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THE PRESENT STATE OF RESEARCH INTO INDUSTRIAL CLUSTERS AND DISTRICTS. CONTENT ANALYSIS OF MATERIAL PUBLISHED 1997-2006

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ABSTRACT

The aim of this work is to help gain a better understanding of the research conducted on territorial agglomerations of firms at a multidisciplinary level. To this end, an analysis was performed of the contents of the most significant scientific literature on economics, management, planning and development, urban studies and geography published over the period 1997-2006. From the results a database of 142 papers from 43 journals was then elaborated. An analysis of these works reveals the level of development of the main lines of research in this field and, consequently, makes it possible to detect the topics that require greater attention and that can be the object of future research for researchers and academics. The main conclusions include the growing number of studies conducted on the subject in recent years, as well as a greater predominance of empirical research over conceptual work, and the existence of a significant change in the topics or lines of research throughout the period under study.

Key words: Industrial district, cluster, territory, content analysis.

1. Introduction

The process of globalisation in which economies are presently developing is leading to an increase in the importance of economies of scale and specialisation in production. Although traditionally this process has been contemplated from the point of view of large firms, in recent decades different researchers have highlighted the existence of other important factors which are external to individual firms, but seem to affect groups of firms within a geographical area. Because of this, attention to firms located within limited geographical areas has grown, with special emphasis placed on the superiority of this type of industrial organisation over mass production and the vertically integrated company (Piore and Sabel, 1984; Best, 1990). Authors generally suggest that territorial agglomerations benefit firms due to a series of external factors involving non-commercial interdependencies (Storper, 1992).

In fact, the phenomenon of globalisation and the proliferation of trans-national firms have produced a contradictory and paradoxical reaction. On the one hand, we find the existence of extensive networks that are mostly of a financial nature, and lack any national or territorial ties. On the other hand, this same phenomenon has been seen to reinforce the importance of the national or regional bases of firms. The paradox of globalisation lies in the fact that while competition becomes increasingly global, business and industrial localisation is ever more restricted to certain areas.

As a result of this interest, an enormous variety of concepts accounting for the phenomenon have been developed, including *Milieux Innovateurs* (Aydalot, 1986); *Flexible Specialisation* (Piore and Sabel, 1984); *Production System* (Storper and Harrison, 1991); *Industrial Cluster* (Porter, 1990; Enright, 1995), *National Innovation System* (Lundvall, 1992), *Hot Spot* (Pouder and St. John, 1996) or *Industrial District*, initially proposed by Marshall (1925) and later developed by Becattini (1979, 1987, 1989, 1990) and a great number of economists and sociologists (Sforzi, 1990; Triglia, 1990; Brusco, 1990; Bellandi, 1992).

However, as Storper and Harrison (1991) comment, such a large number of concepts and approaches generate confusion and make it more difficult to understand the phenomenon. Yet, in spite of these problems, the scientists who have contributed most to the development of these studies at an international level are geographers and economists (Salom, 2005). In all these cases reference is made to an economic resurgence related to local characteristics (that are specific to the place), which allows them to compete in a global context (Molina-Morales and Martínez-Fernández, 2008; Belussi and Sedita, 2009; Parrilli, 2009).

One of the decisive elements for the success of these areas is their capacity to generate, adopt and divulge innovation. In the present economic context, in which competition is price-based, innovation is often replaced by improved dynamics, a crucial endogenous determinant for economic growth and the adaptation of firms to the territory (Malmberg and Maskell, 2002; Giuliani and Bell, 2005; Boschma and Ter Wal, 2007; Robinson et al., 2007; Aharonson et al., 2008).

In recent years there has been a noticeable increase in research dealing with regional development as well as technological research and development themes, with many contributions on the theme of innovation and technology in regional development (Salom, 2005). One major difference from past periods, when attention was centred on technology-based company innovation and territorial aspects played a merely supporting role or represented simply the scenario where events took place, is that we now understand that this capacity for innovation, which allows efficient use of the existing resources in a particular field by individual firms, is also capable of producing a geographical hotspot that favours development (Mendez and Caravaca, 1997). Firms are no longer considered to be isolated innovative agents, but rather part of a medium with a particular innovative capability which makes it essential to analyse relationships between firms in the same area and to study the organisational methods and habits that characterise them. Hence, the environment helps to

encourage socioeconomic dynamism and, in the global logic of networks, allows specific spaces to be determined as fast developing or emerging (Mendez and Caravaca, 1997).

However, in spite of the attention that the subject deserves, up to now no reference framework has been developed to clearly outline the current state of academic research published in the international literature on these areas of local and regional development, which tend to be characterised mainly within the concepts of industrial districts and territorial clusters. Twenty-five years after the appearance of the seminal paper by Professor Giacomo Becattini in the *Revista di Economia e Politica Industriale*, the notion of territorial agglomerations of firms has permeated both the theoretical field of analysis of development and actual industrial policy (Soler, 2006).

Bearing both this and the aforementioned research gap in mind, the main aim of the present paper is to conduct an in-depth study on the state of academic research, as well as to suggest lines of research that deal with the relations between firms in territorial agglomerations. With this end in mind, our intention is to review recent contributions in the main international scientific journals on economics, management, planning and development, urban studies and geography by the content analysis technique. The papers selected were studied from three standpoints: their scientific characteristics, their content (by means of the lines of research to which they are related) and the methodology used.

The results of our work can make future research investments more productive for both academics and managers. Reviewing published research is one of the most useful and relevant approaches for evaluating the accrued knowledge of a particular field. Although time-consuming and data-intensive, journal content analyses can mark a discipline's progress, while simultaneously providing direction into future areas of needed inquiry (Williams and Plouffe, 2007). They allow researchers to know the level of development of the different fields of research that address the subject of territorial agglomerations of firms. This would

enable them to detect the topics that deserve a greater amount of attention and as a result to work on the future lines of research that emerge.

This work is structured as follows: first, we present the methodology used to perform the content analysis. The main results of the study are then outlined and finally the general conclusions of the work (centred on the gaps that were identified), the most significant findings and the way forward for further research are all presented.

2. Research Methodology

Reviewing published research material on a specific theme constitutes one of the most important ways of evaluating its methodological content. *Content analysis* of papers published in academic journals allows us to evaluate the scientific development of a discipline, to ascertain the direction and tendencies of research in that field, and to understand the mechanisms determining the quality of research publications as an adequate way to direct the work of researchers.

A review of the work on content analysis published to date shows that two main methods can be used. The first is *direct identification*, which involves describing the theme or area of the research and the profile of the work by looking at the objectives, methodology and results. This type of work appears quite frequently because the editorial advice in journals usually expresses an interest in evaluating the characteristics of publications on a regular basis. The second method is *indirect identification*, which consists in analysing how knowledge is passed from one publication to another. It is a procedure that, rather than tackling the concepts used, in fact analyses the structure of references to other publications, thereby enabling us to find out how one discipline interacts with others.

The work presented here uses content analysis through direct identification to review international research in a field of wide academic and business interest, i.e. the territorial

agglomeration of firms. In order to perform the content analysis scientifically, the instructions proposed by Kassarian (1977) and Kolbe and Burnett (1991) were followed.

We considered a 10-year period (1997 to 2006) to be appropriate, given that this time span is common in methodological reviews (e.g. Scandura and Williams, 2000; Chandler and Lyons, 2001; Maude, 2004; Yang et al., 2006; Hanson and Grimmer, 2007; Piekkari et al., 2010), and it has the advantage of providing sufficient breadth to capture disciplinary practices within a scholarly community (Piekkari et al., 2010:111).

Content analysis begins with the selection of the information sources to be used, although there is far from unanimous agreement about how to go about selecting the sources for this type of study. While some authors include only academic journals, others include conference papers and other publications. We chose only academic journals, since we believe that both papers presented at congresses and doctoral theses generally end up being published in journals at a later stage.

The second step is to choose which journals to examine. Because of the lack of academic journals that deal specifically with the theme under consideration here, we chose periodicals which were likely to include papers on the theme from two international databases that are widely recognised for their quality by the scientific and academic community. Thus, journals indexed in the *Journal Citation Report (JCR)* and in *Scimago Journal & Country Rank (SJR)* were analysed. Finally, the following categories were chosen for analysis: Economics, Planning and Development, Urban Studies, Environmental Studies, Business, Management and Geography, for the JCR; and Business, Management and Accounting, Geography, Planning and Development, for the SJR. We understand that the journals chosen contain a wide, and thus representative, sample of research on the territorial agglomeration of firms. However, we are also aware that including or failure to include a particular journal could become a subject for discussion.

The third step is to choose the papers that are likely to contain material that is relevant to the theme under study.¹ This is achieved by searching for a series of keywords that should appear in the title and the abstract of the article. In this particular case the following keywords were used: industrial district, cluster, agglomerations, local productive systems, territory, research networks, and social capital.

In order to lower the degree of subjectivity in the three previous steps, we enlisted the help of a panel of experts in territorial agglomerations of firms, with extensive experience in publications both nationally and internationally, from different research groups in clusters and industrial districts. The *Delphi* method was used to reduce the list of journals, categories and keywords. In this way we obtained a database made up of 142 papers (listed in the Appendix), whose source publications can be seen in Table 1. Research articles came from 43 different sources over the period 1997-2006.

INSERT TABLE 1 ABOUT HERE

On concluding this work, each article was analysed in greater depth by means of a data file which included the following information: year of publication, authors, type of work, sources used, information type, timescale and geographical location, statistical techniques used, application sector and line of research.

From the data gathered from this review, first a general analysis of the scientific characteristics of the selected articles was carried out and we then went on to analyse the lines of research followed in each publication. Several statistical methods were used to determine when the differences among the different variables are statistically significant, as well as to examine the evolution of some of the more important variables over time. The F test was used to examine continuous variables, while the Φ^2 and Cramer's V tests were used for nominal data.

3. Analysis of Results

In the following sections we will present the most significant results of the content analysis carried out on the papers in our database.

3.1 *Evolution of the scientific characteristics of the papers*

Two indicators were used to measure the evolution of the scientific characteristics of the papers: the number of empirical versus conceptual papers, and the number of statistical techniques used in each work to support the empirical part (Table 2).

The first manifestation of the scientific characteristics of a work will be that it includes some form of empirical research, since the existence of a consolidated theoretical foundation can be used if empirically contrasted with other contexts and situations. As a result of this, we could therefore expect the number of empirical papers to increase over time, as the data available for comparison accumulates. The results show that, for the period studied, there were far more empirical studies than conceptual ones (71% against 29%, respectively), with no significant differences detected from year to year (Cramer's $V = 0.161$, Sig. = 0.932). This result could be indicative of the existence of a theoretical foundation on the subject of territorially agglomerated firms that has become consolidated over the years.

INSERT TABLE 2 ABOUT HERE

Secondly, and as an initial approach, we considered that the more statistical techniques are used in empirical papers, the more sophisticated the research is, which could in turn indicate a positive evolution in the scientific characteristics of the discipline. The average number of techniques per article is 0.82, which increases only slightly over the time period in question (Fig. 1), with no statistically significant differences from year to year ($F = 0.696$, Sig. = 0.711). From such findings it can be deduced that there is a fairly low level of sophistication in research on the theme analysed. In order to extend this initial approach, in

later sections of the work we will go into this aspect in greater depth by analysing not only the number of techniques that were used, but also what type they belonged to. This will provide us with a wider and more valid view of this aspect.

INSERT FIGURE 1 ABOUT HERE

3.2 Lines of Research

We also wanted to examine the lines of research detected in the study of territorial agglomerations of firms. In order to code the content of the articles, we first developed an initial list of major lines of research based on previous work that provided different topics, trends, agendas and lines of research on territorial agglomerations of firms. The expert panel, by iteratively sorting the individual lines and regrouping them into coherent groups, proposed five mutually exclusive lines of research: CHARACTERISATION, LIFE CYCLE, PERFORMANCE, POLICIES and SPECIFIC REALITIES (see Table 3).

A pre-test was performed to measure the reliability of the categories and the classification rules. A group of doctoral degree students chosen from a course on market research methodologies were instructed in the use of the categories and the classification rules, and assigned 20% of the items to be codified (30 items). Answers to their doubts were incorporated into the classification rules. The authors classified the same items and the degree of agreement between the two parts was measured and found to be satisfactory.

Once the coding scheme had been refined, the 142 selected papers were coded. Reliability analysis was conducted to determine whether the lines of research could be placed into the same options by independent judges. Working independently, two raters (authors) assigned the line of research of each article to the one of the five options that best described its content. Each article received one research line code, which represented the primary research line of the article. The level of agreement between the two judges was calculated as a percentage of

agreement (number of articles assigned to a same line of research by both raters) of 91%, which is higher than the 85% proposed by Kassarian (1977). In the case of disagreements, the authors discussed the specific article category until consensus was reached (Williams and Plouffe, 2007). If no agreement was reached, the senior author decided.

INSERT TABLE 3 ABOUT HERE

Hence, the first line of research, proposed and identified as CHARACTERISATION, includes articles on the subject and, more specifically, articles that include literature reviews, as well as showing classifications, taxonomies and reflections on the territorial agglomeration of firms. This block contains mainly conceptual articles that attempt to identify these factors, in many cases supported by statistics to describe the relationships within a sector. We also included articles which model relationships but without any empirical work to support them. There are 72 articles in our database that study the different approaches that can be used to analyse territorial clusters or districts, together with the Theory of Social Capital or the Theory of Resources and other similar theories that validate their existence.

The second line of research, LIFE CYCLE, includes papers that analyse the creation of clusters or districts or their transformation (relocation of activities, internationalisation of firms, tertiary impact, spin-offs, poly-specialisation, etc.). Content analysis provided 13 articles in this category.

Thirdly, PERFORMANCE is a line of research which includes all those papers dealing with the performance of firms belonging to the districts/clusters from an internal point of view (competitiveness, results, innovation, etc.), as well as those that make *inside-outside* type comparisons between districts and clusters. We identified 34 papers in this group.

The fourth group, POLICIES, includes papers that refer to the government-level policies implemented in clusters or districts, as well as the influence that the different local institutions have on them. We found 10 articles in this category.

Lastly, in SPECIFIC REALITIES, we include articles that study very specific cases of industrial agglomerations in a certain geographical area such as technological districts, for example. We detected 13 articles in this block.

Table 4 shows a detailed list of the papers analysed according to the lines of research they belong to.² The results show that more than half the papers we found belong to CHARACTERISATION (50.7% of the total), followed by the PERFORMANCE line with nearly 24% of the papers, while the other three categories account for less than 10% each.

INSERT TABLE 4 ABOUT HERE

Once the content of the lines of research has been analysed, we then establish how it evolves over time. Thus the lines can be expected to vary with time, with differences between years that can generally be explained by the themes chosen in the research. The results (Table 5) show that 74.64% of the papers analysed fall into either the CHARACTERISATION or the PERFORMANCE categories, together with a significant link between the line and time variables (Cramer's $V = 0.301$, Sig. = 0.046). In Figure 2 we can see how all the lines increase except for that of SPECIFIC REALITIES, which decreases slightly over the years, while CHARACTERISATION evolves continuously.

INSERT TABLE 5 ABOUT HERE

INSERT FIGURE 2 ABOUT HERE

3.3 Methodology and characteristics of the work by lines of research

The last point to be considered concerns the methodology of the research papers, which involves analysing whether or not there is a relationship between the lines of investigation and the methods employed to conduct the research. This is achieved by looking at the main aspects, such as the type of work, information sources, type of information, timescale and geographical scope, type of research, statistical techniques and sector of activity.

The results obtained according to lines of research (Table 6) show that, first, there is a significant correlation between the *type of work* and the line of research ($\Phi^2 = 0.327$, Sig. = 0.004). As expected, there is a vast predominance of empirical work in the studies analysed both overall and for each of the lines of research, although relatively high percentages of conceptual papers were detected in the CHARACTERISATION and POLICIES lines, which is totally coherent with the definition of these lines.

Second, it can be said that, in global terms, *secondary sources* of information (59.2%) are used more frequently than *primary* ones (40.8%) in empirical papers. Consequently, this characteristic is also found in the lines considered, the only exception being the LIFE CYCLE line of research, in which papers using primary information sources predominate. Hence, we can see that there are significant differences depending on the line of research followed in the papers (Cramer's V = 0.229, Sig. = 0.034).

INSERT TABLE 6 ABOUT HERE

As far as the *quantitative or qualitative nature* of the information in the empirical papers is concerned, the notable point is the equality that exists between the use of qualitative (50.38%) and quantitative information (49.62%) overall. In contrast, we find significant differences as regards the lines of research analysed (Cramer's V = 0.313, Sig. = 0.000). Qualitative papers predominate in the CHARACTERISATION, LIFE CYCLE and POLICIES categories, while

in the PERFORMANCE and SPECIFIC REALITIES lines the papers tend to use quantitative information.

As regards the *type of objective* of the research in the empirical (descriptive or explanatory-predictive) papers, Table 6 again shows a balance between descriptive (51.49%) and explanatory-predictive papers (48.51%) on a global level. If we break this down into lines of research, however, it can be seen that there are significant statistical differences depending on the line of research considered (Cramer's $V = 0.297$, Sig. = 0.002). Descriptive objectives predominate in the lines CHARACTERISATION, LIFE CYCLE and SPECIFIC REALITIES, while in PERFORMANCE there is a predominance of explanatory-predictive ones and in POLICIES we find 50% of each.

In general terms, the *timeframe* in which the research is conducted is mostly cross-sectoral (54.46% of the papers) and fewer research papers adopt a longitudinal or dynamic perspective (45.54%). There are also significant statistical differences between the lines (Cramer's $V = 0.347$, Sig. = 0.000). Transversal papers predominate in CHARACTERISATION and PERFORMANCE, while longitudinal papers are more frequent in LIFE CYCLE, POLICIES and SPECIFIC REALITIES.

The *geographical scope* of the research is mainly local (53.47%), as opposed to 28.71% national and only 17.82% international. Analysis by lines of research does not yield any significant differences at a 95% confidence rate, but some were detected at 90% (Cramer's $V = 0.221$, Sig. = 0.053).

INSERT TABLE 6 (BIS) ABOUT HERE

As far as the *type of research* used in the papers is concerned (Table 6Bis), the most common are studies from archival/secondary data (35.16%), literature reviews (17.58%), interviews (16.48%) and surveys (15.38%). We can see that there are no statistically significant

differences according to the lines of research followed in the papers (Cramer's $V = 0.225$, Sig. = 0.248).

With respect to the *statistical techniques* (Table 6Bis), the most commonly used methods in the papers are descriptive statistics (56.90%) and regression analysis (11.21%), while the least frequently employed are discriminant analysis and time series, with percentages under 1%. The results indicate that there is no significant correlation between the subjects or lines of research and the statistical techniques that were used (Cramer's $V = 0.352$, Sig. = 0.085).

Lastly, analysis of the *activity sectors* used in the papers (Table 6Bis) shows us that, overall, most of the papers are focused mainly on the technology (22.54%) and textiles/footwear sectors (17.61%), with no statistically significant correlation between research topics and activity sectors (Cramer's $V = 0.241$, Sig. = 0.607).

4. Discussion and conclusions

Territorial agglomerations of firms have generated a significant body of knowledge in recent decades. In this study we have performed a multidisciplinary diagnosis of the state of research on this field over a 10-year period (1997-2006).

Evaluating an academic discipline's knowledge production and diffusion is a complex task. In this sense, given the myriad research techniques available, analysing the content of academic journals is only one approach to such a task, but it may be one of the most revealing (Williams and Plouffe, 2007). Content analysis is an important and (re-) emerging method for facilitating many other types of analyses. Potential contributions also exist in the role that content analysis can play in theory development. We consider that the 142 articles from 43 scientific publications reviewed in this content analysis represent the increased progress being made in knowledge about this field, and which is relevant to many stakeholders – those

interested in clusters or industrial districts research, and others within and beyond the academy. Hence, the following conclusions can be highlighted.

4.1 Identified gaps

The main gaps were identified as being due to the differences between the papers in our database and the proposed lines of research that were detected by our analysis, i.e. CHARACTERISATION, LIFE CYCLE, PERFORMANCE, POLICIES, and SPECIFIC REALITIES.³

Thus, there are more papers in the CHARACTERISATION line, which includes descriptions and classifications of the theories that currently exist on the territorial agglomeration of firms. However, a deeper analysis of this first line shows that there is a shortage of conceptual papers that propose research agendas or trends in the study of the horizontal relationships between firms in industrial districts or territorial clusters in the same way as vertical relationships between firms are analysed in work with an international scope.

The second line, LIFE CYCLE, covers papers dealing with different internal and external factors that have an influence on the creation and development of clusters and industrial districts. However, this is nearly always carried out on an empirical level and consists in analysing particular cases. In this sense, there is an obvious lack of conceptual papers that put forward a general model for these life cycles which can be used to generalise on how the factors can affect the development and functioning of territorial agglomerations of firms.

The third line, PERFORMANCE, is the second largest group of articles, in which research is conducted mainly from an empirical point of view with fundamentally explanatory-predictive objectives. We have, however, detected a lack of papers centred on the analysis of models of cluster or industrial district performance with a longitudinal timeframe that shows their evolution over time.

The fourth group, POLICIES, includes papers that refer to the government-level policies implemented in clusters or districts, while also focusing on the influence of the different local institutions. Qualitative papers are far more common than quantitative ones, which means that it could be interesting to research further into the quantitative effects of the policies applied in territorial agglomerations of firms.

Lastly, the SPECIFIC REALITIES field is the one that can provide the most opportunities for further future research (as we found few papers in the journals). It is also the one where, up to now, a great deal of effort has been made to describe particular cases, but there are very few suggestions for future proposals for models that can be used to explain these realities or how they work.

4.2 Significant findings

The main findings derive from the analysis of the papers in terms of their scientific characteristics, the existence and evolution of lines of research and the methodology employed in them.

Although there does not seem to be a clear evolution of the scientific characteristics of the papers over time, we did detect a predominance of empirical papers over conceptual ones in the last few years, which indicates the existence of a consolidated theoretical foundation concerning territorial agglomerations of firms. On the other hand, the number of statistical techniques has grown slightly over time but without any noticeable statistically significant differences from year to year. This finding could indicate that time, rather than the number of techniques, is the best indicator of the scientific rigour of an investigation. Moreover, it is important to highlight the predominance of statistically descriptive techniques in the papers analysed.

There is an especially significant evolution in the themes dealt with over time, and so we can conclude that there could be manifest trends or modes in the lines of research considered.

Above all, there is a clear upward trend in the papers in all the lines analysed except that of SPECIFIC REALITIES, which descends slightly while the CHARACTERISATION line develops at a steady rate.

Lastly, there is a significant relationship between the line of research of the papers and the following methodological variables: type of work, type of information, type of objective and timeframe. In contrast, no significant relationship was found between the research topics and the following methodological variables: geographical scope, type of research, statistical techniques and sector analysed.

4.3 Future research directions

First, we would like to point out that, in accordance with the gaps that were identified, there are topics that have not yet been studied or that have been analysed to a certain extent but could be the object of future research on territorial agglomerations of firms. Most papers focused on studying “what kinds” of relationship and structure take place in territorial agglomerations of firms. However, we understand that to reach greater maturity in research it would be interesting to study "how" and "why" these relationships and structures are produced between organisations in the same district or cluster, as proposed by Sacha and Datta (2002) in their work on vertical relationships between firms.

Most of the selected papers are locally based. However, globalisation strategies in firms include both horizontal and vertical relationships with other firms in any part of the world, and so we conclude that this is an opportunity to study more complex chains and networks.

Moreover, it is important to highlight that we have based our work on the analysis of horizontal relationships in districts and clusters, but we are aware of the strategic importance of other types of relationships, such as vertical ones. Consequently, our future research will be aimed at completing the study of inter-organisational relationships by including an analysis of the major international publications on vertical relationships among firms within the same

territorial agglomeration. Finally, we would like to underline the fact that this study does not claim to be anything more than a first exploratory step to be extended later by looking deeper into the themes of vertical and horizontal relationships among firms within the same geographical area.

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Notes

1. Analyses of brief notes, editorials, professional commentaries and book reviews, which are often seen in journals, have not been included in the study.
2. The authors are aware that relationships may exist between the different lines proposed here and so the articles can be classified according to more than one line of research. The task of analysing the lines in each article with the greatest possible precision was carried out by having different judges assign them to a single main line.
3. In view of the intermingled relationships between some of the proposed lines, the gaps identified in some lines could be applied to others.

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