

Geographical Indication: a proposal for measuring centrality

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Abstract

The present work discusses Geographical Indications, which have increasingly grown in Brazil, becoming of extreme importance for territorial development. With this in mind, this work is aimed at establishing a centrality indicator for municipalities, capable of contributing for Geographical indication, based on the development on the Gross Domestic Product (GDP) of services for promoting local development. The measurement of centrality adopted in this work is based on the arrangement of GDP data on services, according to the Central Place Theory, in which cities are hierarchically organised and some services are only provided by more relevant locations. The database used for assessing the levels of centrality of municipalities were divided into four different groups: participation of the gross value added of services, excluding public administration on the gross value at total current prices; in the state level; in the microregion; in the country. The analysis observed simple structure averages to operationalise the hierarchical ruler, having established that the best route concerned attributing weighting coefficients to the group of indicators through a linear combination algorithm. It is important to point out that the most important tool considered included the Principal Component Analysis (PCA). Accordingly, it was established that a location is an important territory with what concerns the spatial contour, with the service sector (excluding the public service) having an impact on local economy. Therefore, the registration of a Geographical Indication may promote economic development, attributed to the increase in local production, demand and greater added value and, consequently, an upsurge in the generation of jobs and wealth, having a relevant impact in the notoriety of the region.

Keywords: development; measurement; indicator.

1. Introduction

From the increase in the promotion of local products, as well as the return of traditional production methods and the implementation of policies for adding value to products focused on local development, there is a great need of identifying and protecting Geographical Indications (GI) attributed to products or services with unique features from a certain origin, being associated to a positive reputation, intrinsic value and unique identity of the region, besides being distinguished from other similar products available in the market. In addition, GI registration holders must represent the specific group of producers or service providers [BRAZIL, 2017].

The products recognised with a GI strengthen local communities, contributing to the origin and quality certifications linked to the territory. Therefore, there is a great need of local development policies for improving production processes, consequently contributing to the quality of life of local communities, taking into account the idea that regions and municipalities have their specificities and potentialities [CALDAS; CERQUEIRA; PERIN, 2007].

It is also important to note that the development process generate real forms of freedom that generate social progression, in individual and social terms, being a result of economic, cultural and political activities. Accordingly, development is not only associated to the multiplication of wealth, but also to reaching goals for a better and more complete life for all [SACHS, 2004].

Taking into account the importance attributed to the combined actions promoted by agents that establish a Geographical Indication, as well as the need for considering local specificities attributed by the territory and local-historical identity, which contribute to the understanding of the level of centrality and proximity between social actors, the following question can be raised: how can a measure of centrality contribute to a potential Geographical Indication?

According to Sposito [1996, p. 120], centrality consists of flows and fluidity, thus, being a dynamic expression of the definition/redefinition of central areas and of flows within a city. Therefore, these areas concentrate unique economic, social, historic and cultural factors which stand out in the urban network of small cities.

With this in mind, this article is aimed at establishing an indicator of centrality for cities, capable of contributing towards Geographical Indications, based on indicators of Gross Domestic Product (GDP) of services for verifying local development, taking into account that development goes beyond the increase of Gross Domestic Product and other variables related with wealth [SEN, 2000 p. 28], and, at a wider level, transcends all forms of freedom of an individual and communities from the time the individuals find the identity connected to where they are inserted and are the protagonists of their own history, as drivers of change.

The reflection on Geographical Indications and their measurement of centrality is highly relevant. In modern days, GIs seek to diversify and value the originality of products according to each territory and to a local reality. This reality is a result of several factors: hierarchies and services; local identity; GDP growth; and regional development. In this respect, the study on centrality can be applied to areas concerning the distribution of goods and/or services, classified according to the size and level of influence, while legal changes are suggested in a realistic way.

The present article is organised into five sections, including this introduction. Second section includes the concepts concerning the central place theory, explained in terms of a spatial organisation, with a subsequent description of the Development theory by Amartya Sen, considering development as a form of freedom. This section also discusses the association of Geographical Indications to concepts, principles and legitimacy, as well as indexes and indicators, establishing units and abstract concepts of academic interest. The third section approaches the materials and methods regarding indexes and indicators, which establish abstract measurements and concepts of academic interest. The fourth section describes the measurement of centrality, with GDP indicators, the central place theory, the hierarchy of services, economic aspects and spatiality. Finally, the final remarks and references are pointed out.

2. Theoretical Background

2.1 Central Place Theory

Walter Christaller, in his book 'Places in Southern Germany', describes a theory to demonstrate the orderly standards of a community around him. The book was written in 1933, becoming notorious in 1950. The central place theory describes the spatial organisation and areas of influence, particularly its relative location and dimension [BRADFORD et al., 1987].

Central places (great urban centres) are providers of goods and services for the centre itself or for smaller and more central hubs. However, Walter Christaller considers that the centralisation of goods and services cannot only be explained by geographical factors, stating that the geographical centre is not necessarily a central location. Thus, it can be pointed out that the concept of geographical distance must be replaced by the concept of economic distance [ARAÚJO; ALMEIDA; RODRIGUES, 2009].

Nevertheless, with this theory, a central place is a settlement that essentially takes the form of a distribution centre of goods and/or services, being classified in terms of its size and level of influence: a settlement, a village, a town, a city, a regional capital, in ascending order. The scope of the role of a central place is determined by a superior limit, which is the maximum distance that people are willing to travel to buy goods and, at a lower limit, being related to the minimum amount of consumption required to maintain the offer of goods in central places [TORRES, et al, 2019].

Thus, Christaller, by observing specific cities in the South of Germany, observed that they were within equal distances from each other. He also verified the roles of settlement structure, discovering that it is possible to model local standards using geometrical forms, considering as a rule that the lower the order, the greater the number of existing settlements [COSTA; CARMO; BARJA, 2019].

Christaller believed in the emergence of a regular hierarchy, in which a central place of a certain level provides a set of goods and services which is specific to such level, as well as other sets which are defined for all other lower levels. These market areas (typically in a hexagonal shape) are exactly nested between each other according to a factor K to be fixed in magnitude for a specific system. The advantages of Christaller's theory include its geometrical simplicity (in hexagonal shapes) and sharp behavioural propositions, especially regarding travel behaviours of consumers, in which the packaging process tends to maximize central locations per unit area, thus, minimising transportation costs to the customer [MULLIGAN; PARTRIDGE; CARRUTHERS, 2012].

Thus, the Christallerian model suggests a uniform population density, iso-transport fares, iso-consumer preference, iso-wealth distribution, seeking to incorporate key concepts of "critical limit" and "range", with the possibility of regionalisation of spaces within the urban network, involving the offer of services [CUNHA; SIMÕES; PAULA, 2005].

2.2 Development theory by Amartya Sen

Development must, above all, be aimed at increasing the freedom of individuals in order to play an important role in the entire process of effectively recognising the pluralist character of a combination of human rights by different social groups: political and civil rights; social, economic and cultural rights; and the collective right to development [RIBEIRO, 2008].

In the development theory, people are considered to have a freedom of choice and opportunities, despite the limited choices. Thus, from when agents are empowered with their freedom, they can deliberately start

taking their position as an agent. Therefore, development is beyond the limited concept of economic growth, englobing lifestyle and forms of freedom [SEN, 2000].

Taking into account the concept from Sen (2000), one understands that social participation, spatial distribution, wealth and quality of life with social inclusion and environmental conservation become fundamental pillars for the existence of social participation in public spaces for defining social policies and the exercise of citizenship.

In benefit of a spatial dynamic regarding the exercise of freedom, from the political discussion on organisational processes in terms of the necessary options that characterise a sustainable development model, it is of fundamental importance to englobe democracy and the right of choice [ZAMBAN, 2012].

This sustainable development model can only be realistically carried out if five action tools are included: political freedom, economic availability, social opportunities, transparency assurance and social protection [SEN, 2000].

In the way people live, there are several ways to emphasize the value of people and actions, distinguishing between roles and capacities [SEN, 2000]. This regards people's actions, as well as lifestyle and identity aspirations [ROBERTSON, 2015]. Therefore, some people are not encouraged to wish for freedom as a result of their lifestyle, accepting deprivations of liberty, hiding their wishes and spending their lives without a proper identity.

Thus, the understanding of development must go beyond (monetary) wealth, focusing instead on the well-being of people, on their freedom of choice in how to live rationally. This can only happen with autonomy and self-determination, with an evaluative-constructive and causal-instrumental role in the development process [SEN, 2000]. Therefore, when individuals have a perception of their freedom, this enables the capacity of influencing the environment where people live and in favour of a collective freedom [PINHEIRO, 2012, p. 15].

By recognising an individual freedom, it is possible to form a social product, which interacts with freedom in community, for seeking processes that depend on institutional arrangements, reaching public reasoning, that is, civil and political freedom that must precede the satisfaction of economic needs.

With this in mind, from the time the relationship between progress and the increase in the freedom of people is observed, it is noted that development is crucial for the insertion of the individuals in the job market, due to their productive capacity, besides human and natural resources found in their region, as well as the access to public policies able to elevate political, economic and social freedom, as well as safety and transparency [SEN, 2000].

2.3 Geographical Indications

In Brazil, geographical Indications (GIs) are associated to the Industrial Property Law (Law no. 9.279/1996), which controls their application and functioning in the country, being currently governed by Normative Instruction INPI no. 95/2018. This normative instruction establishes the conditions for the concession of GI registration [INPI, 2018]. This Law is internationally linked with the Agreement on Trade-related aspects of Intellectual Property Rights (TRIPS), which emerged for reducing distortion in international trade and protect the right to intellectual property. For Law no. 9.279, GIs are divided into

two types – Indication of Provenience or Denomination of Origin [BRASIL, 1996], being defined as follows:

- Indication of Provenience (IP): geographical denomination of a country, city, region or municipality which has been recognised as an extraction, production or manufacturing centre of a certain product or of service provision;
- Denomination of Origin (DO): geographical denomination of a country, city, region or municipality, which designates the product or services whose qualities or characteristics are exclusively or essentially due to the geographical location, including natural and human factors [BRASIL, 1996].

Both IPs and DOs recognise the importance of Geographical Indications as a strategic potential for development, from an array of territorial goods, adding value to a combination of local products, in either economic, social or environmental terms.

Geographical Indications are related to the places that identify territoriality and cultural identity, as well as to production history, promoting the added value of these traditions and local development. Therefore, it is important to highlight the importance of the *terroir*, the concept of location and territoriality, being characterised by distinguishing products that are directly influenced by their forms of cultivation and/or production processes, promoting a typical identity [CADOT, 2012; SILVA, 2014].

The Guide for Requesting a Geographical Indication for Agricultural Products, developed by the Coordination of Incentive to the Geographical Indication of Agricultural Products, part of the Brazilian Ministry of Agriculture, Livestock and Food Supply [MAPA, 2007], proposes the concession of Geographical Indications based on sustainable development, emphasising agricultural products which have their production chain focused in the cultural aspects of the region [RAMOS, 2015].

Therefore, the lack of government incentives for implementing environmentally sustainable legislations in the territories associated to Geographical Indications has foreseen the voluntary incorporation of sustainability aspects by organisations or philanthropic institutions that fight for this cause. It also important to highlight the partnerships between local entrepreneurs and research institutions for fomenting sustainable strategies, ranging from scientific research and technological development, focused on optimising the value chain of socio-biodiverse products for the implementation of territorial management plans and the creation of community banks.

Thus, GIs are aimed at securing economic transactions, promoting the mediation between unique products and consumers, and suppliers that seek these specific attributes through certifications.

The studies addressing the subject of Brazilian geographical indications have discussed their relations with economic development, as well as the quality of products, juridical aspects and the significance of artisanal production [FROEHLICH, 2012; TONIETTO, 2005].

3. Materials and Methods

This topic points out the methods and techniques used for developing the indicators that can evaluate the measurement of centrality, capable of contributing to a geographical indication. Accordingly, analytical

resources were used to demonstrate the reality according to a combination of variables that can be seen or measured in a quantitative form through indicators.

Therefore, the methodological option for this work focuses on the collection of data and information through a bibliographic review. It is a descriptive and exploratory study, using data on GDP and the central place theory, as well as the levels of centrality of Brazilian municipalities.

3.1 Indexes and Indicators

An indicator is a quantitative measure, empirically referenced and with substantial meaning, being used to incorporate – by either replacing or operationalising – an abstract concept of academic or political interest [JANNUZZI, 2012].

It is understood that indicators consist of quantitative or qualitative parameters to monitor (individual, collective, associative, economic, political, social, etc.) processes or their results, serving to project the reality of events [MINAYO, 2009].

The main feature of an indicator lies on allowing to establish comparisons, either in temporal (time series) or performance terms, or regarding the level of commitment of individuals with events or even the level of achievement of targets established [TRZESNIAK, 2014].

In the treatment of stochastic facts, the measurement of the dimensions studied cannot only be inferred by an isolated observation, being necessary to obtain a combination of representative elements in order to make substantial affirmations on the event [TRZESNIAK, 1998]. Due to their intangible nature, measuring social aspects is a challenging task, which can only be improved with the increase in precision, clarity and concision of the concepts used. This becomes even more challenging with the increase in the understanding of what to be measured [SOLIGO, 2012].

The development of an indicator must clearly link the issue exposed by a given event – and the questions consequently raised – to the results, being, in its conception, structured in a way that its validity and application is not questioned in the future [TRZESNIAK, 1998].

Another concept lies on the fact that the development of an indicator or a system is an action carried out by its developer and by its user, requiring stability, temporality, regularity, operability and publicity when being developed [MINAYO, 2009].

It is important to consider that, through a joint act, the validity of determining an indicator is also a political action, which expresses the options and preferences of who engineered it or of who focuses on interpreting its circumscribing reality.

Therefore, besides a theoretical model, an indicator is also an intervention tool of reality, which is not free from ideological values or political interests, with its development process being influenced by theoretical orientations and methodological options [JANNUZZI, 2002].

Among the recommendations to be observed throughout the development process of an indicator, it is important to favour obtaining data that is naturally available, as well as the concern of avoiding biased interpretations and recognising that the generating factor is more important than what is being created [TRZESNIAK, 1998].

In order to be considered well-structured, an indicator must be trustworthy, communicative, being rightly available, periodic, with historicity and the possibility of disaggregation, specificity and the capacity of capturing most variations arising from the fact or event analysed [JANNUZZI, 2012].

The process of elaborating an indicator consists of preparing the collection of data (proposing indicators and standardising parameters and methodological procedures), re-elaborating gross data (extraction and interpretation) and improving the indicator/information relation, that is, the critical analysis of the development process itself [TRZESNIAK, 1998].

4. Results and Discussion

The centrality indicator considered in this work comprises the arrangement of data concerning several perspectives, including of the Gross Domestic Product (GDP) from the Services sector. This is based on the fact that, according to the Central Place Theory, cities are hierarchically organised, with certain services being only provided in more relevant locations.

Therefore, it is inferred that the greater the hierarchical importance of a municipality, the greater the respective result of the generation of service products will be. This lies on the fact that this spatiality is central enough to reduce the average economic transaction costs.

It is also important to point out that the format adopted in this work regards the operationalisation of a service, excluding the services carried out by public entities. This is due to the fact that this macroeconomic sector does not necessarily move according to strictly market reasons, in which the maximisation of profits is the main objective.

However, this data requires greater qualifications in order to avoid any bias when assessing results. This is due to the fact the sole determination of absolute values could lead to distortions in the interpretation of the results, which would also require the use of relative data.

Therefore, the solution lies on attributing weighting coefficients to service products of each municipality in the context of national, regional and state levels, with the magnitude of the additional weighting coefficient of all economic sectors being also added. Thus, the databases for measuring the centrality of municipalities shall be formed by four indicators, expressed in their percentage forms:

- Share of the gross value added of services – excluding Public Administration – at total current prices;
- Share of the gross value added of services – excluding Public Administration – within the federation;
- Share of the gross value added of services – excluding Public Administration – within the microregion;
- Share of the gross value added of services – excluding Public Administration – within the country.

Accordingly, the three last indicators express how important the location is in terms of its spatial outlines, with the first expressing how the service sector (excluding the public sector) impacts the local economy.

Thus, it is possible to estimate the local degree of centrality. Consequently, the greater these percentages, the greater the indicators.

Nonetheless, the use of simple averages to structure this measurement is not the most recommended form of operationalising the hierarchical ruler suggested herein. The most appropriate path would include attributing weighting coefficients through a linear combination algorithm of the original values.

With this in mind, the most adequate tool would be the Principal Component Analysis (PCA), which is versatile with a wide range of analytical applications, ranging from accounting analysis to organisational conflicts, including subjects regarding regional development [LOESCH and HOELTGEBAUM, 2012].

On the other hand, PCA enables to initially redirect the original data to a reduced number of dimensions, being useful for understanding and determining interdependency patterns of variables [LATTIN, CARROL and GREEN, 2011].

The PCA is indicated to promote the reduction in the dimension of the a given database, although, when applied, the presence of (p) original variables generates p-components. This is due to the fact that its application results in the condensation of the entire initial information into k non-corelated principal components, with $k < p$ [MINGOTI, 2005].

It is worth pointing out that dimensionality can provide a unique measure to researchers, attributing weighting values to all categories studied, being an indicator that coherently condenses all variables or a projection plane that enables the mutual observation of the data represented [PEREIRA, 2004].

It is worth pointing out that the first Principal Component (PC) extracted is developed from the linear combination of the original variables, carrying a greater variance volume. In turn, the second PC extracted, which is also a result of the linear combination of the original variables, re-expresses the combined variance that has not yet been explained by the previous PC, and so on until the last PC identified [LATTIN, CARROL e GREEN, 2011].

Despite not diminishing its importance, it is worth pointing out that PCA is an intermediary analysis technique, which cannot be used for establishing final concepts, instead, being an intermediary working tool, to be used when needed to simplify the original format of data [FERREIRA, 2008].

It must also be taken into account that, although one of the purposes of a PCA is the reduction of the dimension of the database – or, in algebraic terms, of the principal subspace – this technique leads to losses of information, which leads to a less accurate analysis of events and their interrelations [LOESCH and HOELTGEBAUM, 2012].

Thus, PCA must be considered a re-expression technique of multivariate data, enabling the reduction of a combination of information without any significant loss of data, but with the property that a combined variance of new variables is concentrated in the first principal components extracted [LATTIN, CARROL and GREEN, 2011].

The components are a result of a linear combinations of the original variables, commonly used as an initial stage of the Factorial Analysis, for redesigning the variability present in the original data in a more compact and understandable way [ROGERSON, 2012].

Each of the components extracted by a PCA aims at maximising the variance volume to be addressed. Following the definition of the first component, the second component will attempt to meet the greatest

possible level of variability remaining, and so on until the determination of all components [BEZERRA, 2009].

Therefore, it is suggested that an indicator must only be expressed by one only component, in order to avoid any misinterpretation of the results obtained and that the parameters defined are theoretically coherent with their values and formats. After all, a counterintuitive result is meaningless.

With this combination of procedures, the indicator obtained will reflect how important the city is within its economic context. In case it is the most important, it is more central for this reality, or, in analogous terms, it exhibits a high level of economic centrality.

Therefore, the indicator developed shall be used for measuring the levels of centrality of each municipality in terms of its wider areas (country, state and region). This indicator is suggested to be applied exclusively on cities, with all cities included having data available for the same period.

Finally, PCA can be considered a very important statistical tool for studying the existing impacts in regions with geographic indication registrations, as it will enable to develop a spatial determination protocol on the efficiency of GIs, which will determine the different behaviours between the municipalities with GI registrations.

5. Final Remarks

Brazil has a great capacity for producing products with a unique identity, which occupy a significant space in increasingly demanding markets in terms of the quality and unique features of products. Nevertheless, a region must be notorious for other factors besides the uniqueness of its products. Thus, it is necessary to promote the increase of Geographical Indication registrations capable of contributing to a protection system, able to value the products and their regional conditions, consequently fomenting an upsurge in local production, demand and added value, creating new jobs and wealth, having a positive impact on economic development.

With this in mind, the indicator of centrality can have an impact on the current scenario, from the registration of Geographical Indications. Thus, it is necessary to reflect on the paradigm shift of the model of local development, promoting greater participation of gross value added at current service prices. Accordingly, the identification of centrality levels of each municipality can contribute for defining actions, taking into account a cause-effect relationship of past actions, as well as identifying priorities of each municipality to foment greater and more efficient proximity between complementary regions and the central place.

The adoption of a strategic territorial planning can help municipalities that are currently forgotten and with slow development rates in reaching a higher level. In addition, the freedom established by an individual and the community depends of what is on offer. Therefore, when greater quality of life is offered, there is greater opportunity to expand and value local identity.

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