What does the Literature Say about Local Productive Arrangements?

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ABSTRACT:
Among the types of agglomerations, there are the local productive arrangements (APLs), understood as territorial agglomerations of economic, political and social agents, which focus on a specific set of economic activities and have links between them. We sought to analyze the research results in APLs from a systematic review of the literature on the Web of Science, a database of journals. A textual corpus consisted of 29 articles, 65 authors and co-authors in 29 scientific journals from 1998 to 2020. We analyzed citation, cocitation and bibliographic coupling metrics using the VOSviewer software. The results show that APLs are a recent research topic, focusing on the European scenario. We verified that the publications diversified into different journals with good reputations. On the main themes, keywords related to small companies, industrial districts and the very concept of APLs predominate.

Keywords: Local Productive Arrangements, Clusters, Bibliometric, APLs, Systematic Literature Review, SRL.

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INTRODUCTION

Among the concepts that involve the agglomerations of companies, there are the local productive arrangements (APLs). Broadly, the definition of APLs presented by the National Bank for Economic and Social Development (BNDES, 2003) reinforces the issue of territoriality and geographic delimitation of the concept, exposing that APLs are geographic concentrations of companies and institutions related in a sector private. In a complementary way, the productive arrangements consider the agglomerations of some specific agents, understood as economic, political and social, which focus on a specific set of economic activities, presenting links between them.[1] Suzigan *et al.*[2] show that agglomerations of companies and institutions can generate external economies, either incidentally or deliberately created, which were pointed out by A. Marshall in his study of English industrial districts. It is from the conjunction of these external economies that collective efficiency results, commonly related to clusters and industrial districts, as the primary determinant of a company's competitive capacity.

Collective efficiency can also be related to APLs, based on the existing links between local productive arrangements' economic, political and social agents. Thus, collective efficiency can ensure that APLs have a competitive advantage over agents that act individually.[3] Thus, the ties established in these agglomerations would be beneficial for the growth of companies. Socio–cultural ties can be highlighted, facilitating cooperation based on trust and local governance.[4] Given these issues, local productive arrangements have received attention from academic studies and public policies.

Thus, the objective is to analyze the articles dealing with Local Productive Arrangements – APLs, based on a systematic review of the literature in the Web of Science database between 1998 and 2020. We mapped and analyzed the systematic review, allowing the planned, detailed and replicable results to minimize bias.[5] In this article, we contribute to contemporary literature by analyzing the evolution of the theme over time. We seek to answer the research problem: what does the literature say about local productive arrangements?

We carry out a search using the term "systematic review", refining the results by "local productive systems " to identify

previous works. The refinement did not return any results, demonstrating the theoretical importance of the research since there are no previous systematic reviews on the topic addressed. To systematically analyze the literature results, Zupic and Carter[6] expose some research questions guiding the analysis, such as who are the experts in the field of research? How has this field developed over time? And what are the main topics associated with studying local productive arrangements?

The article is structured in five sections, the first being this introduction. The second presents the theoretical framework that serves as a basis, and the third contains the methodological procedures used. The fourth section presents the analysis and discussion of the results, and the fifth corresponds to the final considerations of the research.

Clusters, Industrial Districts and Local Productive Arrangements

Aquino and Bresciani[1] expose the similarities and differences between the concepts of clusters and local productive clusters. According to the authors, such concepts presuppose territorial specialization, integration of actors and cooperation between companies. The difference, therefore, lies in the geographic concentration, which exists in the Local Productive Arrangement (APL), but may or may not exist in the cluster.

The most prominent author on economic location is Michael Porter, who developed the notion of industrial or business clusters, making this a standard concept in the area. According to Porter,[7] clusters are geographic concentrations of companies and institutions interconnected in a particular field. Also, according to the author, clusters can cover a variety of sectors and include elements of suppliers, customers and governance aspects, such as the participation of institutions such as universities.

The concept of clusters built by Porter has two main elements. The first is that the companies that make up the clusters must be connected somehow. Thus, they are affiliated companies and institutions associated with similarities or complementarities. These interconnections can occur in a vertical (buying and selling chains) and horizontal format (using inputs, technologies, and complementary products, among others). The second aspect is the formation of interaction networks between firms based on demographic characteristics, encouraging value creation.[7-8]

However, the literature has become fragmented and diffuse.[9] Martin and Sunley[8] say that there is an ambiguity in Porter's definitions, which are vague concerning geographic scale and internal socioeconomic dynamics, causing different analysts to use the idea differently. The authors cite the multiplicity of interpretations used at the World Congress on Clusters

in 2001. The different definitions coexist and can apply in different socioeconomic contexts, with the concept of the cluster will being understood as a puzzle. In particular, from the different definitions, the duel between cluster and industrial district stands out.[10]

The concept of the industrial district was introduced by Marshall and derived from the economic literature, generally referring to the concentration of many small businesses of a similar character in particular locations.[3] In a complementary way, the two fundamental pillars of the industrial district are the notions of external economies and agglomeration economies, being understood as a socio-territorial entity characterized by the active presence of a community of people and a population of companies in a geographically delimited area.[11]

Thus, according to Paniccia,[11] the community of people in industrial districts is formed by a system of values, spread throughout the district and transmitted through generations from institutions and rules (markets, companies, associations, among others) based on aspects of reciprocity, cooperation and trust. Already, the population of companies is the spatial concentration of micro and small companies in a delimited geographic area. These companies specialize in different tasks, making them complementary. Demand in industrial districts does characterize by high variability, product differentiation (vertical and horizontal) and production customization.[11]

In this way, industrial districts or localized industries can be considered a predecessor of modern local productive arrangements.[3] According to Erber,[3] a local productive arrangement (APL) is a complex entity composed of a structured group of companies of different sizes, producing different goods and services. An APL is also composed of other institutions that provide different services, such as training and coordination of actions.

In Brazil, the definition of the term APL emerged from the formation of the Research Network on Local Productive and Innovative Systems (REDESIST), addressing territorial agglomerations of economic, political and social agents, focusing on a specific set of economic activities. This concept's development does base on the evolutionary approach that considers the space and the set of agents interacting in the place.[12] In addition, Cassiolato and Szapiro[13] presented a taxonomy for understanding APLs in Brazil, considering the type of production destination market (local, national and international), type of governance (hierarchies or networks) and the degree of territorialization of the production. Activities (high, medium or low).

We note from this perspective that the concepts of clusters, APLs and industrial districts have similarities. Florian and Lorenzo emphasize that the differences between the concepts

are related to the greater or lesser degree of existing interactions, allowing for the increase of innovative endogenous capacity, competitiveness and local development.

In practical terms, Garofoli[14] analyzed local development in Europe based on theoretical models and international comparisons. The author demonstrates the concept of APL, characterized by a close interaction between economy, society and territory. Thus, through productive links and interaction of local actors, local productive arrangements generate external economies and collective efficiency. Therefore, they are essential structures for local development, as does base on the production of specific knowledge and resources, resulting in collective learning.

For all this, Florian and Lorenzo[12] demonstrate that studies on local productive arrangements have received attention in the Brazilian scenario, mainly due to the significant importance of micro and small enterprises (MSEs). In addition, many successful experiences of industrial agglomerations in the country have encouraged research and academic debate on the subject. Next, the methodology used in work does present.

METHODOLOGY

The documents used in the systematic literature review we selected from the Web of Science journals database. The Web of Science is a multidisciplinary database that encompasses more than 12,000 of the world's most prominent impact journals.[5] Conducting the review involves three major stages: planning the review, conducting the review and reporting and dissemination, according to Tranfield, Denyer and Smart.[15]

According to Tranfield, Denyer and Smart,[15] we identified the need to review the review planning stage, prepare the proposal, and develop the review protocol. We consult the literature on local productive arrangements to identify the need for revision. Thus, we identified the relevance of carrying out a systematic literature review to understand what the literature has addressed regarding local productive arrangements.

We selected studies according to the search string to conduct the review following the research protocol. The search strategy considered the keyword corresponding to local productive arrangements in English, "local productive systems" (LPS). In addition, the search string considered the word variations (singular and plural) from the inclusion of the asterisk. We searched the journal database on December 13, 2020, and the download of results. Table 1 shows the procedures performed.

Inclusion and exclusion criteria were used to refine the results and are defined based on the scope of the review.[5] In general, we considered the entire period available in the journal base. Based on this criterion, we found 31 results. However, the document type filter was performed to analyze

Table 1: Database and search procedures used.

Database	Search String
Web of Science	TS=("local productive systems*") Refined by: Document Types: (Article Or Review) Time frame: Every year. Indexes: SCI-EXPANDED, SSCI, A and HCI, CPCI-S, CPCI-SSH, ESCI.

[1]Subtitle – *TS: topic.*
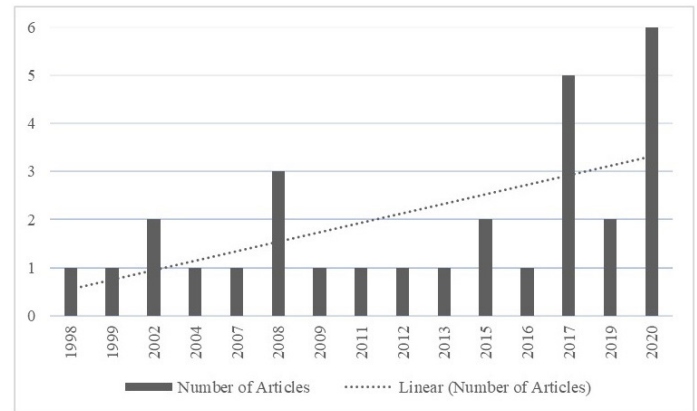
Source: Prepared by the authors

Figure 1: Temporal distribution of the textual corpus.

only the published documents, such as articles and reviews (review). With this, we totaled the textual corpus of 29 results. Subsequently, we identified the adherence of the results to the scope of the research. We read the title and abstract and verified the occurrence of the term local productive arrangements throughout the article.

RESULTS AND DISCUSSION

This section aims to describe the characteristics of the textual corpus. The results of the bibliometric study are highlighted, supported by the three laws of bibliometrics: a) Lotka's Law, which estimates the degree of relevance of authors in a given area of knowledge; b) Bradford's Law, which verifies the degree of the reputation of journals; and c) Zipf's Law, which measures the frequency of occurrence and co-occurrence of words in the text.

Characterization of the Research Corpus

The results show 29 articles, 65 authors and co-authors, distributed in 29 scientific journals. The results start in 1998 and end in 2020, characterizing it as a more recent theme in the literature. Figure 1 shows the temporal distribution of the evaluated corpus.

The temporal distribution shows the number of articles published over the years. The periods of 2000, 2001, 2003, 2005, 2006, 2010, 2014 and 2018 are not included in the temporal distribution because there are no published articles.

Regarding distribution, most of the time, there is one article published per year, which represents 3% of the total. The periods that differ are the years 2002 with two articles (7% of the total), 2008 with three articles (10% of the total), 2015 with two articles (7% of the total), 2017 with 5 articles (17% of the total), 2019 with two articles (7% of the total) and 2020 with six articles (21% of the total). Based on this, the literature on local productive arrangements does consider a more current theme since the publications focus on the 2000s.

Continuing with the characterization of the textual corpus, the profile of the research elite was analyzed based on the number of authors and co-authors of the articles. We based the research elite on Price, who considers the number of prolific authors based on the square root of the total number of authors and co-authors. Thus, from 65 authors and co-authors, the square root (8.06) was obtained, which corresponds to approximately eight individuals in the research elite. Thus, the 12 most representative authors and co-authors were listed, corresponding to Bellandi, M.; Labanda, D.; Santini, E.; Solano, M.; Alexander, R.; Alonso Logrono, M.; Amoros, M.; Boix, R.

Afterward, we analyzed the geographic distribution of the research corpus based on the results available on the Web of Science. The distribution of research in 12 countries was identified. The most representative was Italy and Spain, with nine published works. We have England with four works in the sequence, Ecuador and France with three works each and Brazil with two works. Finally, the list includes some countries with only one published work: Argentina, Belgium, Cuba, Mexico, Nicaragua and Turkey.

Analysis of Authors and Co-authors

To understand the structure of authors and co-authors in the research fields under study, we used bibliometric citation methods, cocitation and bibliographic coupling. Most bibliometric studies provide citation analysis to demonstrate a measure of influence, as authors cite documents they consider essential.[6] We analyzed the citation of documents based on the number of citations found globally in the journal database, considering a minimum of 2 citations. Figure 2 demonstrates the results found.

Of the 29 documents of the textual corpus, 16 works stand out as the most cited, allowing us to identify the influence of publications and verify the works most referenced in the literature for the basis of the themes. The most cited documents are by Ivana Paniccia, published in 1998, with 132 citations. It is titled "One, a hundred, thousands of industrial districts. Organizational variety in local networks of small and medium-sized enterprises" and published in Organization Studies. The author aimed to analyze the nature of industrial
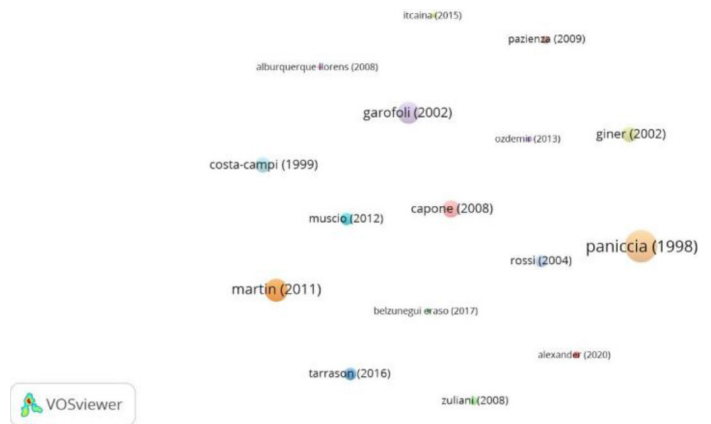

Figure 2: Citation of documents

districts, observing data on 24 local production systems of Small and Medium Enterprises in Italy over 40 years.

In second place is the work of Philippe Martin, Thierry Mayer and Florian Mayneris, published in 2011 and which has 67 citations. The work is entitled "Public support to clusters: A firm-level study of French "Local Productive Systems" and aimed to empirically analyze a public policy to promote industrial clusters in France. The third most cited work is by Gioacchino Garofoli, published in 2002 and with 60 citations. The research is entitled: "Local development in Europe – Theoretical models and international comparisons" and seeks to analyze the role of territory in economic development. Thus, the article deals with a 'local productive system', determined by a close interaction between economy, society and territory.

Thus, in the context of the literature on local productive arrangements, these works are the ones that receive the most attention. We noted that older works tend to cite more and that more recent works may still receive a more significant number of citations and gain representation over time.

Although citation analysis demonstrates the relevant publications and researchers, it does not explore the relational aspect of citations. Two other methods are the cocitation analysis (prospective coupling) and the bibliographic coupling analysis (retrospective). Such methods map the thematic, theoretical and methodological proximities of defined units of analysis, such as documents, authors, countries or journals.[16]

Cocitation analysis is when two units (documents, authors, journals) are cited together by a list of more current references. Cocitation allows identifying the similarity between the two cited units from their occurrence together in the lists of citing authors, thus assuming that their contents are related.[17] Thus, the cocitation image reflects the state of the field in a dynamic
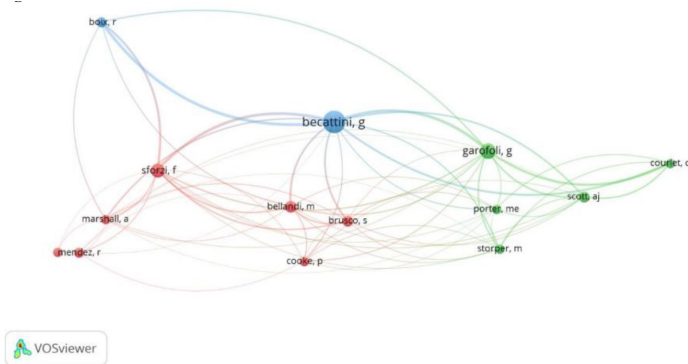
Figura 3: Cocitation of authors.

Figure 4: Bibliographic coupling of documents.

way, which may change over time, thus being a prospective method.[6]

To verify the cocitation of authors, we established the method of the total count (each cocitation has the same weight) and a minimum number of citations by authors equal to 6. We analyzed data in the VOSviewer software based on 871 authors. It is worth noting that the network nodes represent by the first author of each article in the set of cited references from the textual corpus. With the criteria defined, 14 authors presented links between them. The results found are in Figure 3.

The results reveal the formulation of 3 clusters: Cluster 1 (C1): red color, Cluster 2 (C2): green color and Cluster 3 (C3): blue color. In the network configuration in question, the thickness of the nodes is proportional to the frequency of citations received by the co-cited authors, and the line segments represent the relational ties between the authors. From the analysis of the clusters, it is possible to identify authors' approaches from the citing articles, thus observing the most influential authors in a field of research.

In the first grouping (C1), seven co-cited authors visualize (Alburquerque, F; Bellandi, M; Brusco, S; Cooke, P; Marshall, A; Mendez, R; Sforzi, F). The highest citation levels and strength of ties are for Sforzi, F. (14 citations and 177 connections), Bellandi, M. (10 citations and 100 connections) and Brusco, S. (9 citations and 80 connections). Five co-cited authors in the second grouping (C2) (Court, C; Garofoli, G; Porter, M; Scott, A; Storper, M). In this cluster, another author stands out for the level of citation and interconnection with the others: Garofoli, G. (17 citations and 217 connections). The author has the highest number of citations and connections in the last cluster, Becattini, G. (35 citations and 378 connections). In this cluster, there is also the presence of the author Boix, R. with eight citations and 144 connections. From a more specific perspective, we do see that there are interactions between the 3 clusters, demonstrating that the authors have ties with each other.
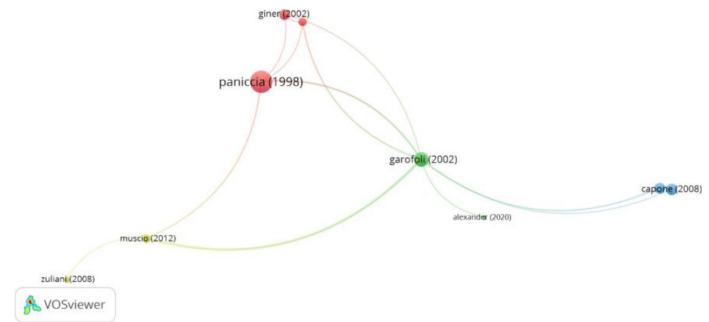
We adopt the bibliographic document coupling method. We introduced this method by Kessler[18] and demonstrated that two works do bibliographically coupled when they reference at least one publication in common. The more references in typical these articles have, the greater the intensity of coupling and connection between them.[17] We considered a minimum number of 6 citations for this analysis, which generated nine linked documents. The results do show in Figure 4.

By observing Figure 4, it is possible to verify that the most intensely coupled authors do distribute in 4 clusters: Cluster 1 (C1), represented by the color red and with three documents; Cluster 2 (C2) in green and three documents; Cluster 3 (C3) in dark blue and two documents; and Cluster 4 (C4) in yellow and two documents. In this case, the thickness of the nodes on the total number of citations received by the documents.

We observed that in the first cluster (C1), the documents with the highest coupling were from Paniccia (1998) with 132 citations and eight connections and Giner (2002) with 32 citations and three connections. Analyzing the works in this cluster and possible similarities, this is an analysis of local productive systems in Spain and Italy, comparing them to theoretical models referring to industrial districts. In this sense, these works usually analyze characteristics of local production systems, such as cooperation and competition.

In the second cluster (C2), the most coupled document is that of Garofoli (2002), with 60 citations and 19 connections. In this grouping, the common theme is the issue of territory in local production systems. For example, Alexander's (2020) work has analyzed global production networks, also looking at the role of governance in local garment production systems in the UK.

In the third cluster (C3), the work highlighted in the coupling is Capone (2008), with 37 citations and two connections. The work of Costa-Campi (1999) also makes up this cluster. Both works identify sources of growth and competitiveness in local production systems, using geographic concentration as an analysis factor. In the fourth and last cluster (C4), the most significant coupling is by Muscio (2012), with 19

citations and ten connections, which do group with the work of Zuliani (2008). The common theme of these researches is the collaboration between institutions in the studies on industrial districts and local productive systems. Among these collaborations analyzed is the relationship between university and company. After the analyses, we evaluated the reputation of the journals.

Reputation Assessment of Journals

We considered the number of published works to analyze the journals' reputations that make up the textual corpus. Based on the Web of Science results, we analyzed its reputation based on the evaluation in the SJR citation index and the *h*–index. It was not possible to perform the indicators of Bradford's Law since all journals have the same number of published articles. Each of them has the publication of an article, thus totaling 29

journals. This law analyzes the degree of relevance of journals, based on the distribution into productivity zones, divided into three types: high frequency or core, medium frequency and low frequency or dispersion[19] These frequencies are estimated based on the number of articles published in each of the journals. The results of the textual corpus do show in Table 2.

The results report the journals in which the articles do publish, the total number of articles per journal, the quartile classification and the *h*–index. According to the quartile quality classification, most articles (12) are publishers in journals with the best reputation (Q1). In the classification sequence, there are six articles published in journals classified in Q2 and two articles in Q3. Finally, eight articles are publishers in journals not classified by Scimago. Therefore, we infer that most articles have a good ranking.

Table 2: Journal Indicator

Journals	Artigos	Quartile	*h_índice*
JOURNAL OF BUSINESS ETHICS	1	Q1	168
ORGANIZATION STUDIES	1	Q1	140
URBAN STUDIES	1	Q1	138
JOURNAL OF ARID ENVIRONMENTS	1	Q2	108
INTERNATIONAL JOURNAL OF URBAN AND REGIONAL RESEARCH	1	Q1	105
ENTREPRENEURSHIP AND REGIONAL DEVELOPMENT	1	Q1	83
EUROPEAN PLANNING STUDIES	1	Q1	75
REGIONAL SCIENCE AND URBAN ECONOMICS	1	Q1	73
CHINA ECONOMIC REVIEW	1	Q1	68
ANNALS OF REGIONAL SCIENCE	1	Q1	59
EUROPEAN URBAN AND REGIONAL STUDIES	1	Q1	59
TIJDSCHRIFT VOOR ECONOMISCHE EN SOCIALE GEOGRAFIE	1	Q2	53
JOURNAL OF CULTURAL ECONOMICS	1	Q1	39
JOURNAL OF BUSINESS ECONOMICS AND MANAGEMENT	1	Q2	33
ITALIAN JOURNAL OF ANIMAL SCIENCE	1	Q2	32
BOLETIN DE LA ASOCIACION DE GEOGRAFOS ESPANOLES	1	Q3	17
PARTECIPAZIONE E CONFLITTO	1	Q2	11
AREA DEVELOPMENT AND POLICY	1	Q1	10
FLORESTA E AMBIENTE	1	Q2	10
ANALES DE GEOGRAFIA DE LA UNIVERSIDAD COMPLUTENSE	1	Q3	7
INTERNATIONAL JOURNAL OF BUSINESS ENVIRONMENT	1	Q2	5
ARBOR CIENCIA PENSAMIENTO Y CULTURA	1	-	-
DILEMAS CONTEMPORANEOS EDUCACION POLITICA Y VALORES	1	-	-
INVESTIGACIONES REGIONALES JOURNAL OF REGIONAL RESEARCH	1	-	-
PAPELES DE EUROPA	1	-	-
REVISTA CONRADO	1	-	-
REVISTA COOPERATIVISMO Y DESARROLLO COODES	1	-	-
REVISTA DEL CLAD REFORMA Y DEMOCRACIA	1	-	-
VISION GERENCIAL	1	-	-

*The *h*-index ranked journals.

Figure 5: Word cloud.

Word Occurrence Analysis

Based on the articles of the textual corpus, wordclouds. com was used to build the word cloud of the textual corpus according to Zipf's Law. The word cloud shows those critical in the textual corpus through a frequency indicator. For the word cloud formulation, a minimum occurrence of 2 does consider to illustrate the words most frequently in the simple lexical analysis. We used the keywords of the articles. The results are in Figure 5.

We note the occurrence of words in the textual corpus, the predominance of the terms "local" (twenty-one occurrences), "systems" (fourteen occurrences) and "productive".

(nine occurrences) representing the English term of local productive arrangements. As they are agglomerations of small companies, "small" and "SMEs" does also highlighted, representing small businesses. And the term "enterprises" represents companies. As mentioned in the theoretical framework, we note that the term APL is broad and does use in the context of industrial districts. Therefore, the term "districts" appears in the word cloud, representing this definition. Following are the research findings.

CONCLUSION

The present work aimed to analyze the research results in local productive arrangements based on a systematic literature review. We carried out the research based on Web of Science journals. We sought to characterize the studies on this theme through citation analysis, cocitation and bibliographic coupling.

The results demonstrate that research on local productive arrangements is a recent topic, with articles in the 1990s and the 2000s. The last years (2017, 2019 and 2020) are the periods with the highest number of publications. As for the geographical delimitation of the works, there is a concentration in Europe, emphasizing Italy and Spain.

Regarding the bibliometric evaluation of the works, we identify that of the 29 articles in the textual corpus, 16 are the most cited in the literature. Regarding the cocitation of authors, we note that the formation of 3 clusters, with the interaction between them, demonstrates that the authors have ties with each other. In the coupling, 4 clusters were found, with the work by Paniccia (1998) having the highest number of citations (132) and connections (8).

Regarding the analysis of the journals' reputation, it does find that each article was published in a different journal, demonstrating the variety of the theme. According to the Scimago classification quartile regarding the quality of journals, most have the best classification (Q1).

Finally, the occurrence of keywords in the articles we analyzed to identify the main topics covered. We identify that the words related to the concept of APL predominate, that is, the local productive arrangements, districts and the term that refers to small companies. The research limitations involve the definition of the database. Therefore, we suggested that more systematic reviews do carry out, expanding the databases for analysis to deepen the understanding of the evolution of this field of research.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

Additional Information

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