International Entrepreneurship and Management Journal (2024) 20:2139–2167
https://doi.org/10.1007/s11365-024-00961-x

Insights into the localisation of outlets: The franchising chains

María D. Caro-Vela[1] · **José M. Ramírez-Hurtado**[1] · **Esther Calderón-Monge**[2]

Accepted: 22 February 2024 / Published online: 6 March 2024
© The Author(s) 2024

Abstract

The geographical location of an establishment is a strategic decision of major importance for companies. In the case of franchising, the peculiarities of the system render this decision of vital importance. The objectives of this work are threefold: a) to identify hotspots of franchise establishments; b) to perform an analysis of the distance between establishments; and c) to specify a weighted geographical regression model to estimate the influence of income, population density, and percentage of commercial area of the municipalities on the number of establishments of the franchises located in the chosen municipalities. To this end, 1,508 establishments belonging to seven franchising chains operating in Spain have been selected. The results show that there is an agglomeration of establishments in various geographical areas. Geographically weighted regression also confirms that the variables analysed constitute good predictors of the number of establishments in each municipality.

Keywords Franchising · Location · Outlet · ArcGis

Introduction

A fundamental strategic decision for the viability of a business and for its survival involves the physical location of a company, which is contingent upon various factors that may foster or handicap the present and future economic activity of the company (Guimarães et al., 2000). The selection of the location for a large company is ordinarily made only once, although relocation may be possible if its

✉ José M. Ramírez-Hurtado
jmramhur@upo.es

María D. Caro-Vela
mdcarvel@upo.es

Esther Calderón-Monge
ecalderon@ubu.es

[1] Department of Economics, Quantitative Methods and Economic History, Universidad Pablo de Olavide, Seville, Spain

[2] Department of Economics and Business Administration, Universidad de Burgos, Burgos, Spain

objectives are not met. The most common problems that arise from the unsuitable location of a company include the distance from the consumer markets, the difficulties in the supply of raw materials and services, the unavailability of a qualified workforce, and the increase in transport costs. Although the concept of location constitutes a key aspect in the literature on retail or entrepreneurship (Cuervo, 2008; Molina-Morales et al., 2014), in the case of franchising it appears to have been dismissed out of hand (El Akremi et al., 2015). Discussions regarding localisation in franchising have been limited to evaluating the costs of control between the franchisor and the establishments of the chain (Bitti et al., 2019; Perryman & Combs, 2012).

However, franchising presents a particular and fundamental context to study geographical location. In a franchising chain, the franchisor develops a brand and business concept by contracting independent establishments: the franchisees. Geographical potential creates business opportunities and motivates the decision regarding where to locate new establishments (Bitti et al., 2019).

Hence, franchising is a business model that consists of reproducing or replicating the business concept through the opening of new establishments. The opening of new establishments of a chain brings advantages for the chain itself, such as helping to increase revenues, to increase the presence of the brand in the market, and to render the market area less attractive for competitors (Ghosh & Craig, 1991; Ramírez-Hurtado, 2017). These establishments may be owned by the franchisor or owned by the franchisees. The location of these franchised establishments is a delicate decision for several reasons. On the one hand, the inappropriate location of an establishment can generate losses for both the franchisee and the franchisor and can even trigger the closure of the establishment (Façanha et al., 2013). On the other hand, the inappropriate location of an establishment can generate a decrease in sales to the benefit of another establishment nearby, whether it be of the same brand or another (Oh, 2016). Therefore, the location of the establishment of a franchising chain is a decision that requires the careful study of a set of influencing factors (Kimelberg & Williams, 2013) in order not to commit mistakes and to achieve success. Variables, such as the population density of the place to open an establishment and the income of its inhabitants, among others, directly influence the location of a franchise establishment (Youn & Lee, 2016).

Given the above, the objective of this work is to carry out an analysis of the location of the establishments of franchising chains. In order to achieve this general objective, three sub-objectives must first be established: a) identify hotspots of establishments to observe in which geographical areas these establishments are concentrated; b) carry out an analysis of the distance between establishments to identify possible strategies of the franchising chains; and c) perform a regression analysis to identify the factors that chains utilise to locate their establishments. Among the factors that are going to be studied are the population density, the income of individuals, and the commercial area of the zone. For data analysis, a geographic information system (GIS) is used. To this end, the data is georeferenced, and, with the help of GIS software (ARCGIS), spatial statistical analysis is carried out that subsequently helps towards achieving the objectives.

In order to pursue this objective, seven franchising chains have been selected that operate in the franchise market in Spain. The choice of these brands is based on the fact that they are brands from traditional sectors in franchising (such as travel agencies, restaurants, opticians, urgent transport, and car repair) and/or for operational reasons to obtain data referring to the geographical coordinates of the establishments.

The work data has been applied to the case of Spain. There are several reasons for this choice. In the first place, Spain is one of the main economies of the European Union, with trade as a strategic sector for the development of its economy. Second, franchising in Spain constitutes a major part of its retail business. In fact, in 2016, up to 15% of retail trade used the franchising system as a formula for expansion: a percentage that 15 years ago stood at only 3% (AEF, 2021). Thirdly, the franchise system in Spain is fully consolidated and continues to grow. Currently, it is a system with 1,381 chains that represent a total of 77,819 establishments, which contribute a turnover of more than 26,000 million euros and generate more than 290,000 jobs (AEF, 2021). Lastly, very few studies have analysed the issue of the location of franchising chain establishments. In the particular case of Spain, to the best of our knowledge, there are no studies in the scientific literature that have analytically addressed this issue.

This article contributes knowledge to the scarce literature that exists regarding the geographical location of franchising chain establishments, and hence presents a significant degree of originality.

The article is organised as follows. "Decisions regarding the location of establishments in franchising chains" section discusses the theoretical arguments that justify the importance of location for the opening/closing of franchising chain establishments. "Methodology" section reveals the data source and discusses the variables and presents the GIS instrument. "Results of the statistical-spatial analysis" section presents the results and contains a discussion of the empirical results. Lastly, several conclusions and future lines of research are included.

Decisions regarding the location of establishments in franchising chains

The decision as to where to locate a business is a critical factor. Many variables influence the suitability of a place, such as the flow of people, the per capita income of citizens, the level of attraction of the area, and the price per square metre. In the case of franchise establishments, the decision regarding location is even more complicated since it has to comply with the dictates of internal regulations and a specific corporate image. Although certain chains assume the final assignment of the location, the most common is that the search for the premises is shared between the head office and the franchisee. On the one hand, the head office provides experience and a systematised process, which the novice entrepreneur lacks. On the other hand, the franchisee best knows their own economic capacity and the area. A third option entails the responsibility for finding the ideal location falling exclusively on the franchisee's shoulders. Whichever the case, there are occasions on which the franchisor-franchisee relationship is not exempt from conflict, due to the location of the establishment.

In a franchise distribution system, where the establishments in the chain are not necessarily the property of the same owner, the objective of the franchisor may be in conflict with the individual objective of the franchisee (Blancas-Peral et al., 2014; Ramírez-Hurtado et al., 2011). In other words, the franchisor may want to open a new establishment of its property close to the original franchised establishment in an effort to maximise its profits or its participation in the market. In this situation, the phenomenon of cannibalisation arises, that is, the loss of market share for the existing establishments of the chain due to the market capture of the new establishment. In this case, a certain balance between the objectives of the franchisor and the objectives of the franchisees is desirable. Therefore, two objectives are involved that are normally found in conflict: the maximisation of the franchisor's market share and the minimisation of cannibalisation (Suárez-Vega & Santos-Peñate, 2014) or, in other words, the maximisation of the income of the chain and the maximisation of the income of a franchised establishment (Kaufmann & Rangan, 1990; Zeller et al., 1980). In this way, the distance between establishments becomes a major strategic variable in location decisions which, if not managed well, becomes a source of conflict (Kwong-yin Fock, 2001). The franchisor will tend to maximise the number of franchised establishments by minimising the distance between the franchisees. Simultaneously, the franchisor provides a minimum threshold to the franchisees to facilitate their survival and keep the franchisees working for the chain. However, the franchisees prefer to maximise their own market territory and seek a niche market without competition from other franchisees.

In the extensive empirical literature on franchises, location decisions appear to be a largely neglected problem. However, franchising represents a rich context for the analysis of the impact of decisions regarding the location of establishments. Location is a crucial decision that affects other future decisions, such as closing an establishment in the presence of another or more of its competitors, or in the presence of other brands, and/or opening a new establishment. In fact, Rosado-Serrano et al. (2019) hold that an optimal mix of company-owned and franchise outlets reduces agency costs and accelerates growth. According to these authors, due to the importance of spatial models for companies, much more research is needed on distance-related aspects. Furthermore, location is significant as a source of conflict between the franchisor and franchisees (Kwong-yin Fock, 2001).

Regarding the closure of a franchising chain establishment, location aspects can play a decisive role in survival (Façanha et al., 2013) and in the financial performance of franchisees (Xiao et al., 2012).

As regards the location of a new establishment of a franchising chain, economic analyses of the profitability of investments in franchises are necessary and these justify the investments therein; these analyses, however, should also take into account everything related with the average income and population in the area (Hasanov, 2019). This author shows that the number of residents has proven to be a major factor in the decisions regarding the location of a franchise establishment, since it is reasonable to open points of sale in areas with a certain average population above that of the average of the total population. In contrast, in less populated areas, it would be justified to open franchises if they were located in high-frequency places, such as motorways and tourist destinations, and visited by a large number of national

or foreign tourists or people in transit. Along these lines, Wiese (2017) looks for specific patterns in the selection of specific locations for restaurant franchises within large cities and finds that urban locations with easy access to main roads, high commercial traffic, and of more affluence are preferred. In analysing the location strategy of *Starbucks* in a Korean province, Youn and Lee (2016) found that the number of *Starbucks* establishments was positively and strongly related to commercial areas with a large floating population. Lee and Kim (2015) found other factors in the coffee franchise sector, such as the business district environment, accessibility, economic efficiency, competitors, and establishment characteristics, respectively. Ghaemi et al. (2014) proposed the calculation of optimal locations, thereby finding a location to open a new establishment in such a way as to maximise the number of potential customers in the establishment, that is, by considering the number of people who live near the establishment.

Another aspect to take into consideration when deciding where to locate franchises involves the phenomenon of commercial gentrification. This phenomenon refers to the process of transformation of the commercial environment of an urban area, usually located in city centres, into high-density areas, as a result of the arrival of residents with greater purchasing power and the consequent reconfiguration of the commercial fabric. This change in the commercial scenario has encouraged large chains and franchises, without abandoning peripheral shopping centres, to locate, expand, or reform in urban centres, thereby attracting customers who shop within the city centre. This can lead to a decrease in travel and the promotion of public transport for a certain segment of the population. At the same time, in the more recently developed neighbourhoods, spaces are beginning to be configured where commercial activity is scarce, thereby increasing motorisation since the population have to travel by car in order to purchase goods (Wrigley & Dolega, 2011).

Competition constitutes another factor that has also been taken into account in the location since it influences the pricing strategy of those chains in the same sector (Kalnins, 2003). Therefore, if the prices in nearby restaurants of different chains were spatially correlated, it would be concluded that customers see their meals as substitutes. In this case, price reduction would be likely to be effective in taking market share from the competition. Furthermore, a relationship between the prices of nearby restaurants within a chain would indicate that the establishments are close enough for consumers to see them as substitutes. Kalnins (2003) found that consumers do not see hamburgers from different fast-food chains as substitutes because their establishments are located close together. However, it did find that there were price correlations in nearby establishments within each chain. This finding for the author indicates that the restaurants of a certain chain are sufficiently close to one another to be in competition with each other.

Beatty and Smith (1987) stated that the greater the market coverage or distribution intensity, the stronger the repeat purchase of the brand and the stronger the value of the brand with respect to the competition. Conversely, lower distribution intensity, or a more selective distribution, would be associated with a greater search by the consumers or with the search effort within a market. Indeed, saturated markets can be found by calculating market coverage in such a way that they condition the profitability of franchised establishments and make it difficult for new establishments

to locate. A saturated market runs the risk of reducing sales per establishment, of increasing the likelihood that the franchisee will operate in underperforming locations, and of reducing demand for new franchisees.

The franchisor allows a franchisee to open an establishment in a specific place, in accordance, in the majority of chains, with a territorial exclusivity clause to ensure that the franchisee is guaranteed a certain level of sales and does not enter into competition with other establishments, whether they be franchisees or their own establishments, of the same brand. These territorial restrictions are suggested as a mechanism to control spatial conflicts in franchising chains. However, it is true that not all brands include this exclusivity clause, and not all franchisors act to protect their franchisees from competing with each other. Chaudhuri et al. (2001) concluded in their work on location-based franchise theory that franchisors chose the most profitable locations to open establishments owned by themselves while they left the franchisees to open their establishments in less profitable locations. It should be borne in mind that, although experienced entrepreneurs tend to make quick but prudent decisions when responding to new challenges (Acharya & Berry, 2023), the large size of a company exerts a positive impact on the its profitability (Fonseca et al., 2022).

In short, it appears that factors such as distance between establishments, agglomeration, and population are elements that should be taken into account when opening a new establishment. For all these reasons, this work strives towards providing a geographical study of these factors in the case of the franchise. Furthermore, other major economic factors such as income and commercial area of the municipalities have also been included in this analysis.

Methodology

Sample

In order to carry out this study, a sample was obtained of 1,508 establishments belonging to seven franchise brands from a variety of sectors in Spain. Table 1 shows the breakdown of establishments in terms of franchise brand and sector. The selection of these brands is justified in two ways. In the first place, they are all brands of traditional sectors in franchising (such as travel agencies, restaurants, opticians, urgent transport, and car repair), and secondly, for operational reasons whereby data is obtained referring to the geographical coordinates of the establishments.

The selected chains and number of establishments are described below:

Location of establishments

All the establishments of each chain were identified through the website of each brand. The full address of each establishment appeared on these pages. Once all these addresses were collected, they were geographically located.

Table 1 Selected chains and number of establishments

Brand	Sector	Nº of establishments in the sample	% of establishments in the sample
La Ventana Natural	Herbalist and Dietetics	146	9.68%
General Óptica	Opticians	261	17.31%
Lizarrán	Restoration	106	7.03%
Centro Midas	Car repair	154	10.21%
Mail Boxes	Messaging	223	14.79%
Nautalia	Travel agency	219	14.52%
B The Travel Brand	Travel agency	399	26.46%
	TOTAL	1,508	100%

Two tools were used in the geographical location process. First, the Google *My Maps* tool was utilised to geocode the addresses, that is, to convert the addresses into WGS84 geographical coordinates. The functionalities of Esri's ArcMap geospatial processing program were then employed to project the data to the UTM coordinate system legally established for the Spanish territory, which is ETRS89. This process is undertaken in order to perform distance analysis more accurately, since the chord distances employed by ArcGIS when using a geographical coordinate system fail to provide a good estimate of geodesic distances beyond 30 degrees (Esri, 2018). In this way, a GIS database is attained with the geographical location of the establishments.

Variables

In order to analyse the relationship between the location of the establishments and other potentially related variables, a GIS database was developed where the study area is Spain. The database includes:

1. Municipal precincts. Iberian Peninsula and Canary Islands. Name and area of the municipalities.
2. Population of the municipalities. Demographic data, including the 2018 population according to the census of the National Institute of Statistics.
3. Average gross income. Income in municipalities with more than 1,000 inhabitants, AEAT data has been completed for the Basque Country with data from the Euskadi Statistical Agency.
4. Commercial area.

All the data listed above has been compiled for all existing municipalities in Spain. The sources of the data are listed in Table 2.

The data was analysed with ArcGIS software of Esri.

Table 2 Data sources

Data	Source
Establishments of franchising chains	Websites of brands
Name and area of municipalities	Municipal precincts and boundary lines. IGN http://centrodedescargas.cnig.es/CentroDescargas/documentos/atom/au/lineas_limite_gml.zip
Population of the municipalities	Municipal register. National Institute of Statistics https://www.ine.es/dynt3/inebase/es/index.htm?padre=517&capsel=525
Census districts in the municipalities	https://www.ine.es/censos2011_datos/cen11_datos_resultados_seccen.htm
Average gross income	Income in municipalities with more than 1,000 inhabitants AEAT and Euskadi Statistics Agency https://www.agenciatributaria.es/AEAT/Contenidos_Comunes/La_Agencia_Tributaria/Estadisticas/Publicaciones/sites/irpfmunicipios_ccaa/2018/jrubik4235c61f8b9ba4e405a5632024b117c5b6402f21.html and https://www.euskadi.eus/t64amVisorWar/t64aIndicadores.jsp
Commercial area	Commercial surface SIOSE land use database http://centrodedescargas.cnig.es/CentroDescargas/buscadorCatalogo.do?codFamilia=SIOSE

IGN National Geographic Institute, *INE* National Institute of Statistics, *AEAT* State Tax Administration Agency, *SIOSE* Land Occupation Information System in Spain

Results of the statistical-spatial analysis

Location of establishments

First, the map of the georeferenced establishments was obtained. In Fig. 1, it can be observed that there are several geographical areas with a high density of establishments. These areas correspond to the central area of Madrid, Barcelona, the coast of Valencia, Murcia, and Alicante, the Basque Country, Galicia, and Andalusia. It can therefore be highlighted that the establishments of the different chains are located throughout the Spanish territory, and largely concentrated in various geographical areas of Spain.

In order to corroborate the previous result, we have utilised the Moran index (Moran, 1950). This index is a global indicator of autocorrelation, which considers all the data as a set and calculates the mean of the total data and then compares the individual items of data with this total mean. The distribution of establishments throughout the region can thus be determined either as a random spatial unit or with a specific pattern, as can the distribution of the data (grouped, dispersed, and random). Moran's autocorrelation lies between -1 and +1. In the Moran index, the null hypothesis is that there is no spatial autocorrelation between the variables, and H1 is based on the spatial autocorrelation between the variables. The significance of the Moran index is calculated using P and Z scores. If the index is not significant, then H0 is accepted, in which the Moran index is close to zero and indicates that

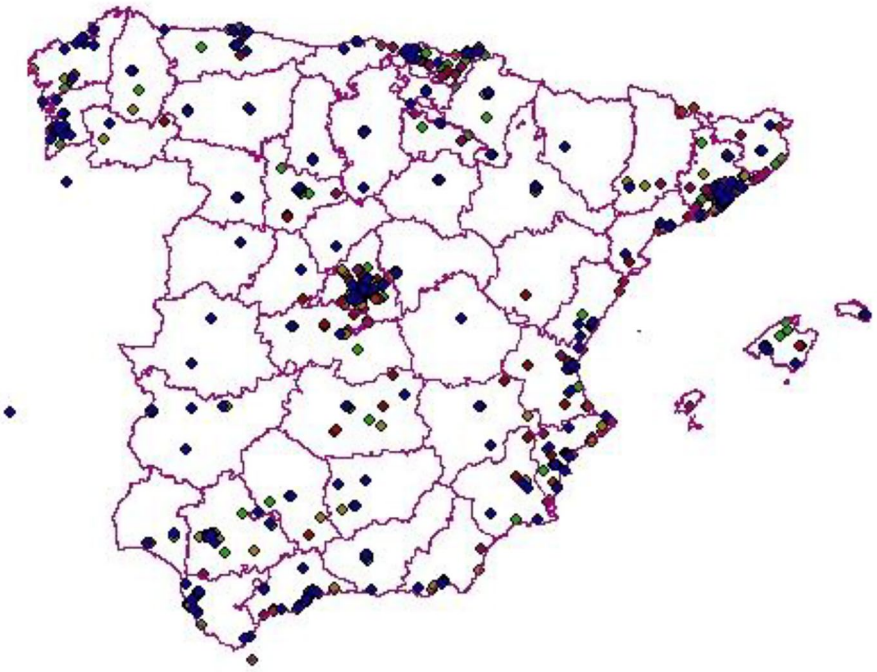

Fig. 1 Location of establishments

there is no relationship between the variables, and that their distribution is random. If the Moran index is significant and positive, then the resulting coefficient will lie between 0 and+1, thereby indicating a positive relationship between the variables and their cluster distribution. If the Moran index is significant and negative, then the coefficient lies between 0 and -1, thereby indicating a negative relationship between the variables and a scattered distribution thereof. In Fig. 2, it can be observed, at a confidence level of 99%, that the establishments are located in the form of clusters, which corroborates the result achieved in the initial map.

Obtaining hotspots

Moran's index has enabled us to ascertain that the establishments of the various franchising chains are not geographically dispersed, but rather are grouped into clusters. This leads us to conduct a local concentration analysis to determine where these hotspots are located.

Hotspot analysis of the establishments has been carried out using municipal districts and bins as the spatial unit, while the Getis-Ord Gi* statistic has been used as a methodology (Getis & Ord, 1992). This tool works by searching for each feature within the context of neighbouring features. Applied to our case, a municipal district or bin with a high number of establishments is interesting but may fail to qualify as

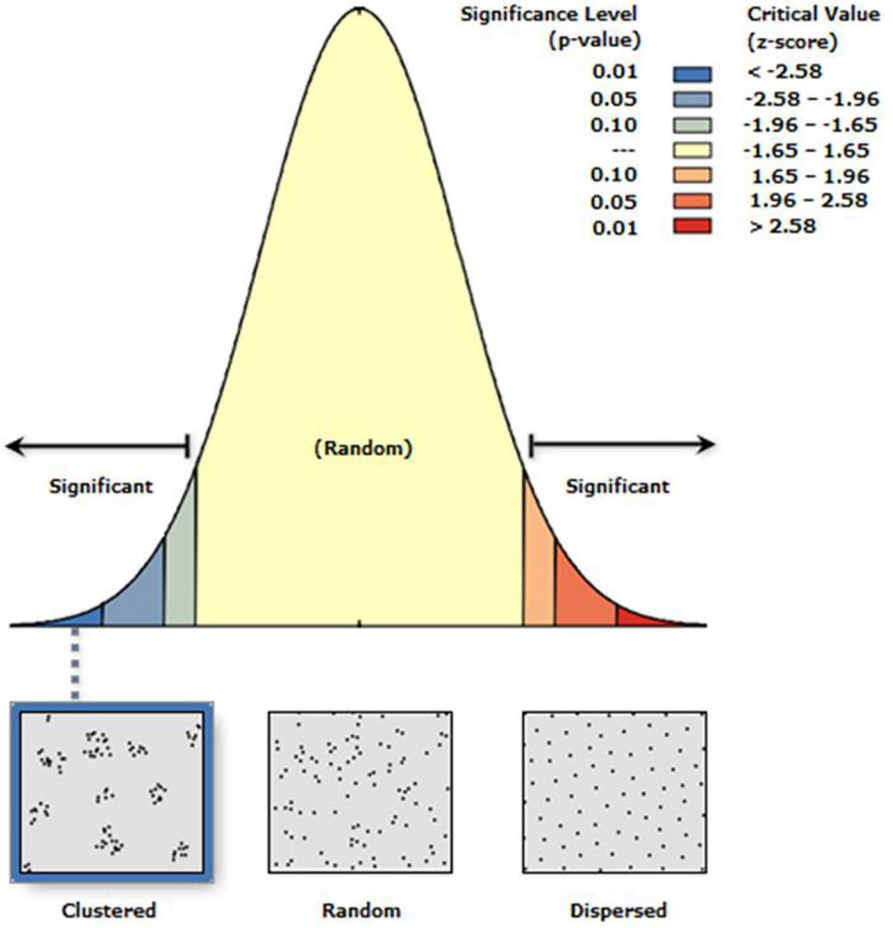

Fig. 2 Moran's index for all the establishments analysed

a statistically significant hotspot. In order to be a statistically significant hotspot, not only must a district have a high value, but it must also be surrounded by other features with high values. The local sum for a district and its neighbours is proportionally compared to the sum of all entities; when the local sum varies widely from that expected and the difference is too large to be the result of random choice, then a statistically significant z-score is the result.

The Getis-Ord Gi* statistic is given by:

$$G_i^* = \frac{\sum_{j=1}^{n} w_{i,j}x_j - \overline{X}\sum_{j=1}^{n} w_{i,j}}{S\sqrt{\frac{n\sum_{j=1}^{n} w_{i,j}^2 - \left(\sum_{j=1}^{n} w_{i,j}\right)^2}{n-1}}} \quad (1)$$

where x_j is the value of the attribute for entity j, $w_{i,j}$ is the spatial weight between entity i and j, n is equal to the total number of entities and:

$$\overline{X} = \frac{1}{n} \sum_{j=1}^{n} x_j \tag{2}$$

$$S = \sqrt{\frac{1}{n} \sum_{j=1}^{n} x_j^2 - (\overline{X})^2} \tag{3}$$

The Gi* statistic returned for each feature in the dataset is a z-score. For positive z-scores that are statistically significant, the larger the z-score, the more intense the clustering of high values (hotspot). For negative z-scores that are statistically significant, the smaller the z-score, the more intense the clustering of low values (cold spot).

Hotspot analysis has been carried out with various spatial units in order to compare results: on the one hand, bins are used, and on the other hand, the census districts are employed. For the analysis of the bins, grids with a side distance of 2,000 m have been constructed. Similarly, it has been deemed appropriate to consider a neighbourhood distance of 3,000 m, whereby establishments in areas around the bins of a maximum of 3 kms can be considered neighbours. Hotspot analysis evaluates the number of establishments in each area and that of its neighbours, and if the results are significantly higher than would be expected in a random sample, then it considers the area to be a hotspot. Since the figure of hotspots using the bins is not very illustrative, it has been decided to include the figure of hotspots using the census districts (Fig. 3), where the municipalities are represented for better visualisation.

A detailed analysis of the hotspots enables the municipalities that constitute the hotspots to be identified with a confidence level of 99%: Oviedo, Gijon, Valladolid, Seville, Madrid, Alicante, Valencia, Barcelona, Bilbao, and Zaragoza. If the confidence level is lowered to 95%, then the following hotspots should be added: A Coruña, Malaga, Reus, Hospitalet, and Santa Coloma.

It can therefore be deduced that the pattern of hot and cold spots in franchising chain establishments largely coincides with the pattern of hot and cold spots in Spain, and hence the opening of new establishments can be explained through demographic factors.

Distance analysis

Another of the objectives set out in this work involves the analysis of the distances between the establishments of the franchising chains. This is intended to study whether the establishments of a brand are located at points close to other brands or, in contrast, they are located near establishments of the brand itself. To this end, we have first carried out an analysis of the minimum distances to other establishments. Table 3 shows the mean of the minimum distance to another establishment, together with the standard deviation.

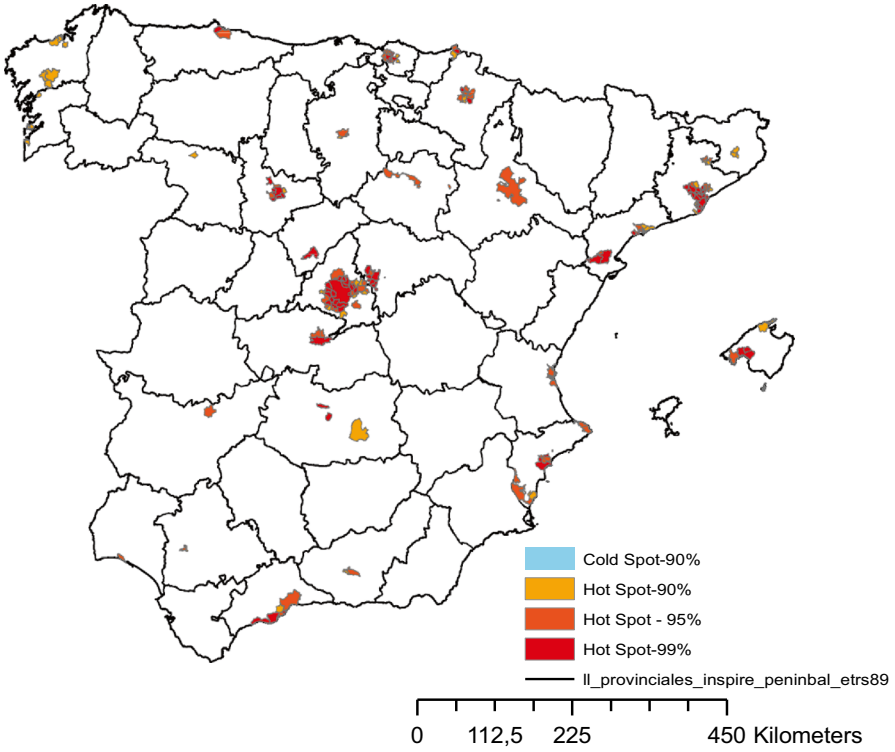

Fig. 3 Hotspots using the census districts as the unit

In Table 3, it can be observed that the brand whose establishments are closest to other establishments (albeit its own brand or another brand) is *B the Travel Brand*, followed by *La Ventana Natural,* and *Lizarrán*. It is true that in the case of *B The Travel Brand* it can be justified because it is the chain with the largest number of establishments and thus covers a larger geographical area. The probability that the establishments of the brand *B The Travel Brand* suffer from a problem of

Table 3 Analysis of the minimum distance to the nearest neighbour

Brand	Average of the minimum distances (in metres)	Standard deviation of the minimum distances (in metres)
B The Travel Brand	7,930.97	14,138.03
General Óptica	15,570.84	27,637.84
La Ventana Natural	12,258.72	22,054.53
Lizarrán	12,690.53	30,320.43
Mail Boxes	15,828.36	32,576.72
Midas	14,476.63	24,258.85
Nautalia	17,153.87	28,755.51

cannibalisation is high. This probability is reinforced if we take into account that this brand does not require exclusivity clauses in its contract for future franchisees. However, *Lizarrán* is the chain in the restaurant sector that has the least number of establishments among those analysed. It can therefore be concluded that the *Lizarrán* establishments are located in those areas where another establishment of one of the chains is nearby, thereby avoiding the problem of cannibalisation. This may be due to the fact that the brand requires its future franchisees to open an establishment in places with at least a minimum population that the franchisor will study in each case, among other requirements related to the location. At the opposite extreme are *Nautalia* and *Mail Boxes*, which are the brands with the furthest nearest-neighbour distances, which means that the establishments of these brands are not as close to other establishments. It therefore follows that *Nautalia* and *B The Travel Brand* do not apply a proximity location strategy, that is, where a *B The Travel Brand* franchised establishment opens, another *Nautalia* establishment does not open nearby and vice versa.

If we analyse each chain individually, we can see that 32.33% of the *B The Travel Brand* establishments have a *General Óptica* establishment as their closest neighbour, while for 24.81% of the establishments of this brand, their nearest neighbour is a *Nautalia* establishment. It is observed that among the closest neighbours there is no pattern that could indicate that there is an association by sector. For example, the closest establishments of *B the Travel Brand* are not those of *Nautalia*, nor are those of *Nautalia* those of *B the Travel Brand*, and hence there is no association within the travel agency sector. The same situation occurs in the remaining sectors. All this information is collected in Fig. 4.

From the analysis above, we can deduce that there is no defined pattern for the location of establishments, since the brands of the same sector are not located as close as possible to other brands of the same sector. In the same way, the minimum distance is different in each brand, and hence it can be confirmed that there is no clear pattern in terms of the distance to place one establishment next to another.

Lastly, a third objective of this work involves establishing a multiple regression model to explain the variable number of establishments as a function of population density, the income of individuals in that area, and the percentage of commercial area existing in that area.

Geographically Weighted Regression (GWR)

Geographically Weighted Regression is a purely local model and is based on a spatial disaggregation of a classic regression model in which the local parameter estimates are generated by "borrowing data" from surrounding locations and then calibrating separate models for each location (Fotheringham et al., 2002).

Standard models, such as those calibrated by OLS regression, assume that the processes generating the data are the same across space. Geographically Weighted Regression removes this assumption and allows processes to vary over space. It does this by calibrating a separate regression model at each location by borrowing data from nearby locations and weighting this data in terms of

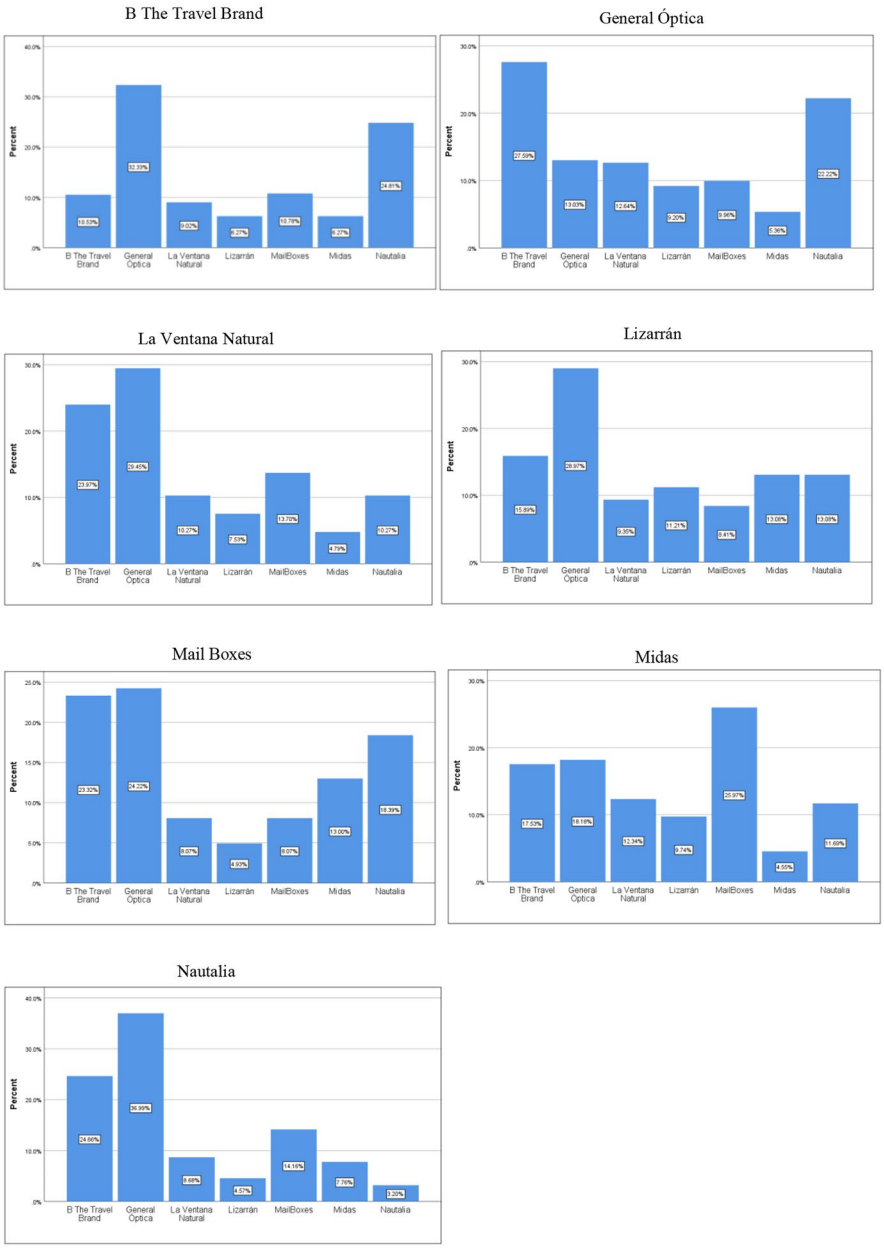

Fig. 4 Nearest neighbour in terms of the brands analysed

the distance from the regression point such that data from locations nearer to the regression point are weighted more than data from locations further afield. This approach is a generalisation of kernel regression concepts (Cleveland, 1979), and has significant and powerful meaning in the context of spatial statistics. The rate at which the weights of locations decline as distance increases is controlled by a bandwidth, which is optimised in the GWR calibration procedure. This regression is formulated as

$$y_i = \sum_{j=1}^{k} \beta_{ij} * x_{ij} + \varepsilon_i$$

where, for the observation at location $i \in \{1, 2, \ldots, n\}$, y_i is the response variable, x_{ij} is the jth predictor variable, $j\ \{1, 2, \ldots, k\}$, β_{ij} is the jth parameter, and ε_i is the error term. The GWR calibration for the $(k, 1)$ coefficients at location i in matrix form is given by $\hat{\beta}(i) = \left(X'W(i)X\right)^{-1}X^tW(i)Y \quad i \in \{1, 2, \ldots, n\}$, where X is the (n, k) matrix of predictor variables, y is the $(n, 1)$ response variable, and $W(i)$ is the (n, n) diagonal spatial weighting matrix for location i with the diagonal elements representing the weights attached to each location. $W(i)$ is calculated based on a specified wernel function and bandwidth.

Working with GWR is carried out by specifying a traditional OLS model. The OLS results are analysed to ascertain whether the relationships between the variables may differ depending on space: if so, then GWR may be an appropriate next step.

Through this procedure, it is intended to ascertain whether the number of establishments in each municipality can be explained by the variables representing population density of the municipality, average income of the municipality, and percentage of commercial area over the total area of the municipality. To this end, a linear regression using the ordinary least squares method is first employed. The results are presented in Table 4.

Table 4 shows that the variables of average income and population density are significant at 99%, while the percentage of commercial area is not significant. On the other hand, the analysis of the waste generated from OLS (see Fig. 5) shows us that the OLS model systematically overestimates or underestimates the number of establishments for certain areas. The hotspot locations are the locations where the residuals are spatially correlated.

Furthermore, if the diagnostic statistics of the OLS regression are analysed, it can be observed that this approach is not the best for the analysis of the relationship between the dependent variable and the explanatory variables (Table 5). On the one hand, the adjusted R-squared coefficient shows that only 5.7% of the variation in the number of establishments could be explained by the variation in independent variables. On the other hand, although the Koenker statistic (BP) is not statistically significant ($p = 0.276$), Moran's I value shows that the residuals generated from the OLS regression are not statistically random ($p < 0.05$), which indicates that the residuals are spatially correlated and the Jarque-Bera (JB) statistic is statistically significant, thereby indicating that the OLS model is biased.

Since it has been found that regression with the OLS procedure is unsuitable for the data in this work, a GWR regression has been used with ArcGIS software.

Table 4 Results of the multiple linear regression analysis through the OLS method

Variable	Coefficient	Std Error	Statistic t	Probability	Robust_SE	Robust t	Robust Pr	VIF
Interceptor	-1.535909	0.310091	-4.953087	0.000001*	0.598135	-2.56783	0.010270*	——
Mean income	0.000096	0.000018	5.414244	0.000000*	0.000035	2.752482	0.005949*	1.083017
Density of población	889.742507	56.37842	15.781614	0.000000*	319.136587	2.787968	0.005338*	1.186745
Percentage of commercial area	-8.055375	6.805701	-1.183622	0.236651	9.950859	-0.80951	0.418266	1.176216

The value of the adjusted R^2 coefficient is 0.099836

*p-value < 0.01

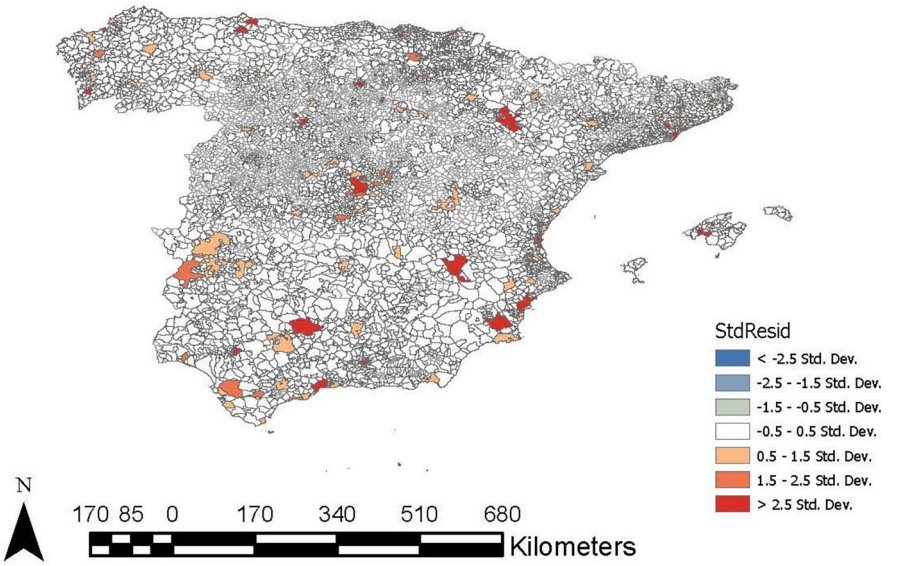

Fig. 5 OLS residual analysis

Geographically weighted regression results

The choice of kernel and bandwidth function is critical when using GWR (Guo et al., 2008; Pirdavani et al., 2014). There are two types of kernels in GWR: fixed and adaptive. In our study, the fixed kernel is chosen, where neighbours are selected based on a distance threshold, and the spatial extent of our analysis is kept constant.

On the other hand, there are three bandwidth options in GWR: AICc, CV, and the bandwidth parameter. The bandwidth parameter method allows us to choose a distance based on prior knowledge. Since the complexity of a GWR model involves both the number of variables and the chosen bandwidth, we have used AICc as a criterion in the selection of our optimal model.

Our study implements an incremental bandwidth selection approach to choose the best bandwidth to achieve an optimal GWR model. With this approach, GWR is run multiple times with gradually varying bandwidths. The optimal distance for GWR

Table 5 Statistics for the diagnosis of the OLS regression

OLS Diagnosis						Moran's Global Summary	
AIC	28100.115	F-Prob	0.000	JB	15044208.203	Moran's index	0.019
AICc	28100.240	Wald	290.574	JB-Prob	0.000	Expected index	−0.000
R^2	0.060	Wald-Prob	0.000	Sigma2	237.194	Difference	0.000
AdjR^2	0.057	Koenker (BP)	14,400			Z score	7.045
F-Stat	17.893	Koenker (BP) -Prob	0.276			*p* value	0.000

analysis is selected based on two criteria: (1) the GWR residuals must be randomly distributed; and (2) the value of the Akaike Information Criterion (AICc) must be less than that of models with other bandwidths. Based on the first criterion, the *p*-values for Moran's I of the residuals are greater than 0.05 when the distance is 5000 m. Based on the second criterion, the GWR models that use a distance of 5000 m performed better than the other models. The distance of 5000 m meets the specified criteria and is a reasonable distance around which the number of establishments might have the most influence. Therefore, a bandwidth of 5000 m was chosen as the optimal GWR model. Table 6 shows the AICc, R^2, adjusted R^2 values, and Moran's I values of the residuals for the different distances utilised in the GWR analysis.

The adjusted values of R^2 show that the variation of independent variables could explain 93% of the number of establishments, which is a much higher percentage than that explained in the OLS analysis (5.7%).

Figure 6 shows the analysis of the GWR residuals when 5000 m is used as the bandwidth. Compared to the OLS results, the residuals from fewer areas are concentrated, which indicates that GWR has avoided spatial autocorrelation in the residuals.

Figure 7 shows the local R-squared values derived from the GWR analysis with the optimal bandwidth. Although the adjusted global R-squared is 93% for the GWR analysis, the local R-squared values are not the same at all locations. The local R-squared map clearly shows that the relationship between the number of establishments and the environment varies in space. The residual distribution map shows that there is no serious spatial autocorrelation problem in the residuals, since most of the standard residuals lie within the range of -1.96 to 1.96 (95% confidence level).

Table 7 presents the results of the GWR regression. For the analysis of the spatial non-stationarity of the relationships, descriptive statistics for each independent variable appear. As shown in the table, all variables have positive and negative coefficients which indicate that a built environment variable may have opposing associations with the number of establishments in different areas. For example, the

Table 6 Different bandwidths (distances) used for GWR analysis and related statistics

Different bandwidths (distances) for GWR analysis						
Distance (metres)	AICc	R^2	Adjusted R^2	Moran's I	z-score	*p*-value
4000	2380.35	0.967121	0.84033	-0.16024	-4.06103	4.9E-05
4500	2680.766	0.954592	0.817565	-0.12406	-3.5782	0.00035
5000	**3318.42873**	**0.937196**	**0.937196**	**0.002825**	**0.10756**	**0.91434**
5500	4018.70374	0.909819	0.697257	0.057475	2.09885	0.03583
6000	4545.57146	0.879452	0.635121	-0.17084	-6.84527	0
6500	5016.53829	0.840292	0.561115	-0.0097	-2.15311	0.03131
7000	5604.06967	0.797078	0.473596	-0.10441	-4.90675	1E-06
7500	6240.0025	0.915255	0.79447	-0.10643	-5.30448	0
8000	7038.80929	0.895313	0.755201	-0.11689	-6.1624	0
8500	7780.6545	0.872723	0.712386	-0.11617	-6.43791	0

Moran's I and z-score are values for residuals. The GWR residuals are statistically non random if p-value. The bold band bandwitdth is the optimal distance selected for this study

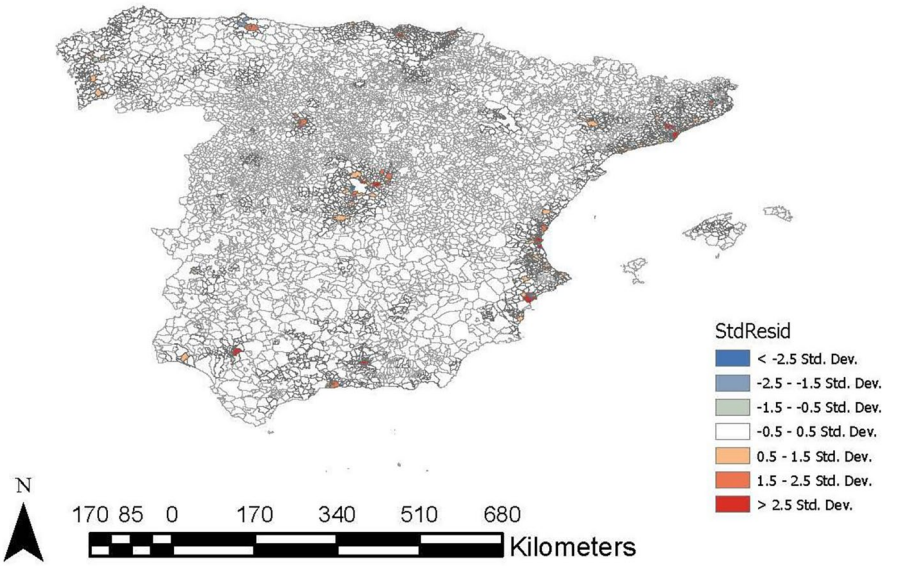

Fig. 6 GWR residual analysis (using 5000 m as the bandwidth)

population density variable is positively correlated with the dependent variable of the number of establishments in approximately 67% of the municipalities in our area of study. The same occurs with the variables representing rent and percentage of commercial area over the total area. Both in the population density variable and in the percentage of commercial area variable there is a dominant direction, since the

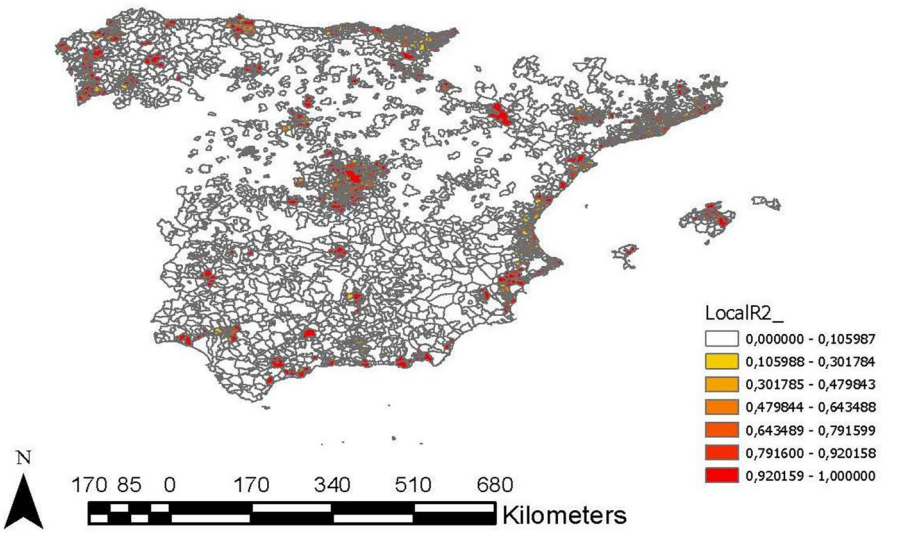

Fig. 7 Geographical distribution of local R-squared values

Table 7 Summary of GWR regression results

Independent variables	Coefficient			Percentage of municipalities with positive/negative coefficients	
	Minimum	Median	Maximum	Negative	Positive
Population density	-1.7E+308	-10,518	17624.9443	33.14%	66.86%
Disposable income	-1.79E+308	0	143453.556	44.20%	55.80%
Percentage of commercial area over total area	-1.79E+308	-5.75E-06	0.01265524	32.87%	67.13%

percentage of municipalities with positive coefficients is close to 70%. However, in the income variable, a dominant direction is not observed in such a clear-cut way.

On the other hand, Figs. 8, 9, and 10 show the significance of the municipalities in terms of each of the explanatory variables. It can be observed that, in the blue areas, the relationship is negatively significant at 95%, while in the red areas the relationship is positively significant at 95%.

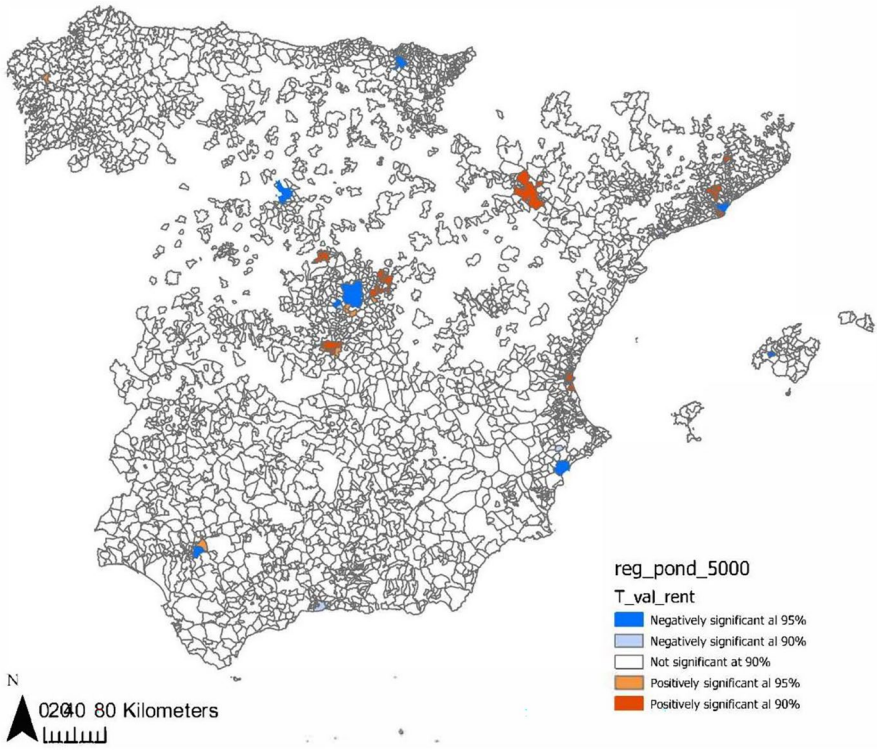

Fig. 8 Significance of the disposable income variable

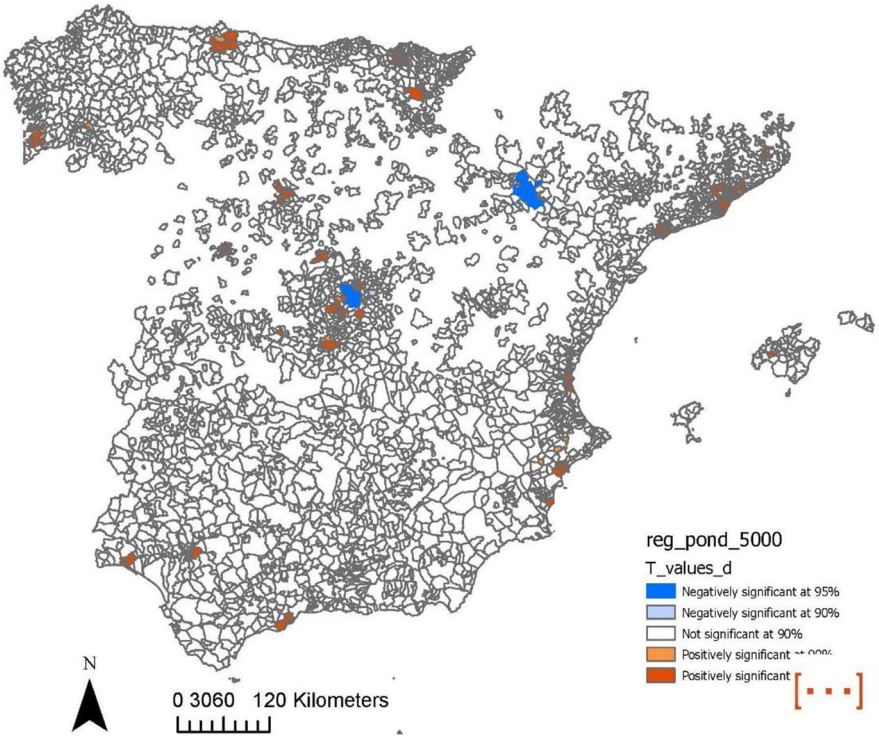

Fig. 9 Significance of the population density variable

Discussion of the results

The analysis of the geographically weighted regression enables us to deduce that the income, the population density, and the percentage of commercial area of the municipalities are indeed variables that influence the decision to open new establishments in the franchising chains. However, this geographically weighted regression analysis also reveals several contradictory results. The majority of the negative relationships are found between the income level variable and the number of establishments of the franchise brands under consideration. These negative relationships are weaker with the variables representing population density and commercial area.

With respect to the level of income, it is observed that the franchise brands analysed do not behave in the same way in every area where they have opened establishments. In Madrid, Barcelona, Bilbao, and several of their municipalities, and in Alicante, Seville, and Valladolid there is no positive relationship between the level of income and the number of opened establishments. This behaviour may be due to the existence of other variables that also intervene in the decision, such as the price per square metre of commercial area and the flow of people. However, in Zaragoza, Guadalajara, Segovia, Toledo, and Valencia, and in certain municipalities in Barcelona and Madrid, such as Alcalá de Henares, there is a positive

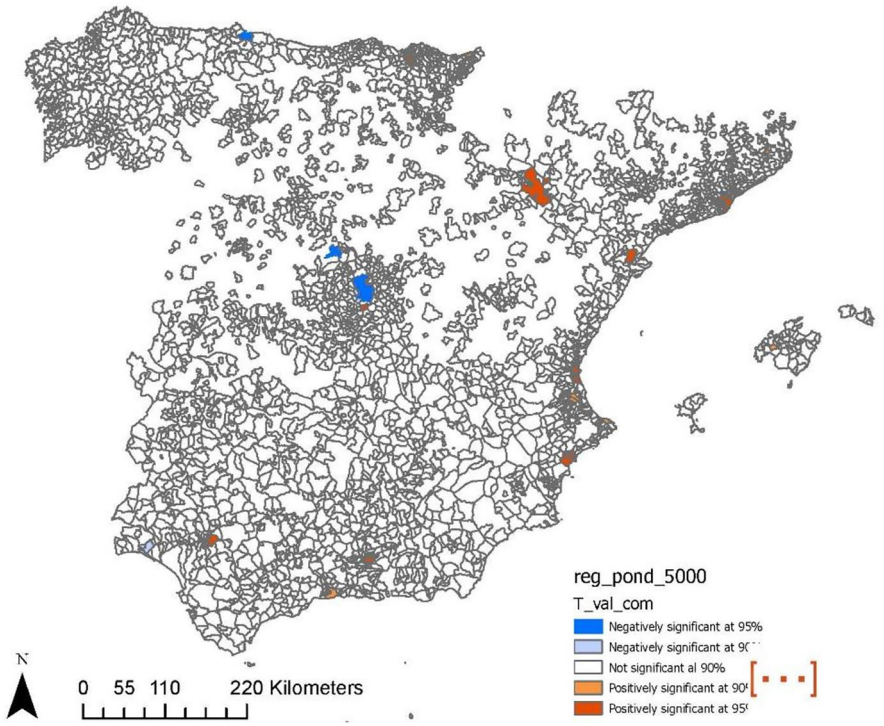

Fig. 10 Significance of the percentage of commercial area variable

relationship between the level of income and the number of opened establishments. In general, it is observed that the franchisor allows the opening of medium-sized establishments in cities with a high level of income. The results above show that that the income, the population density, and the percentage of commercial area of the municipalities influence the franchisees' decision to open an establishment in one city or another. However, these results may be conditioned by another factor developed in recent years, namely the existence of store-in-store franchisees. Through this strategy, a large establishment (e.g., El Corte Inglés in Spain) rents out space within its shop to a franchisee to operate a smaller shop within its premises. The store-in-store approach, supported by a strong contractual relationship that fosters trust and commitment, can constitute an effective model for brand and franchise expansion (Rosado-Serrano & Navarro-García, 2023).

B The Travel Brand is the only brand that has opened establishments in all the aforementioned areas and that behaves in the manner described when opening establishments. The rest of the brands behave irregularly in the listed areas where there is a negative relationship between income level and number of opened establishments. However, these same brands have preferred Segovia to open their establishments in order to serve a higher income level. The behaviour of *B The Travel Brand* can be explained by analysing the franchise agreement where it is observed that the franchisor does not require a minimum population size, exclusive area, preferred areas,

or a preferred location in order to open an establishment. The rest of the brands do include several of these clauses in their contract, such as a minimum area for the establishment, its location, minimum population, exclusive area, and other requirements for the premises. A new discussion should therefore be initiated as to whether, in addition to economic variables, there are variables related to the contract that influence the decision regarding the location when opening an establishment.

With respect to the population density variable, it is also not observed that the franchise brands analysed behave in the same way in all the areas where they have opened establishments. However, there are fewer geographical areas where there is a negative relationship between population density and the number of opened establishments. Specifically, the areas where this negative relationship occurs include Zaragoza, Guadalajara, Segovia, Toledo, and Valencia, and in certain municipalities of Barcelona and Alcalá de Henares. In these areas with greater population density, fewer opened establishments have been studied in terms of their brands. This behaviour may be due to the fact that in these places, franchisees and franchisors look for a high frequency or flow of people. The restaurant sector brand, *Lizarrán,* requires its franchisees to locate their establishments at street level with a high density of pedestrian traffic. However, the number of points where there is a positive relationship between the population density variable and the number of opened establishments is higher: Barcelona, Seville, Gijon, Alicante, Valencia, Tarragona, Bilbao, Gerona, Salamanca, Toledo, Vigo, Oviedo, Vitoria, Huelva, and Segovia. Moreover, there are numerous municipalities in Barcelona, several in Bilbao and Madrid, and to a lesser extent in Malaga, Pontevedra, Valencia, and Tarragona.

As was the case with the income level, *B The Travel Brand* is the only brand that has opened establishments in all the aforementioned areas and that behaves in the manner described in order to open establishments. However, *Nautalia* and *General Óptica* are the brands that have opened franchised establishments in all the capitals of the aforementioned provinces, due to their greater population density. One possible explanation is that the franchisors of *Nautalia* and *General Óptica* demand a minimum population for an establishment to be opened. Therefore, they look for areas of greater population density. *B The Travel Brand* has the largest number of opened establishments, followed by *General Óptica* and *Mail Boxes.*

Lastly, there are very few areas referring to the commercial area where the coefficients are statistically significant in a negative way. A negative relationship is observed between this variable and the number of establishments opened in the areas of Madrid, Gijon, and Segovia. In other words, the franchisors of the franchise brands analysed do not open establishments in proportion to the commercial area featured in certain areas such as Madrid, Gijon, and Segovia. This behaviour of the brands may be due to the fact that neither the level of attraction of the area nor the commercial traffic are high. In the rest of the areas mentioned in the previous variables, there is a positive relationship between the commercial area and the number of opened establishments. In general, the brands analysed, and in particular *Lizarrán and Mail Boxes*, fail to take advantage of commercial areas to open a greater number of establishments. This behaviour is reinforced if it is taken into account that, with the exception of *Nautalia*, the remaining brands do not specify shopping areas as their preferred location. Reasons why the commercial area of certain cities exerts

no influence on the opening of franchised establishments may include that the city possesses an insufficiently large floating population (Youn & Lee, 2016), or that it is difficult to access, or that the area has an environment that is not beneficial to the company (Lee & Kim, 2015).

Conclusions and business implications

The results of this work enable several conclusions to be drawn. In the first place, it can be concluded that the establishments of franchising chains are grouped into certain hotspots in Spain. In part, this result is logical since within the map of Spain there are many geographical areas, such as mountains, that remain largely unpopulated. The unequal distribution of the population in Spain is causing more franchised establishments to open in those places where there is a greater population, giving rise to a concentration of establishments and brands in specific areas. This issue forces certain companies to be market competitors, although other companies do cooperate with each other, since they can be their suppliers of goods or services.

Secondly, through the analysis of distances, we have found there to be no pattern in terms of the location of establishments in one sector with others in the same sector. Despite this, location and geographical proximity remain highly relevant when identifying externalities such as the generation of knowledge and technological development (Audretsch, 1998). The location and minimal geographical proximity of franchised establishments usually feature as contractual clauses in certain franchises, and these define a certain pattern of behaviour.

Thirdly, the number of establishments of the franchising chains is influenced by the disposable income of individuals in the geographical areas, by the population density, and by the percentage of commercial area of the municipalities over the total area of chosen municipalities. Many companies are located in areas with high population density because this generates higher productivity (Holl, 2013). Similarly, higher income can generate higher productivity, and it is therefore desirable to establish new points of sale in areas of higher income. In relation to the percentage of commercial area, there is a major polarisation of commercial activities in large shopping malls. Some of these large areas are characterised by their functional specialisation and others by the synergy with compatible activities to obtain advantages in terms of attraction and rationality in the use of communal services (Vecslir & Font, 2009). Franchises have not remained immune to this phenomenon and many of their chains try to establish points of sale in large commercial areas.

From the results attained herein, we can conclude that the level of income influences the opening of establishments of the franchise brands under study, although this does depend on the zone involved. In the zones where there is a higher income and greater commercial area, there is a greater number of establishments opened whose density is negatively related to the opening of establishments. In other words, the franchise brands studied prefer to open establishments in medium-sized cities with higher income levels or in large cities with lower income levels. In this way, the brands compensate for the lower population density of medium-sized cities and the higher density of large cities, respectively. This is the ideal situation for those brands

that do not impose restrictions for the opening of establishments related to the minimum population, exclusive area, and/or location.

However, due to the peculiarities of franchise systems, the opening of establishments of a franchise brand is not only influenced by the three variables analysed herein, but also by other restrictions, such as the aforementioned location or geographical proximity, that are included in the various clauses of the contract. For instance, the optimal franchise proportion could be a variable for consideration in geographical information studies. Although several researchers consider that the optimal franchise proportion for a company should be 20%, it could very well be 90% for another firm depending on the geographical dispersion of its outlets (Hsu & Jang, 2009; Madanoglu et al., 2019). The findings of Rosado-Serrano et al. (2019) showed that an optimal franchise proportion should lie between 59 and 76 percent. Furthermore, Hsu and Jang (2009) considered that companies with high geographical dispersion should franchise 55 percent of their outlets to achieve higher return on assets (ROA), while this figure should be 35 percent for companies with low geographical dispersion. It is important to bear in mind that companies operating over greater geographical areas need more resources in order to monitor their outlets and control their operations (Sorenson & Sorensen, 2001). Nevertheless, the optimal mix of corporate and franchised units depends on the geographical dispersion of the firm (Hsu & Jang, 2009), and therefore further research is needed on this issue.

In short, we can conclude that the location strategy of these analysed brands is to concentrate establishments in certain geographical areas of Spain. Several of these areas have a high density of establishments. The franchisors of these brands follow a strategy of concentrating establishments, with the risk of suffering problems of cannibalisation. On the other hand, at the level of franchise brands, franchisors in the same sector do not follow a proximity location strategy towards that same sector, but instead try to avoid competition between establishments in the same sector. However, brands from complementary sectors do use a proximity strategy, thereby taking advantage of economies of scale.

Limitations and future lines of research

As in all studies, this research suffers from a number of limitations. In the first place, only seven franchising chains have been analysed herein. It would have been much more productive to have data from a greater number of franchising chains. However, this work represents a first approximation to the study of the geographical location of franchising chain establishments. Secondly, we have not been able to obtain information on the ownership of the establishments, that is, it was unknown which establishments are owned by the franchisor and which by the franchisee. This has prevented us from analysing the competition between the franchisors and their franchisees, and competition between the franchisees of the same brand, and has even prevented us from relating the minimum distances between establishments, whether owned by the franchisor or owned by the franchisees, with the number of establishments that have closed. Lastly, the lack of disaggregated availability, such as the sales figures of each establishment, has prevented us from ascertaining how

the location of the establishments influences their sales and affects the issue of cannibalisation, which would have been very enriching.

Similarly, the choice of these seven franchise brands also constitutes a limitation for this study. Although the choice of these brands has been made in an effort to capture any major heterogeneity (different sectors, different customers, different time of consumption, etc.), at the same time it may present a limitation since it could be necessary to run a sample with firms all in the same industry.

Overcoming some of the above limitations could serve as future lines of research. Other lines of future research could involve the analysis of market coverage through the number and location of owned and franchised establishments, while taking into account the competition between establishments, the competition between establishments of the same brand, and competition between establishments of different groups of companies within the same sector, such as fast food.

Analysis of the location of the establishments in relation to the prices of the products and a study of the substitutability of the products could constitute another future line of research. Related to the expansion of the chain, the entrepreneurial character of the franchisor could also be analysed, since the literature shows that fear of failure affects entrepreneurial activity (Galindo-Martín et al., 2023). This study could also be replicated by either disaggregating franchisee data, by incorporating traditional shops, or by applying the store-in-store approach, as proposed by Rosado-Serrano and Navarro-García (2023). Lastly, finding which products are substitutes for each other and consequently modifying the location strategy could constitute another future line of research.

In light of the lack of studies in the franchising literature that address spatial heterogeneity and the GWR state of the art, it can clearly be concluded that further contributions are needed. Future research developments might include the introduction of other potentially relevant regressors (e.g., land prices). Moreover, it would be interesting to introduce the time dimension into the analysis by incorporating a model such as that of the Geographically Weighted Panel Regression (GWPR). From a methodological point of view, GWPR could expand the advantages of GWR. From an economic point of view, GWPR would enable an all-encompassing analysis to be performed of the localisation processes of the establishments of franchising chains.

Acknowledgements The authors would like to thank the Red Iberoamericana de Investigación en la Franquicia (REDIFRAN) for their help in obtaining the data and conceptualising the article. Funding for open access publishing: Universidad Pablo de Olavide/CBUA.

Funding Funding for open access publishing: Universidad Pablo de Olavide/CBUA

Data Availability The data that support the findings of this study are available upon request from the authors.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission

directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

References

Acharya, K., & Berry, G. R. (2023). Characteristics, traits, and attitudes in entrepreneurial decision-making: Current research and future directions. *International Entrepreneurship and Management Journal, 19*(4), 1965–2012. https://doi.org/10.1007/s11365-023-00912-y

AEF. (2021). La franquicia en España. Informe 2020. Asociación Española de Franquiciadores. Available in https://www.aefranquicia.es/wp-content/uploads/2020/03/Informe-de-la-AEF-La-Franquicia-en-España-2020.pdf. Accessed 17th Jul 2021.

Audretsch, D. B. (1998). Agglomeration and the location of innovative activity. *Oxford Review of Economic Policy, 14*(2), 18–29. https://doi.org/10.1093/OXREP/14.2.18

Beatty, S. E., & Smith, S. M. (1987). External search effort: An investigation across several product categories. *Journal of Consumer Research, 14*(1), 83–95. http://www.jstor.org/stable/2489245

Bitti, E. J. S., Fadairo, M., Lanchimba, C., & dos Santos Silva, V. L. (2019). Should I stay or should I go? Geographic entrepreneurial choices in Brazilian franchising. *Journal of Small Business Management, 57*(S2), 244–267. https://doi.org/10.1111/jsbm.12469

Blancas-Peral, F. J., Contreras, I., & Ramírez-Hurtado, J. M. (2014). Choosing a travel agency franchise by mean of a global composite indicator: An application in Spain. *Journal of Business Economics and Management, 15*(1), 153–173. https://doi.org/10.3846/16111699.2012.689259

Chaudhuri, A., Ghosh, P., & Spell, C. (2001). A location based theory of franchising. *The Journal of Business and Economic Studies, 7*(1), 54–67.

Cleveland, W. S. (1979). Robust locally weighted regression and smoothing scatterplots. *Journal of the American Statistical Association, 74*(368), 829–836. https://doi.org/10.1080/01621459.1979.10481038

Cuervo, A. (2008). The geographic space and the creation of new firms. *International Entrepreneurship and Management Journal, 4*(2), 105–107. https://doi.org/10.1007/s11365-007-0068-6

El Akremi, A., Perrigot, R., & Piot-Lepetit, I. (2015). Examining the drivers for franchised chains performance through the lens of the dynamic capabilities approach. *Journal of Small Business Management, 53*(1), 145–165. https://doi.org/10.1111/jsbm.12059

Esri. (2018). ArcGIS for desktop. https://desktop.arcgis.com/en/, Accessed 25th Nov 2018.

Façanha, L. O., Resende, M., Cardoso, V., & Schröder, B. H. (2013). Survival of new firms in the Brazilian franchising segment: An empirical study. *Service Industries Journal, 33*(11), 1089–1102. https://doi.org/10.1080/02642069.2011.627433

Fonseca, S., Guedes, M. J., & da Conceição Gonçalves, V. (2022). Profitability and size of newly established firms. *International Entrepreneurship and Management Journal, 18*(2), 957–974. https://doi.org/10.1007/s11365-020-00730-6

Fotheringham, A. S., Brunsdon, C., & Charlton, M. (2002). *Geographically weighted regression: The analysis of spatially varying relationships (Wiley & Sons Ltd (ed.))*. Wiley.

Galindo-Martín, M.-A., Castaño-Martínez, M.-S., & Méndez-Picazo, M.-T. (2023). Fear of failure, entrepreneurial passion and entrepreneurial motivation. *International Entrepreneurship and Management Journal, 19*(4), 1835–1853. https://doi.org/10.1007/s11365-023-00908-8

Getis, A., & Ord, J. K. (1992). The analysis of spatial association by use of distance statistics. *Geographical Analysis, 24*(3), 189–206. https://doi.org/10.1111/J.1538-4632.1992.TB00261.X

Ghaemi, P., Shahabi, K., Wilson, J. P., & Banaei-Kashani, F. (2014). A comparative study of two approaches for supporting optimal network location queries. *GeoInformatica, 18*(2), 229–251. https://doi.org/10.1007/s10707-013-0179-x

Ghosh, A., & Craig, C. S. (1991). A franchise distribution system location model. *Journal of Retailing, 67*(4), 466–498.

Guimarães, P., Figueiredo, O., & Woodward, D. (2000). Agglomeration and the location of foreign direct investment in Portugal. *Journal of Urban Economics, 47*(1), 115–135. https://doi.org/10.1006/juec.1999.2138

Guo, L., Ma, Z., & Zhang, L. (2008). Comparison of bandwidth selection in application of geographically weighted regression: A case study. *Canadian Journal of Forest Research, 38*(9), 2526–2534.

Hasanov, A. (2019). Economic indicators of business and living standards of the population, as potential factors, for franchise operations in the services and trade sectors. *Oditor - Casopis Za Menadzment, Finansije i Pravo, 5*(3), 6–24. https://doi.org/10.5937/oditor1903006h

Holl, A. (2013). Localización y productividad de la empresa española. *Investigaciones Regionales, 25*, 27–42. https://ebuah.uah.es/xmlui/handle/10017/26976#.Yl6E_iF3cKI.mendeley

Hsu, L.-T.J., & Jang, S. S. (2009). Effects of restaurant franchising: Does an optimal franchise proportion exist? *International Journal of Hospitality Management, 28*(2), 204–211. https://doi.org/10.1016/j.ijhm.2008.07.002

Kalnins, A. (2003). Hamburger prices and spatial econometrics. *Journal of Economics & Management Strategy, 12*(4), 591–616. https://doi.org/10.1111/j.1430-9134.2003.00591.x

Kaufmann, P. J., & Rangan, K. V. (1990). A model for managing system conflict during franchise expansion. *Journal of Retailing, 66*(2), 155–173. https://link.gale.com/apps/doc/A8853370/AONE?u=anon~ead9c1d6&sid=googleScholar&xid=d4a217f1

Kimelberg, S. M., & Williams, E. (2013). Evaluating the importance of business location factors: The influence of facility type. *Growth and Change, 44*(1), 92–117. https://doi.org/10.1111/grow.12003

Kwong-yin Fock, H. (2001). Retail outlet location decision maker – Franchisor or franchisee? *Marketing Intelligence & Planning, 19*(3), 171–179. https://doi.org/10.1108/02634500110391717

Lee, E., & Kim, M. M. (2015). A study of the franchisee' location decision factors of the small coffee franchise through AHP. *Journal of Tourism and Leisure Research, 27*(11), 327–342.

Madanoglu, M., Castrogiovanni, G. J., & Kizildag, M. (2019). Franchising and firm risk among restaurants. *International Journal of Hospitality Management, 83*, 236–246. https://doi.org/10.1016/j.ijhm.2018.10.021

Molina-Morales, F. X., García-Villaverde, P. M., & Parra-Requena, G. (2014). Geographical and cognitive proximity effects on innovation performance in SMEs: A way through knowledge acquisition. *International Entrepreneurship and Management Journal, 10*(2), 231–251. https://doi.org/10.1007/s11365-011-0214-z

Moran, P. A. P. (1950). Notes on continuous stochastic phenomena. *Biometrika, 37*(1/2), 17–23. https://doi.org/10.2307/2332142

Oh, S.-J. (2016). A study on the factors affecting sales of franchise snack bar. *Review of Real Estate and Urban Studies, 9*(1), 145–161.

Perryman, A. A., & Combs, J. G. (2012). Who should own it? An agency-based explanation for multi-outlet ownership and co-location in plural form franchising. *Strategic Management Journal, 33*(4), 368–386. https://doi.org/10.1002/SMJ.1947

Pirdavani, A., Bellemans, T., Brijs, T., & Wets, G. (2014). Application of geographically weighted regression technique in spatial analysis of fatal and injury crashes. *Journal of Transportation Engineering, 140*(8), 04014032. https://doi.org/10.1061/(ASCE)TE.1943-5436.0000680

Ramírez-Hurtado, J. M. (2017). The use of importance-performance analysis to measure the satisfaction of travel agency franchisees. *RAE Revista De Administracao De Empresas, 57*(1), 51–64. https://doi.org/10.1590/S0034-759020170105

Ramírez-Hurtado, J. M., Guerrero-Casas, F. M., & Rondán-Cataluña, F. J. (2011). Criteria used in the selection of franchisees: An application in the service industry. *Service Business, 5*(1), 47–67. https://doi.org/10.1007/s11628-011-0101-2

Rosado-Serrano, A., Longobardi, T., & Paul, J. (2019). Country dispersion in international franchising: System, proportion, and performance. *International Journal of Retail & Distribution Management, 47*(7), 752–771. https://doi.org/10.1108/IJRDM-10-2018-0216

Rosado-Serrano, A., & Navarro-García, A. (2023). Alternative modes of entry in franchising. *Journal of Business Research, 157*, 113599. https://doi.org/10.1016/j.jbusres.2022.113599

Sorenson, O., & Sorensen, J. B. (2001). Finding the right mix: Franchising, organizational learning, and chain performance. *Strategic Management Journal, 22*(6/7), 713–724.

Suárez-Vega, R., & Santos-Peñate, D. R. (2014). The use of GIS tools to support decision-making in the expansion of chain stores. *International Journal of Geographical Information Science, 28*(3), 553–569. https://doi.org/10.1080/13658816.2013.858817

Vecslir, L., & Font, A. (2009). Letture interpretative degli spazi della produzione e del consumo della regione urbana di Barcellona. *Territorio, 48*, 28–34. https://doi.org/10.3280/TR2009-048005

Wiese, N. (2017). The effects of institutional quality and market potential on the agglomeration of fast food franchises in Central America. *Management Research: Journal of the Iberoamerican Academy of Management, 15*(3), 268–291. https://doi.org/10.1108/MRJIAM-06-2017-0757

Wrigley, N., & Dolega, L. (2011). Resilience, fragility, and adaptation: New evidence on the performance of UK high streets during global economic crisis and its policy implications. *Environment and Planning A, 43*(10), 2337–2363. https://doi.org/10.1068/A44270

Xiao, Q. U., O'Neill, J. W., & Mattila, A. S. (2012). The role of hotel owners: The influence of corporate strategies on hotel performance. *International Journal of Contemporary Hospitality Management, 24*(1), 122–139. https://doi.org/10.1108/09596111211197836

Youn, Y., & Lee, D. (2016). An empirical analysis of coffee franchise location strategies: Evidence from Gyeonggi province. *Journal of the Korea Academia-Industrial Cooperation Society, 17*(8), 192–199. https://doi.org/10.5762/KAIS.2016.17.8.192

Zeller, R. E., Achabal, D. D., & Brown, L. A. (1980). Market penetration and locational conflict in franchise systems. *Decision Sciences, 11*(1), 58–80. https://doi.org/10.1111/J.1540-5915.1980.TB01125.X

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.