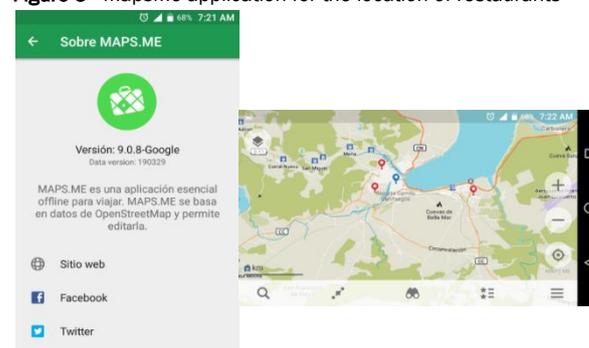For density calculation of the restaurants, the equation was used (1)

$$Dsg = \frac{\sum rest}{S} \qquad\qquad (1)$$

Where:

Dsg_{AI}: density

$\sum rest$: sum of the restaurants located within the area under study

S: study area in Km²

Figure 5 - MapsMe application for the location of restaurants

Source: Taken from the application.

So, the number of existing restaurants per square kilometer in the area studied was obtained. Although the literature does not offer an optimal value of this indicator, its determination is of interest in the investigation since it offers a panoramic idea of the existing distribution.

With the information compiled in table 1, the restaurants were located in the map with the use of QGis software, making a global analysis by the type of offer of the distribution in the area of study.

Two variables were used for the analysis of the agglomeration. According to the type of offer they provide, it is possible to determine if agglomeration exists, based on the minimum distance between restaurants with the same food offer; which directly affects the perception of variety (Torres Oñate et al., 2018). The restaurants were grouped into three groups: Cuban, Specialized and International.

For the statistical treatment of the data, the Conglomerate Analysis by the Centroids method was selected, using as distance metric for the determination of similarities that of the Habitational Block, by means of the Statgraphics software. In order to create clusters it is important to have a measure of "closeness" or "similarity" so that similar objects can be put together, in this case, the offer.

Also, from the graphic options the 2D network was selected, where according to the variables used (map coordinates) the clusters in coincidence with their location are shown.

In contrast with the resulting conglomerates, a heat map was made using QGis, which allowed the identification of restaurant agglomeration in some areas, as well as the presence of centroids. For the organization of these centroids, a radius of 100 meters was taken as a reference. This measure responds to the characteristics of the area under study and the concentration of services.

The study of the distribution in the plan was concluded with the determination of the minimum geodesic distances between restaurants, considering the urban layout and with the use of the matrix shown in table 2.

Table 2 - Matrix arrangement to determine distances between restaurants

	R1	R2	Rn
R1			
R2			
Rn			

Source: Authors.

Finally, based on the analysis of the previous results, actions were proposed to improve the current distribution of gastronomic services. The suggestions are not only aimed at changing the location, taking into account the investment cost, but also at reformulating the offer, which may be much more feasible from the economic point of view. The goal can be oriented to take into account empty spaces, supporting the decision making regarding the place and type of establishment, in the case of opening new facilities.

4 RESULTS ANALYSIS AND DISCUSSION

The field work developed in the area under study, from the identification of the 43 restaurants, summarized in table 3 the data of interest for the analysis of the location.

Table 3 - Gastronomic services in the area (continue)

	Name	Address	Offer type	Coordinates Latitude	Longitude
R1	Kiki s Club	5 St. and Kawama Ave.	International	23.134499	-81.285607
R2	Sangría	7 St. and Kawama Ave.	International	23.134504	-81.28451
R3	Sakura	9 St. between Sea road and Kawama Ave.	Specialized	23.136011	-81.284767
R4	Castell Nuovo	11 St. and 1st Ave.	International	23.135446	-81.282235
R5	Casa del Chef	12 St. and 1st Ave.	International	23.136274	-81.28186
R6	Comida rápida	13 St. and 1st Ave.	Specialized	23.137051	-81.281814
R7	Bellamar	1st Ave. between 15 and 18 St.	International	23.13928	-81.280102
R8	Pequeño Suarez	18 St. and 2nd and 3rd Ave.	International	23.13859	-81.278308
R9	El Criollo	18 St. and 1st Ave.	Cuban	23.139752	-81.2791
R10	Lai Lai	18 St. and Beach Ave.	Specialized	23.140403	-81.279084
R11	Vaca Rosada	21 St. and 1st and 2nd Ave.	International	23.140302	-81.27656
R12	Steak House	25 St. and 1st Ave.	Specialized	23.14247	-81.274304
R13	Casa de la Miel	26 St. and 1st Ave.	Specialized	23.142623	-81.274052
R14	Terracita Café	28/29 St. and 1st Ave.	Specialized	23.143274	-81.271801
R15	Don Alex	31 St. between 1st and 3rd Ave.	Specialized	23.143718	-81.269817
R16	Salsa Suárez	31 St. between 1st and 3rd Ave.	International	23.143992	-81.269701
R17	Vernissage	1st Ave. and 36 St.	International	23.146069	-81.266855
R18	Esquina Cuba	1st Ave. and 36 St.	Cuban	23.146231	-81.266555
R19	Melaito	1st Ave. between 37 and 38 St.	Cuban	23.146877	-81.266096
R20	Vicaria	38 St. and 1st Ave.	Cuban	23.147173	-81.265766
R21	Nonna Tina	38 St. between 1st Ave and Beach Ave.	Specialized	23.147368	-81.265619
R22	La Bodeguita del Medio	40 St. between 1st Ave and Beach Ave.	International	23.148305	-81.264377
R23	El Caney	1st Ave. and 40 St.	International	23.147965	-81.264098
R24	Sabor Cubano	40 St. and 1st Ave.	Cuban	23.147953	-81.26376
R25	Doña Nelly	43 St. and 1st Ave.	Specialized	23.149031	-81.26232
R26	En Familia	1st Ave. between 44 and 47 St.	Specialized	23.150172	-81.261035
R27	Casona del Arte	47 St. between 1st. Ave. and Beach Ave.	International	23.150754	-81.25908
R28	El Rápido 47	47 St. between 1st Ave. and Beach Ave.	Specialized	23.150676	-81.258573
R29	Bodegón del Gordo	49 St. between 1st and 2nd Ave.	International	23.150396	-81.257285
R30	El Itsmo	1st Ave. between 52 and 53 St.	International	23.151748	-81.254963
R31	Los Tres Cerditos	54 St. between 5th and 6th Ave.	International	23.151748	-81.254963

Table 3 - Gastronomic services in the area   (conclusion)

	Name	Address	Offer type	Coordinates Latitude	Longitude
R32	El Palacio de la Pizza	54 St. and Highway	Specialized	23.149588	-81.251969
R33	El Quitrín	55 St. and 1st Ave.	Cuban	23.152747	-81.252785
R34	La Campana	56 St. and Josone Park	Cuban	23.15141	-81.251143
R35	El Retiro	56 St. and Josone Park	International	23.152207	-81.251599
R36	El Dante	56 St. and Josone Park	Specialized	23.152103	-81.251304
R37	El Rancho	1st Ave. between 57 and 58 St.	International	23.153568	-81.25125
R38	Waco s Club	3rd Ave. between 58 and 59 St.	International	23.151632	-81.249389
R39	Restaurante de Cuatro Palmas	60 St. between 1st and 2nd Ave.	International	23.153637	-81.24961
R40	Varadero 60	61 St. and 3rd Ave.	International	23.15214	-81.248236
R41	Casa del Chocolate	61 St. and 1st Ave	International	23.154528	-81.248834
R42	Fondue	1st Ave between 62 and 63 St.	Specialized	23.154646	-81.248337
R43	Barbacoa	64 St. between 1st Ave. and Beach Ave.	International	23.1556	-81.247391

Source: Authors.

Of the 43 restaurants according to the type of administration, 30 belong to the state, 10 correspond to the private sector and 3 are cooperative restaurants. They are identified according to the type of offer: 7 Cuban, 14 Specialized and 22 International (figure 6). Bearing in mind the intention of communicating an image of "Authentic Cuba", the few number of restaurants dedicated to Cuban cuisine is contrasting.

**Figure 6 -** Offer composition

Source: Authors.

The restaurants are distributed from left to right on the diagonal, starting from the lower left edge. Although a line behavior of their arrangement is perceived in the plan, at the upper right edge the restaurants are slightly dispersed. This means that the restaurants cover a larger area in this zone (Figure 7).

Figure 7 - Distribution of restaurant services on the map, according to Cartesian coordinates
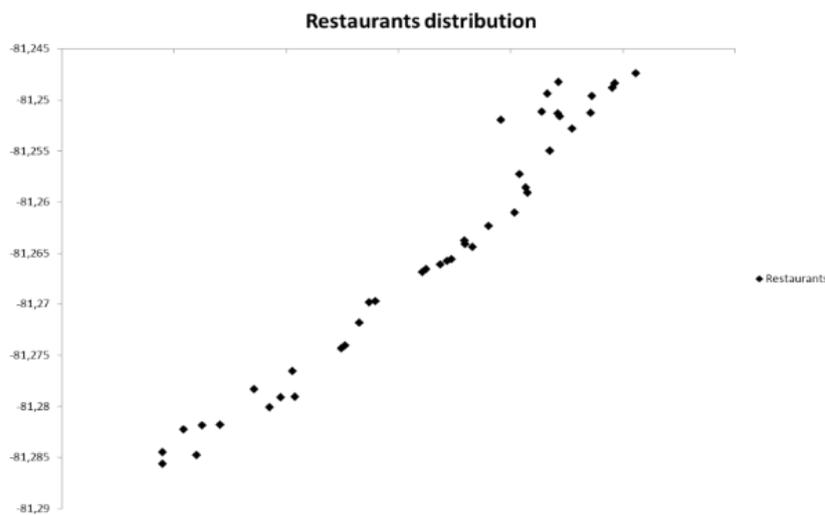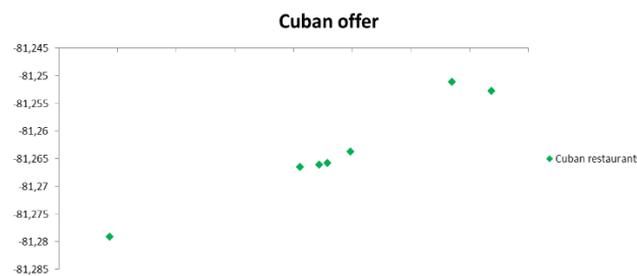

Source: Authors.

In figure 8, the graphic was divided into quadrants based on the mean of the x;y values.

Figure 8 - Division of the distribution of restaurants from the average of the x;y values
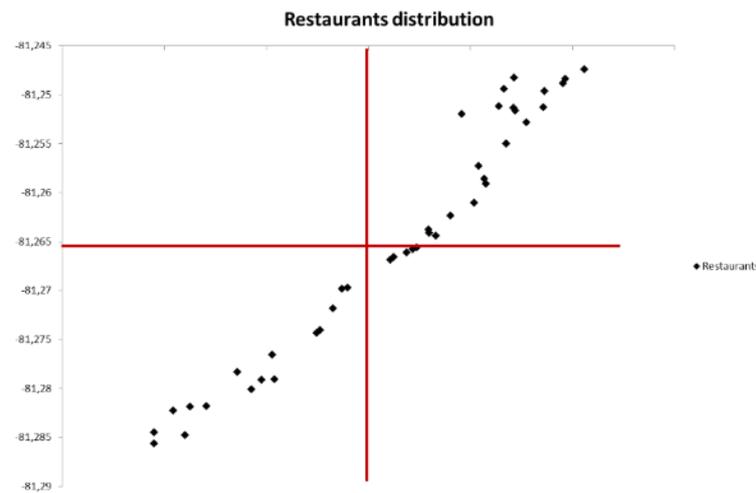
Source: Authors.

This analysis confirms the approach derived from figure 7. There are 21 restaurants at the upper right edge and 18 at the lower left edge, denoting a slight imbalance towards the right end. In the left-superior and right-inferior quadrants, no installations are located, and this behavior may be conditioned by topographic characteristics.

When locating the values related to the type of offer, the Cuban restaurants (7) are concentrated in the central zone (4) and have a minimum representation in the left-lower (1) and right-upper (2) extremes, as shown in figure 9.

Figure 9 - Distribution of the restaurants according to offer type (Cuban)

Source: Authors.

This behavior indicates that it is necessary to expand the offer of Cuban cuisine in the area under study, since it bases its promotional campaign on the slogan "Authentic Cuba". Therefore, it is contrasting the scarce representation of gastronomic offers dedicated to its culinary traditions, as well as their imbalance in the current distribution.

About the type of specialized offer (14), there are the restaurants dedicated to Asian cuisine, chicken-based dishes and gastronomic particularities such as cheese, honey and beef cuts. About their distribution (figure 10), these are scarcer on the map and can therefore be better perceived by customers. In the central zone, four of these services are grouped together, relatively close to each other, which can affect their commercialization since as substitute products they compete for the same clients, in addition to compromising the perception of variety of supply, one of the aspects that justified this research.

In the case of the international offer (21), it is significantly higher. Although many of these services include in their menus dishes from Cuban cuisine, they are sold as restaurants of Cuban and international cuisine. This sense causes confusion for the clients, at the same time that it masks the authenticity of the plates of Cuban food. This behavior of a kitchen mix turns out to be usual in the gastronomic Cuban environment .

Figure 10 - Distribution of the restaurants according to offer type (Specialized)
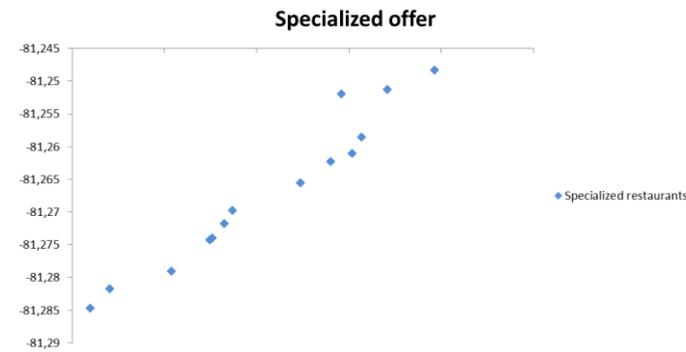
Source: Authors.

With respect to the distribution of the international supply (figure 11) there is little presence in the central zone of the plan and they show a greater dispersion in the extreme right-superior.

Figure 11 - Distribution of the restaurants according to offer type (International)
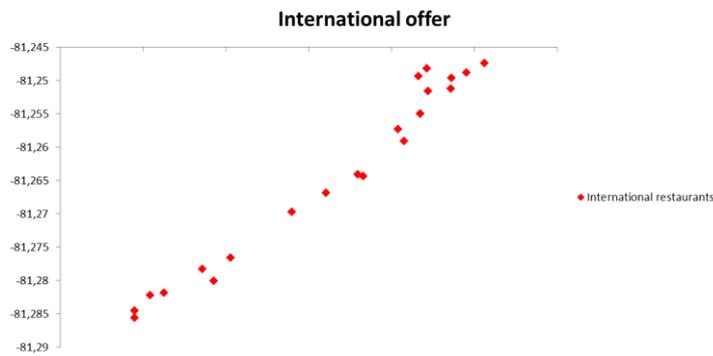
Source: Authors.

Density of gastronomic services

The area covers 4.2Km² approximately. According to (1) 10 restaurants per Km2 are located in the area under study.

$$Dsg = \frac{\sum rest}{S}$$
$$Dsg = \frac{43\ retaurants}{4.2\ km^2}$$
$$Dsg = 10.23 \approx 10\ retaurants/km^2$$

Although it is a general measure, and there may be a greater or lesser concentration in certain areas, the customer who travels through the area under study has the probability of finding 10 restaurants per square kilometer. According to this, a certain concentration of restaurants can be found in the destination, which increases given the unequal distribution of the current offer. There are only 7 restaurants of Cuban food, against 21 of International and 14 of Specialized food, for each restaurant of Cuban food there are 2 of Specialized ones and 3 of International ones. That corroborates the imbalance of the offer variety.

Taking as a reference the type of offer, where 7 restaurants are of Cuban food (DsC), 14 are Specialized (DsE) and 22 offer International food (DsI), the density was as follows:

$$DsC = \frac{\sum rest}{S}$$
$$DsC = \frac{7\ restaurants}{4.2 Km^2}$$
$$DsC = 1,6\ \approx 2 restaurants/Km^2$$

$$DsE = \frac{\sum rest}{S}$$

$$DsE = \frac{14\ restaurants}{4.2 Km^2}$$

$$DsE = 3.33\ restaurants/Km^2$$

$$DsI = \frac{\sum rest}{S}$$

$$DsI = \frac{22\ restaurants}{4.2 Km^2}$$

$$DsI = 5.23\ restaurants/Km^2$$

Taking this into consideration, the density of Cuban restaurants per square kilometer is 2 restaurants, directed to each type of offer in particular. In the case of Specialized restaurants, it is 3 and for International cuisine it is 5.

Restaurant location on the map

In figure 12 Varadero peninsula is represented, from west to east, with a gradient toward the northeast. The area is elongated in the diagonal from left to right (west-east) and narrow across the width. On average, its extension along the gradient is approximately 5.2 km and its width barely exceeds 0.7 km on average.

Figure 12 - Restaurants location on the map according to offer type

Source: Authors.

In addition, the results of the location of the Cartesian coordinates are confirmed. The distribution responds to the own topographic characteristics of the selected area; there are no geographical barriers (except for the sea) that condition the location of the entities.

Not only is the Cuban offer in this case a minority, but also its distribution showed representations at the beginning of the area, three relatively close to the central zone and 3 at the end (figure 13).

Figure 13 - Distribution of Cuban food restaurants

Source: Authors.

The Specialized offer (figure 14) showed a more homogeneous distribution being located throughout the area under study, there was no evidence of *a priori* concentration of this type of restaurant.

Figure 14 - Distribution of Specialized food restaurants

Source: Authors.

The International offer, despite being the majority, is not concentrated. Although a prevalence was observed in the upper-right zone of the area under study (Figure 15).

Figure 15 - Distribution of International food restaurants

Source: Authors.

The distribution of the restaurants according to the type of offer (figures 13, 14, 15) showed the lack of Cuban food restaurants, as well as their deficient distribution, their dispersion does not correspond to the value of the corresponding density (2 restaurants/km²) according to the total of existing restaurants. There were also empty areas, with a significant distance between offers.

It contrasts with the high number of International restaurants with Cuban offer, if the promotional campaign of sales of the destination under the slogan "Authentic Cuba" is taken into account. This behavior compromises the perception of variety of the gastronomic offer in the destination and the projection of the desired image, in line with Batista Sánchez et al (2017).

Restaurant agglomeration analysis

Cluster Analysis, using the centroid method through a 2D scatter diagram, showed the existence of 5 clusters (table 4).

Table 4 - Existing conglomerates in the area under study

Conglomerates	Members	Average
1	6	13,95
2	5	11,63
3	5	11,63
4	9	20,93
5	18	41,86

Source: Authors.

Figure 16 shows 5 clusters from 43 observations. A higher concentration of restaurants can be seen in the last cluster (41.6%), which statistically confirms the existing imbalance in its general distribution.
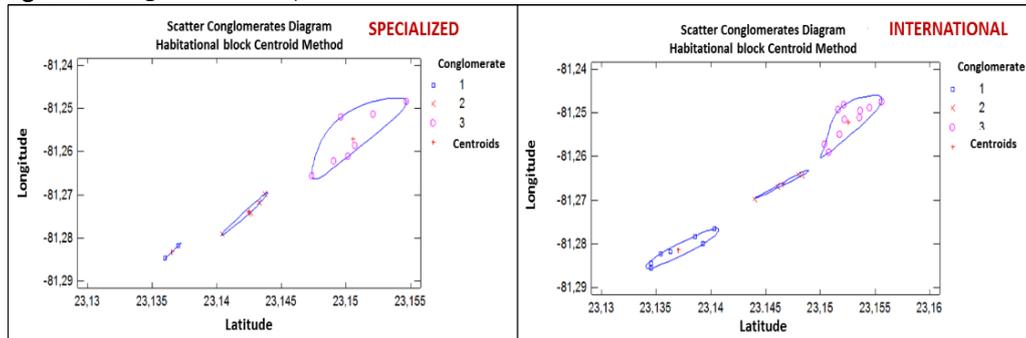
Figure 16 - Cluster scatter diagram
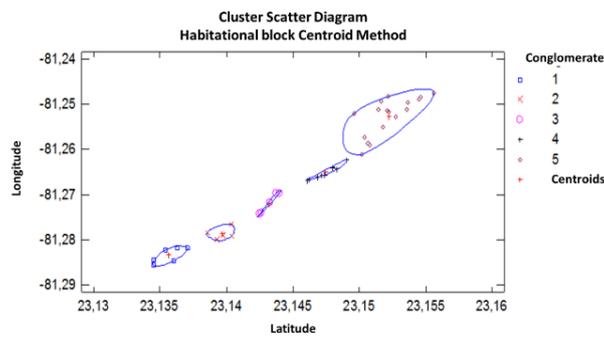
Source: Authors.

This analysis by offer type (figure 17), showed 3 conglomerates for Specialized and International restaurants, in both cases a conglomerate formed by 50% of the offer, which is the zone of agglomeration.

Figure 17 - Conglomerates for Specialized and International offers

Source: Authors.

This behavior confirms the poor dispersion of restaurants, in terms of geographical location and offer type.

However, taking into account the movement of customers, a minimum distance between restaurants of 100 meters was defined for the study of the proximity between facilities. Using the GIS, the 43 restaurants were located according to their cartographic coordinates, and through a further analysis (heat map) the areas with the greatest agglomeration were identified for the minimum pre-set distance (figure 18).

Figure 18 - Proximity analysis for 100 meters
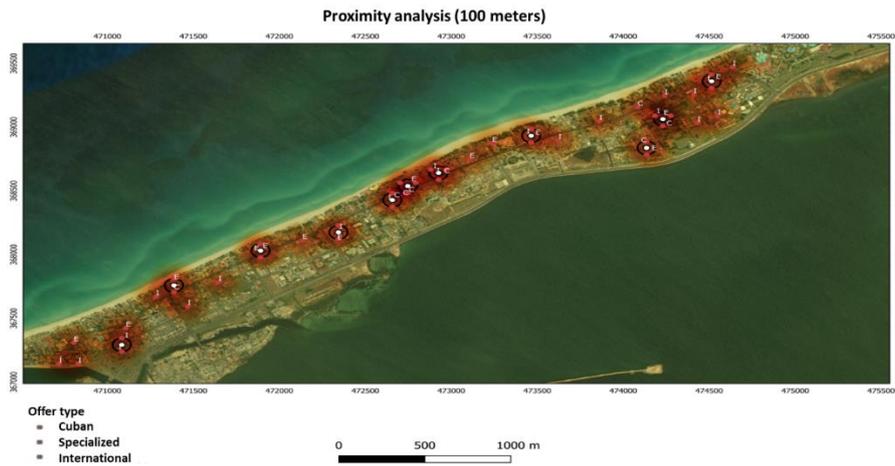
Source: Authors.

With the heat map for a radius of 100 meters, 11 centroids were identified, which evidences 11 points where the distance between restaurants is less or equal. There was a bigger concentration of restaurants in the area between 36th and 38th streets (central zone), with the presence of 8 restaurants. The other zone with an agglomeration of restaurants is located between 54th and 64th streets (upper-right zone), for a total of 14 (table 5).

**Table 5 -** Composition of the centroids at less than 100 m

Centroids (100 m)	Number of restaurants	Zone	Offer
1	2	lower-left	Similar
2	2	lower-left	Different
3	2	lower-left	Similar
4	2	lower-left	Different
5	2	Central	Different
6	3	Central	Different *
7	3	Central	Different *
8	2	upper-right	Different
9	2	upper-right	Different
10	3	upper-right	Different
11	2	upper-right	Different

Source: Authors.

These results showed the presence of agglomerations of restaurants in different areas of the plan in general, which attempts against the variety of the offer in terms of number of restaurants. It should also be noticed that in centroids 1 and 3 the offer is similar and in centroids 6 and 7 (*) two of the restaurants that make them up offer similar meals.

According to the offer type in the case of the Cuban restaurants, a centroid was evidenced in a radius of 100 meters. The same is for the Specialized offer, although they specialize in different foods; the first one bases its dishes on beef cuts and the second one on the preparation of chicken-based dishes, so it does not attempt against the little variety despite its proximity. However, for the International restaurants, predominant offer in the destination, 3 centroids were identified. The first one is located on 12th street, with the restaurant Castell Nuovo and Casa del Cheff. The second one is located on 40th street with La Bodeguita del Medio and El Caney. And a third one, made up of two restaurants, evidencing that in this area there are 5 other international restaurants, which although they are more than 100 meters apart, they are relatively close (figure 19).

Figure 19 - Proximity analysis, international food restaurants
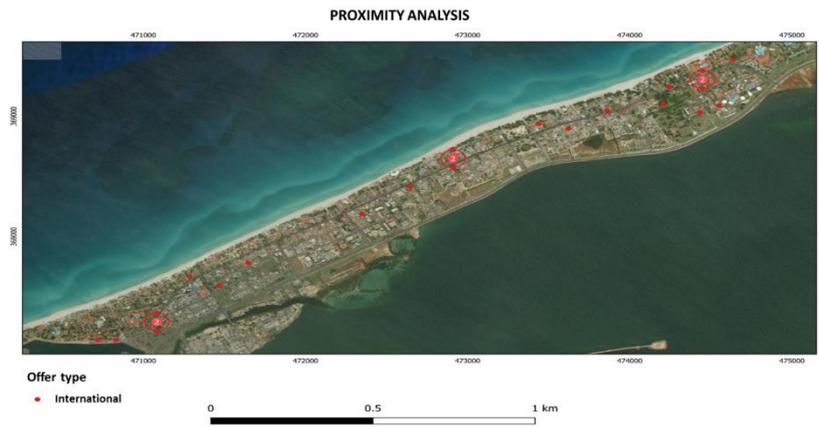
Source: Authors.

Closeness analysis

Although the analysis of proximity for a radius of 100 meters offers a vision of the proximity of the restaurants, the concern arose to assess the minimum distance between the facilities, taking into account the urban layout. In this way it is possible to obtain a general overview of the distribution of the restaurants on the map in terms of proximity.

By means of GPS the distance of each restaurant from the rest was tabulated to identify then the minimum distance of a restaurant from another (table 6).

Table 6 - Minimal distances

Restaurants	Minimal distance (m)	Restaurants	Minimal distance (m)
Kiki s Club	130	El Caney	48
Sangría	240	Sabor Cubano	48
Sakura	240	Doña Nelly	250
Castell Nuovo	160	En Familia	280
Casa del Chef	130	Casona del Arte	140
Comida rápida	130	El Rapido 47	140
Bellamar	200	Bodegón del Gordo	220
Pequeño Suarez	190	El Itsmo	290
El Criollo	98	Los Tres Cerditos	110
Lai Lai	98	El Palacio de la Pizza	110
Vaca Rosada	320	El Quitrín	210
Steak House	110	La Campana	310
Casa de la Miel	110	El Retiro	190
Terracita Café	280	El Dante	260
Don Alex	46	El Rancho	190
Salsa Suárez	46	Waco s Club	150
Vernissage	36	Restaurante de Cuatro Palmas	190
Esquina Cuba	36	Varadero 60	150
Melaito	120	Casa del Chocolate	76
Vicaria	32	Fondue	76
Nonna Tina	32	Barbacoa	180

Source: Authors.

The frequency histogram (Figure 20) confirms that the minimum distances are between 0 and 200 m. This result confirms the 11 centroids identified by the heat map generated with the QGis.

Figure 20 - Frequency histogram
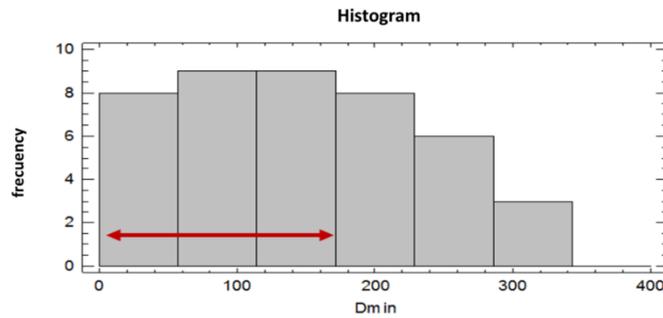
Source: Authors.

In an area of up to 57 meters there are 8 restaurants, from 57 to 114 meters 9 restaurants and 8 from 171 meters on (table 7). Therefore, the majority of restaurants have a minimum distance from one to another of less than 200 meters. This behavior suggests a high concentration of offers in the destination.

Table 7 - Frequency of minimum distances

Class	Limit Bottom	Limit Top	Midpoint	Frequency	Frequency Related	Frequency Accumulated	Frequency Rel. Accum.
	Less or the same	0,0		0	0,0000	0	0,0000
1	0,0	57,1429	28,5714	8	0,1860	8	0,1860
2	57,1429	114,286	85,7143	9	0,2093	17	0,3953
3	114,286	171,429	142,857	9	0,2093	26	0,6047
4	171,429	228,571	200,0	8	0,1860	34	0,7907
5	228,571	285,714	257,143	6	0,1395	40	0,9302
6	285,714	342,857	314,286	3	0,0698	43	1,0000
7	342,857	400,0	371,429	0	0,0000	43	1,0000
	Bigger than	400,0		0	0,0000	43	1,0000

Media = 151,209   Standard Deviation = 82,8621
Source: Authors.

With this data a bubble graphic was made, from the inverse of the real minimum distances (Idm) obtained according to:

$$Idm = \frac{1}{Dmin} * 10000$$

In that sense, to major proximity value, a bigger bubble. There is an overlap of some restaurants with others, confirming once again the existing agglomeration between them (figure 21).

Figura 21 - Bubble Chart
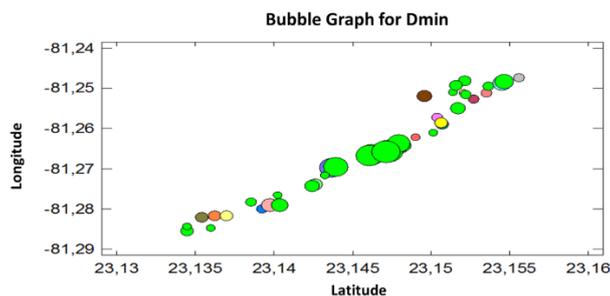
Source: Authors.

Reordering propositions or redesign of the offer.

On the basis of the analysis carried out, both geographically and statistically, of the restaurant services in the tourist space defined as the object of study, a deficient distribution of the location of the offers was evident. In addition, there is an imbalance in the offers, with international food being the prevailing type of cuisine. The restaurants are not strategically located, indicating a deficit in territorial planning according to Diéguez Matellán (2008); Soulard et al. (2018). This behavior results in decommercialization, a decrease in profitability and a lack of attractiveness for

customers who choose to buy Varadero as a vacation destination, according to Willmer Escobar et al. (2015). This approach is based on the results obtained from the analysis of density and agglomeration.

Therefore, a reordering or redesign of the offer is considered. If the first proposed solution is addressed, it is more accurate to propose a reordering of the restaurants in the plan, although it would be a costly investment process for the destination (Estay and Chávez, 2015). However, it may be taken into account in the development of territorial planning strategies (Toro et al., 2015) for the opening of future restaurant facilities.

It is then more reasonable to make a redesign of the offer. It is a less costly investment process and contributes to improve the distribution of supply on the plan. It must be taken into account that there are a few restaurants serving local food and the country must constantly work on promoting the "Authentic Cuba", the main slogan in advertising and promotion as a tourist destination to be purchased. Based on the observation of the restaurants on the map and their distribution, it is proposed:

From 5th to 13th street there is a centroid, where you can find 6 restaurants, 4 of international food and two of specialized cuisine. Analyzing the characteristics as far as infrastructure and design of the installation, it is possible to redesign the offer in the present international restaurant Casa del Chef to Cuban cuisine.

From 25th to 32nd street, another centroid was identified. There are 5 restaurants, 4 of them are specialized and only one of international food. If we take into account that the proposed redesign is aimed at increasing the number of restaurants offering Cuban food and analyzing each one of these, it is considered that the restaurant that should redesign its offer is the Steak House. In spite of being a specialized restaurant, its commercialization is low, which implies a low profitability. As a commercialization strategy and at the same time of planning, it is possible to restructure its offer, changing it to Cuban food, creating a new image of it and attracting the clients with typical Cuban dishes.

From 43rd Street to 49th Street, 5 restaurants can be identified, of which 3 are specialized and two are international. It is suggested that, El Bodegón del Gordo should reform its offer from international food to Cuban food. This is a private restaurant, located in the central area where there are few local offers.

Finally, from 54th to 64th Street, an area where there is a greater concentration of restaurant services, with a total of 13 restaurants, 3 for Cuban food, 3 for specialized food and 7 for international food; the redesign of its offer is considered to be El Rancho restaurant, which has an infrastructure with typical Cuban elements, and is located on the avenue, a crucial opportunity for its commercialization.

The redesign of the gastronomic offers not only affects the commercialization of the companies, but also contributes to the local commerce by generating new demands of inputs. It offers more variety to clients and provides a range of options that affect the image of the destination. Besides, the opening of new businesses has a positive impact on the local population as a source of employment. Likewise, the increase in typical offers results in the enhancement of the country's traditions and culture, an aspect that in gastronomy is increasingly interesting for foreign customers, enriching the commercial offer and contributing to consumer satisfaction.

5 CONCLUSIONS

Territorial planning is fundamental in the management of tourist destinations, since it conditions their future development and has an impact on the satisfaction of consumers with the services provided. The methodological background showed three main methods for location studies, the metropolitan metric, Euclidean metric and the center of gravity (González Becerril, 2004). However, these focus their analysis on the location of new offers. On the other hand, the variability and constant movement of demand makes its application more complex (Molina Rodríguez, 2019).

The integration of both geographical and statistical tools allows a more effective decision making for the problems of location, or distribution in this case. The statistical analysis of conglomerates provides robustness to the results and the work with geographic information systems allows deepening the treatment and visualization of data, in accordance with Rodriguez Sanchez (2016).

The contrast between visual information from the work with maps and the statistical analysis with the distances between facilities is highlighted. So, it is possible to identify agglomerations that at first sight are not detectable. Also, the minimum distances between services allows issuing items related to proximity, since a high concentration in a given space although provides variety can be compromised when taking into account the type of supply that is

marketed. Thus, studies related to location should complement the geographical location, with the nature (offer) of the services subject to analysis.

In tourist destinations, the adequate planning of offers is nourished by different branches of science, where decisions must be based on studies that corroborate each other and preferably taking into account multivariate analyses (Velazco, 2016), in this case geographic location and offer. In this regard, when working in urban spaces, the layout of the streets is another aspect to consider.

The study carried out on the location of already established facilities provides a way to manage tourist destinations that, once they have reached maturity, need to be reconfigured. The changes and modifications that have arisen during their evolution require a rethinking of the original design. In this way, research offers a way to carry it out, not only from the geographical point of view, but also incorporating the competitive dimension to the analysis.

The results of the research showed that the emergence or projection of services to be provided in a destination should not be left to chance. It must be ordered territorially, following a plan that guarantees the transmission of the commercial image that is pursued and the satisfaction of the consumers.

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