

SCIENTIFIC COLLABORATION NETWORK AMONG BRAZILIAN UNIVERSITIES: AN ANALYSIS IN DENTISTRY AREA

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ABSTRACT

This paper analyses the scientific collaboration network formed by the Brazilian universities that investigate in dentistry area. The constructed network is based on the published documents in the *Scopus* (Elsevier) database covering a period of 10 (ten) years. It is used social network analysis as the best methodological approach to visualize the capacity for collaboration, dissemination and transmission of new knowledge among universities. Cohesion and density of the collaboration network is analyzed, as well as the centrality of the universities as key-actors and the occurrence of subgroups within the network. Data were analyzed using the software UCINET and NetDraw. The number of documents published by each university was used as an indicator of its scientific production.

Keywords: Scientific Collaboration; Social Network Analysis (SNA); Brazilians Universities; Dentistry; Scientific Production.

1 INTRODUCTION

Since some decades, science policy makers have shown increasing interest in promoting scientific collaboration between institutions, since it improves both the transfer and the dissemination of results. Particularly in South America, the strengthening the cooperation between countries, both inside and outside the continent, has become a priority in science policy as a cohesion and convergence instrument (MALTRÁS; QUINTANILLA, 1995).

Since scientific publication is the vehicle by which new knowledge is disseminated and explained, it is therefore the easiest way to quantify and analyze the scientific collaboration among researchers, universities, countries or scientific areas. There are several reasons for researchers to work and publish in teams. Perhaps the most plausible is the researcher's specialization and increased efficiency – in a word, professionalization (BEAVER; ROSEN, 1978).

Price and Beaver (1966) were among the pioneers to use co-authorship relationships to investigate social structures, in particular, networks of communication, and their influence on science. Price (1963) and Crane (1972) introduced and developed the concept of 'invisible college' as an informal network of communication with some form of social organization. Crane stressed the importance of key individuals in the dissemination of information in a scientific area, and showed that these individuals are elite members of the 'invisible colleges'. These 'invisible colleges' or networks of the most prolific authors are an important aspect of the social organization of a scientific area, because they tend to link separate groups of collaborators and promote the development of the area.

Scientific collaboration contributes to the creation of knowledge and its subsequent dissemination. Scientists or research centers well positioned within a collaborative network will receive higher quality information and in a faster way (LAMBIOTTE; PANZARASA, 2009).

Social networks have been used to analyze scientific collaboration since several years (JANSEN; VON GORTZ; HEIDLER, 2010; HOU; KRETSCHMER; LIU, 2008; VALDERRAMA; GONZÁLEZ; ALEIXANDRE; MIGUEL, 2007). Unlike

traditional analyses in which the results focus on quantifying the number of collaborations, social network analysis (SNA) provides insight into the 'scientific community' as a whole, revealing which researchers and institutions are best connected or have the greatest influence on the rest of the community (ESCALONA; LAGAR; PULGARÍN, 2010). SNA aims to identify and analyze the structure and behavior of a particular social group. Its basis is the mathematical theory of graphs and indeed it has been easy to transfer and apply the vocabulary of this theory to the study of different social networks (WASSERMAN; FAUST, 1994). A graph is constituted by a set of nodes (universities or countries in the present study) and a line set that connect them (collaborations in the present case). These lines or links connecting the various nodes can be directed (one-way) or reciprocal (two-way). A directional arrow represents the firsts and the latter by a double-tipped arrow. The representation of the links in a graph can be binary (presence or absence), ordinal (whether the link is stronger or weaker), or weighted (according to a range or average value).

By means of SNA, it is possible to identify the general structure of a network, and get a relative measure for subsequent comparison with other networks. By the degree, closeness and betweenness indicators, the study of the network centrality identifies the positioning of the different actors (universities) or groups of actors relative to the network as a whole, or to other actors. SNA also detects the different subgroups to which an actor (university) belongs, providing subgraphs in which all the nodes are connected to each other (HANNEMAN, 2010; LUCE; PERRY, 1949; BRON; KERBOSCH, 1973).

In 1974, Czepiel used the concept of centrality to explain the patterns of the technological innovation diffusion in the steel industry and found that the companies which occupied the most central positions in an informal inter-company communication network were those to first adopt a new foundry process. According to the author, this centrality gave them a technological advantage.

We highlight that, although social networks are being used to analyze scientific collaboration in several scientific areas, in Dentistry area are observed few studies about it.

In Brazil, the scientific production in the Dentistry area presented a significant increasing during the first years of the XXI century, observed by a bigger spreading of the works in specialized journals (DIAS; NARVAI; REGO, 2008).

Such an increasing is proven by means of the data provided by the Scimago Journal & Country Rank (SJR), which registers the Brazil's scientific production in the Dentistry area, in which is located in the 4th position of the world-wide ranking accumulated production along the period between 1996 the 2009. This position places the mentioned area in a prominence situation, whereas the total Brazilian scientific production - independently of the considered area- places in 15^a position. Therefore, Dentistry constitutes the area in which Brazil places in the best position of the ranking amongst the 27 areas evaluated by the SJR.

Recall that, once the production is evaluated, a group can reach parameters allowing to reevaluating and rethinking its objectives, by reprogramming strategies of necessities and growing. Moreover, when the scientific production volume becomes visible for the institutions or groups, is necessary the usage of methodologies to evaluate it (OLIVEIRA; GRACIO, 2011).

The present paper aims to visualize and analyze the scientific collaboration network constructed by Brazilian universities in Dentistry area, identifying national and international relationships established by them. Based on the scientific production of the various Brazilian universities, it is studied the overall structure of the Dentistry scientific community in Brazil, as well as the position that the universities, or sub groups of them, occupy in the scientific community as a whole.

2 MATERIALS AND METHOD

The study's objective was to analyze the social structure of scientific research in Dentistry in Brazilian universities. This social structure is based on the scientific collaborations among those universities. To obtain the data, we considered a scientific publication as the unit of analysis and we have used Elsevier's Scopus database as the source of information. We have not used the Web of Science database because the larger coverage by Scopus (ESCALONA; LAGAR;

PULGARÍN, 2010).

In the Scopus search (articles and reviews); we retrieved the documents published by researchers in the Dentistry area in Brazil during a period of 10 years. The search strategy was based on the authors' address to the 'Affiliation' field and the 'Subarea' field of the Scopus database, using the terms 'Brazil' or 'Brasil' and 'Dentistry', respectively. The result was 6116 papers published between 2000 and 2009, inclusive.

To explore scientific collaboration in the Brazilian Dentistry area, we have constructed two matrices. The first one (146×146 square matrix) presented all the collaborations among Brazil's universities, without consider the collaborations with associations, institutions, companies, or research centers. The second matrix (2-mode data matrix with 96 universities and 55 countries) presented the collaborations of Brazil's universities with foreign institutions. Each cell in the matrices corresponds to the number of documents published jointly. The matrices were analyzed using the software UCINET (BORGATTI; EVERETT; FREEMAN, 2002) and NetDraw (BORGATTI, 2002).

3 RESULTS

3.1 National Scientific Collaboration Network Among Brazilian Universities

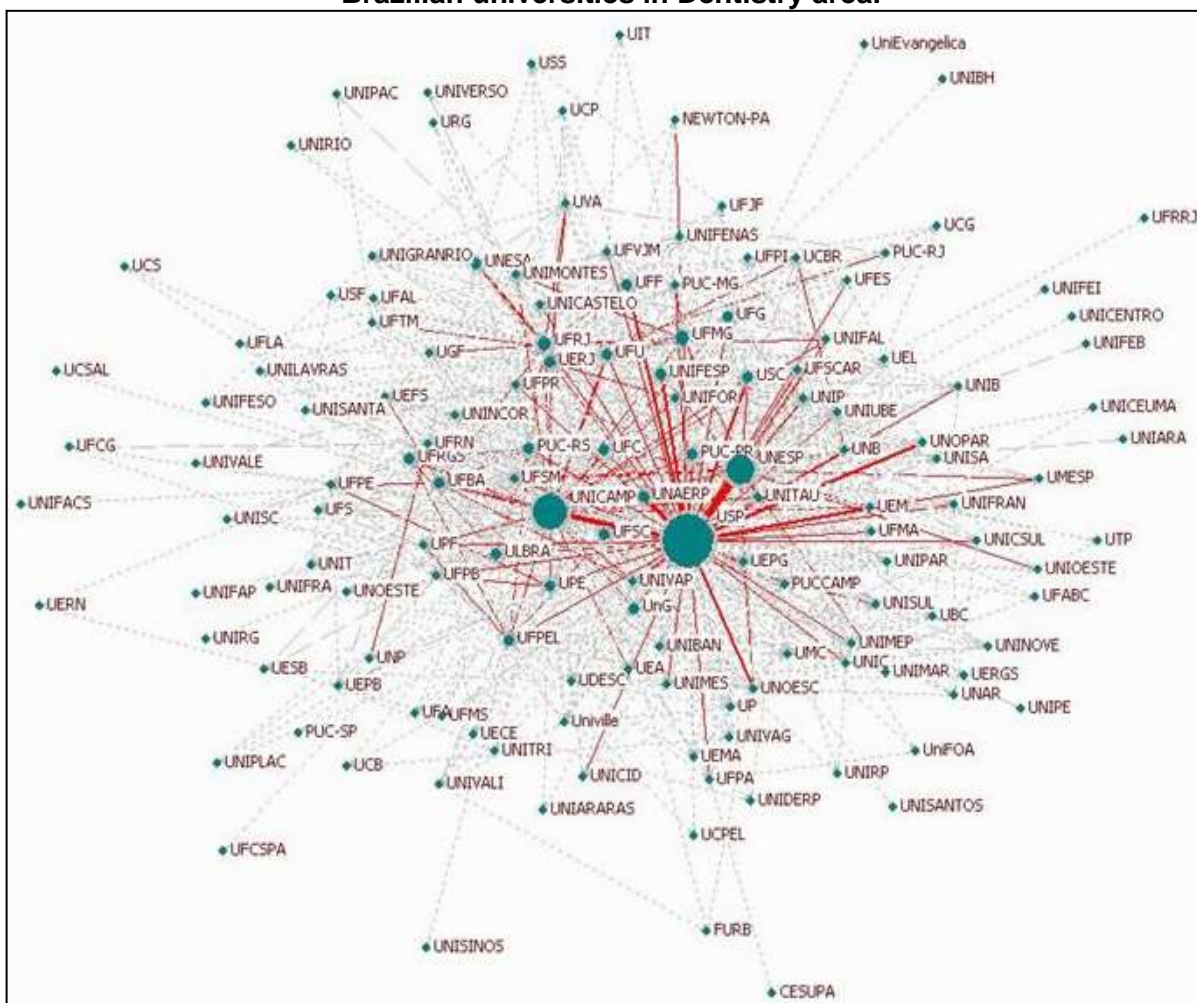
Figure 1 shows a graphical representation of the national scientific collaboration network of the Brazilian universities in Dentistry area. The nodes represent the different universities and the links show the collaborations between them, with their thickness representing the collaboration frequencies. The dotted lines correspond to fewer than 5 collaborations; the dashed lines between 5 and 10 collaborations; and the solid lines over 10 collaborations. As an attribute of the network, we have included in the node of each university the number of records retrieved – the greater the number the larger the node.

For a first approximation to the structure of the network, we studied the level of cohesion by analyzing its density, the mean distance between nodes, and the

reachability level of each university with others in terms of scientific collaboration. The scientific collaboration network presents only one large component or sub graph constituted by all the 146 Brazilian universities.

The density of a network is the measure of how many links belong to network in relation to the total number of possible links (DOREIAN, 1974; BURT, 1976). In the network in Figure 1, its value is 63.7%. The average distance between two nodes is a measure of the effort required by a university to collaborate with another, defined as the mean shortest distance between two nodes. In this case, its value was 2.17. The "reachability" index is an indicator of which universities are (directly or indirectly) reachable by others in terms of collaboration (DOREIAN, 1974). In this case, all the universities were reachable.

Figure 1: Scientific collaboration network among Brazilian universities in Dentistry area.



The centrality measures show where each university is positioned within the structure of the network (FREEMAN, 1979). To this end, one calculates the following parameters for each node: degree (the degree or rank of the node), betweenness, and closeness. These indicators reveal which universities are the most central, prestigious, and active in terms of collaboration. We also determine the possible clusters or subgraphs (cliques) within the network.

3.1.1 Degree (the degree or rank of the node)

The measure "degree" or rank of the node in the present case is the number of a university's direct collaborations, i.e., how many other universities it is directly linked to. From Table 1 there stand out *Universidade de São Paulo* (USP), *Universidade Estadual Paulista* (Unesp), *Universidade Estadual de Campinas* (UNICAMP) and *Universidade Federal do Rio de Janeiro* (UFRJ). Considering the normalized degree (NrmDegree) of these four universities, one observes that they account for more than 8% of the network's total links.

In the descriptive statistics for the parameter "degree", the mean value was 92.4, and the range was from 1 to 2644, i.e., these latter figures were the lowest and the highest number of collaborations.

Table 1: Centrality measures of the social network of national collaboration for the 20 universities with the greatest values of nodal degree.

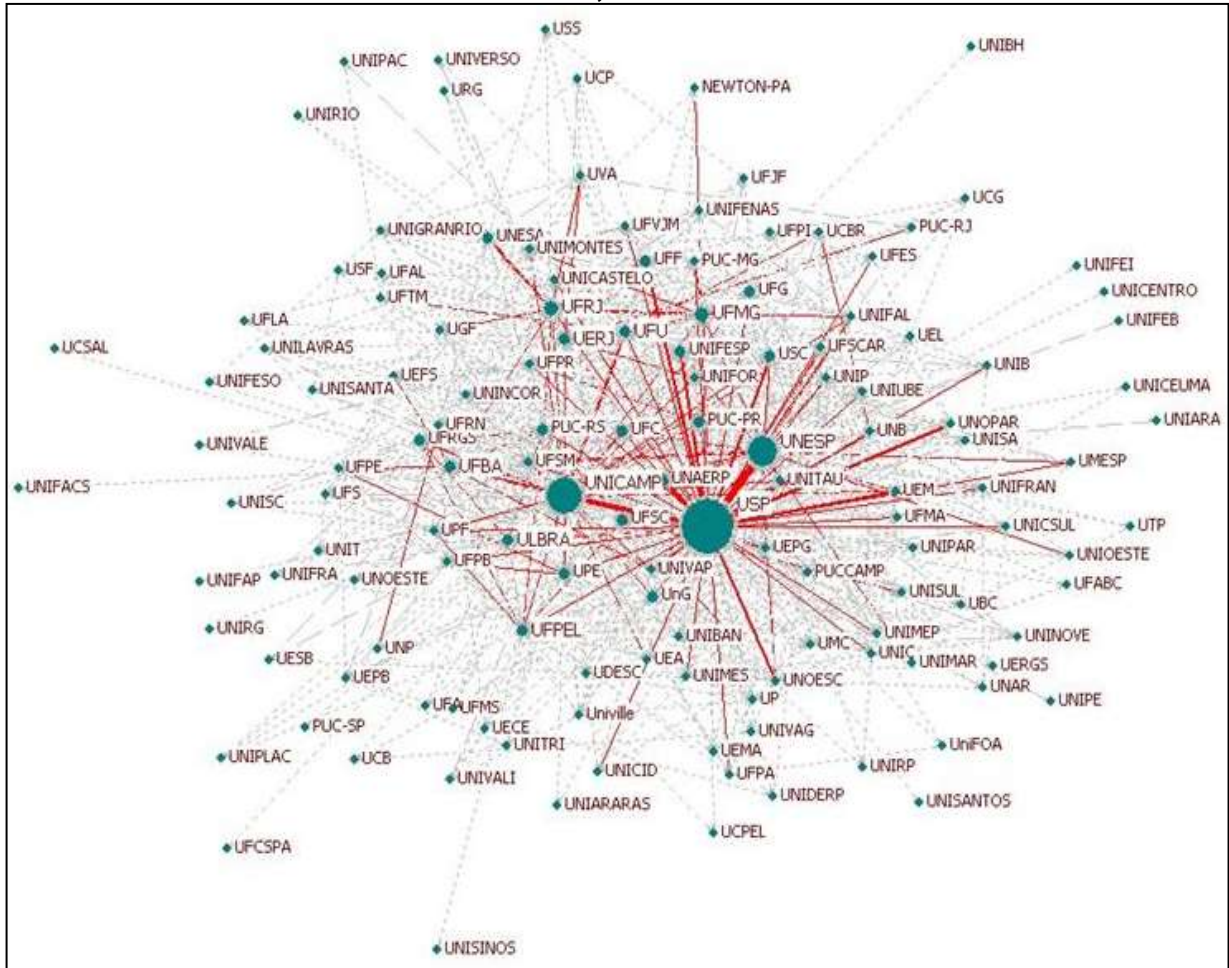
Universities	Degree	NrmDegree(%)	Universities	Betweenness	NBetweenness (%)	Universities	Farness	NCloseness(%)
USP	2644	3,8	USP	2550,3	24,4	USP	191	75,9
UNESP	1340	1,9	UNICAMP	2513,8	24,1	UNICAMP	194	74,7
UNICAMP	1309	1,9	UNESP	1852,1	17,7	UNESP	206	70,4
UFRJ	430	0,6	UFRJ	570,1	5,5	UFRJ	248	58,5
UFMG	305	0,4	UFBA	382,4	3,7	UFBA	264	54,9
PUC-RS	247	0,3	UFU	289,3	2,8	UNIFESP	265	54,7
UNAERP	236	0,3	ULBRA	277,9	2,7	UFSC	267	54,3
UERJ	234	0,3	UFPEL	257,1	2,5	PUC-RS	267	54,3
UFRGS	227	0,3	UERJ	253,9	2,4	UERJ	268	54,1
UFPEL	214	0,3	UFMG	245,9	2,4	UNAERP	268	54,1
UFU	201	0,3	UFRN	240,1	2,3	ULBRA	269	53,9

Universities	Degree	NrmDegree(%)	Universities	Betweenness	NBetweenness (%)	Universities	Farness	NCloseness(%)
UFBA	197	0,3	UFG	215,7	2,1	UFRN	269	53,9
ULBRA	194	0,3	UNIFESP	201,1	1,9	UFU	270	53,7
UNIFESP	191	0,3	UFSC	200,7	1,9	PUC-PR	272	53,3
UNOESC	187	0,3	UNIP	196,5	1,9	UFRGS	273	53,1
UFSM	186	0,3	PUC-RS	161,3	1,5	UFMG	274	52,9
USC	184	0,3	UFPA	151,4	1,4	UFPB	276	52,5
UFF	180	0,3	UFPB	116,1	1,1	UFG	276	52,5
UFSC	175	0,3	UNIMONTES	109,6	1,0	UFPEL	276	52,5
UNIVAP	157	0,2	UFRGS	102,4	1,0	UPE	278	52,2

3.1.2 Betweenness

The measure "betweenness" is the frequency with which a university occurs in the shortest paths connecting two others (FREEMAN; BORGATTI; WHITE, 1991). This parameter shows those universities which have collaborated with two other members of the same group which themselves have never worked together. Universities with greater betweenness are in a position of power since they control communication flows. Those with the greatest values of this parameter were: *Universidade de São Paulo (USP)*, *Universidade Estadual de Campinas (UNICAMP)*, *Universidade Estadual Paulista (Unesp)* and *Universidade Federal do Rio de Janeiro (UFRJ)*. The Figure 2 is a graphical representation of the 10 universities with the greatest values of betweenness. From Table 1, there also stand out the positions of *Universidade Federal da Bahia (UFBA)*, *Universidade Federal de Uberlândia (UFU)*, and *Universidade Luterana do Brasil (ULBRA)* which, while occupying positions 12, 10, and 13, respectively, in terms of nodal degree, now occupy positions 5, 6, and 7 in terms of betweenness. The contrary is the case for *Universidade Federal de Minas Gerais (UFMG)* which was ranked 5 in terms of nodal degree, but now is ranked 10 in terms of its betweenness.

Figure 2: Social network of national collaboration of the 10 universities with highest values of betweenness: USP, UNICAMP, UNESP, UFRJ, UFBA, UFU, ULBRA, UFPEL, UERJ, UFMG.



3.1.3 Closeness

A measure of a university's capacity to collaborate with others is its degree of closeness to the others. Closeness is calculated from an inverse of the mean distance of each university to the other universities in the network. Higher values of closeness suggest that there exists a greater capacity for collaboration. High values of both betweenness and closeness will indicate that this is an important actor (university) in the network.

One observes that the universities with the greatest capacity for collaboration are *Universidade de São Paulo (USP)*, *Universidade Estadual de Campinas (UNICAMP)*, and *Universidade Estadual Paulista (Unesp)*. There also stand out

Universidade Federal da Bahia (UFBA), *Universidade Federal de São Paulo (UNIFESP)*, and *Universidade Federal de Santa Catarina (UFSC)*. *Universidade Federal da Bahia (UFBA)* with a nodal degree of 197 (ranked nº 12) passes to being the 5th ranked in terms of closeness, i.e., in its capacity to collaborate with other universities. Similarly, *Universidade Federal de São Paulo (UNIFESP)* passes from position nº 14 in terms of nodal degree, to position nº 6 in terms of closeness. Both of these cases are due to their collaborations with universities of high centrality – *Universidade de São Paulo (USP)*, *Universidade Estadual Paulista (UNESP)*, and *Universidade Estadual de Campinas (UNICAMP)*. *Universidade Federal de Santa Catarina (UFSC)* also presents a marked jump upwards in ranking, passing from position nº 19 in terms of nodal degree to position nº 7 in terms of closeness.

3.1.4 Subgroups (Cliques)

The UCINET program uses the algorithm of Bron and Kerbosch (1973) to find all the cliques or subgroups within a network. A clique is a set of nodes – in our case universities – which have all the possible links between them (LUCE; PERRY, 1949). Using the threshold of a minimum of 8 nodes, a total of 34 cliques were found, of which 5 consisted of 9 nodes.

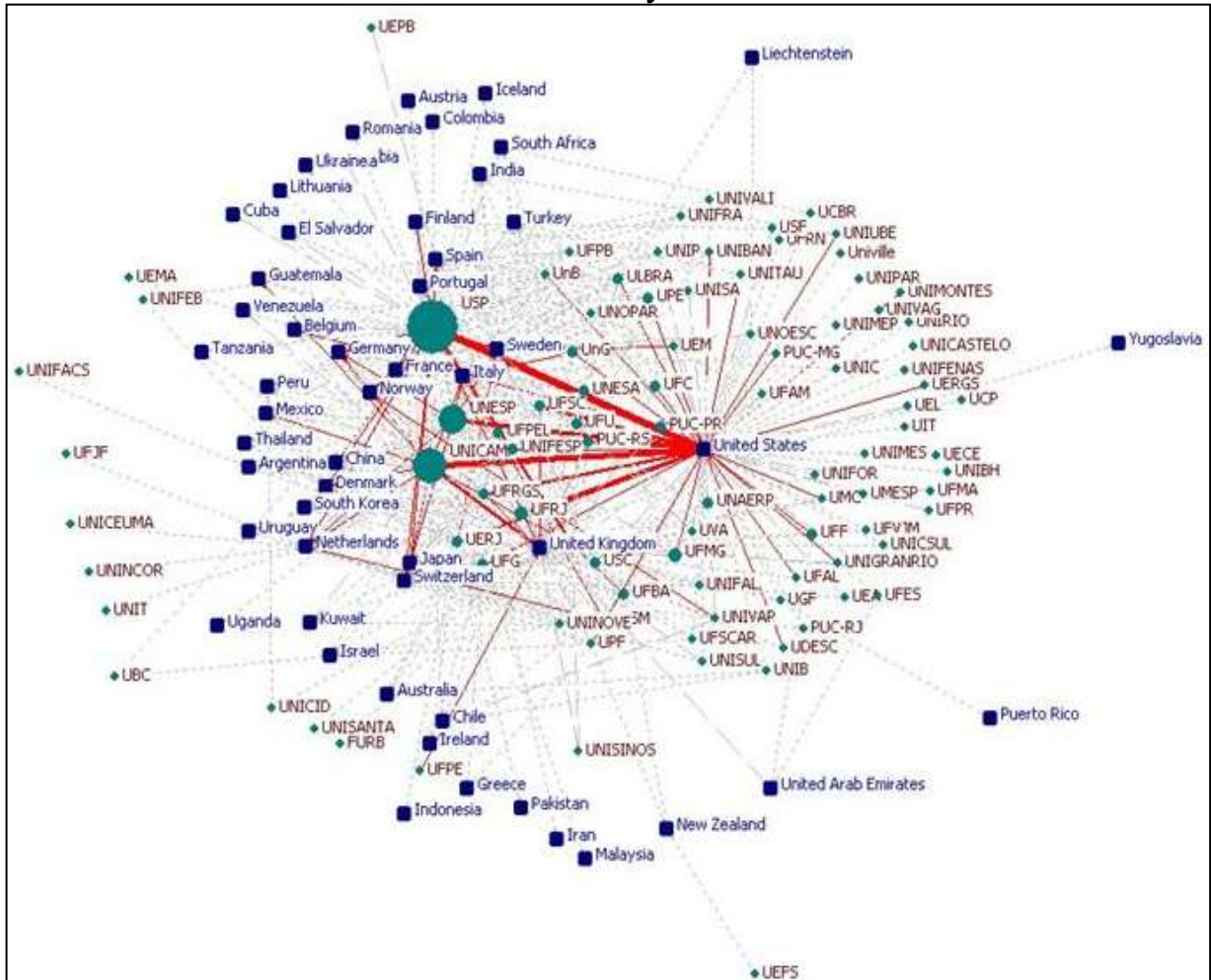
Analysis of the diagonal elements of the superposition matrix (the "co-membership matrix") gave the number of different cliques that each university belonged to. *Universidade de São Paulo (USP)* with 34, and *Universidade Estadual Paulista (UNESP)* and *Universidade Estadual de Campinas (UNICAMP)* with 33, were those that were members of most cliques, while 113 universities belonged to none of the cliques identified.

3.2 The International Collaboration Network of Brazilian Universities

Figure 3 is a graphical representation of the international collaboration network of Brazilian universities, constructed by selecting only those universities with at least one collaboration with a country other than Brazil as reflected in the articles

analyzed.

Figure 3: Social network of Brazilian universities' international collaboration in "Dentistry".

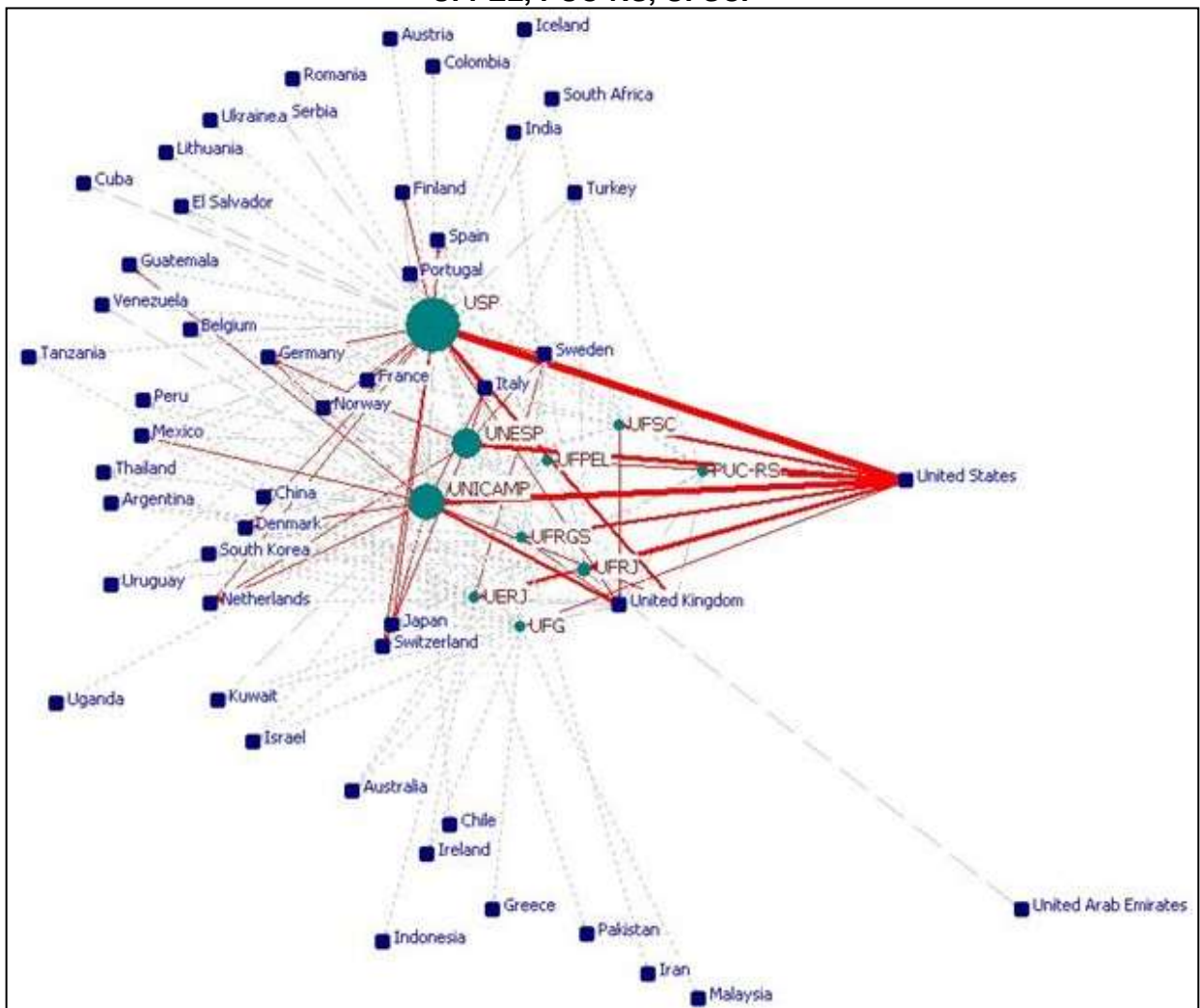


Collaboration in this case is in only one direction since the analysis is of Brazilian collaboration with the exterior. Hence this is a directed graph with the links between the nodes going in one direction (BORGATTI; EVERETT, 1997). The nodes represent the different universities and countries, and the links the number of collaborations, with their thickness depending on that number. As in the national collaboration case, the dotted lines represent fewer than 5 collaborations, the dashed lines between 5 and 10 collaborations, and the solid line over 10 collaborations. As an attribute of the network, we have included in the node of each university the number of records retrieved – the greater the number the larger the node. The

network is non-fragmented, having a single component. A network density – cohesion measure of the international collaborative network - is 8.4%.

As the matrix in this case corresponds to 2-mode data (universities and countries), the analysis of the centrality of the network provides separate centrality measures for universities and countries. Figure 4 shows the 10 universities with the highest nodal degree.

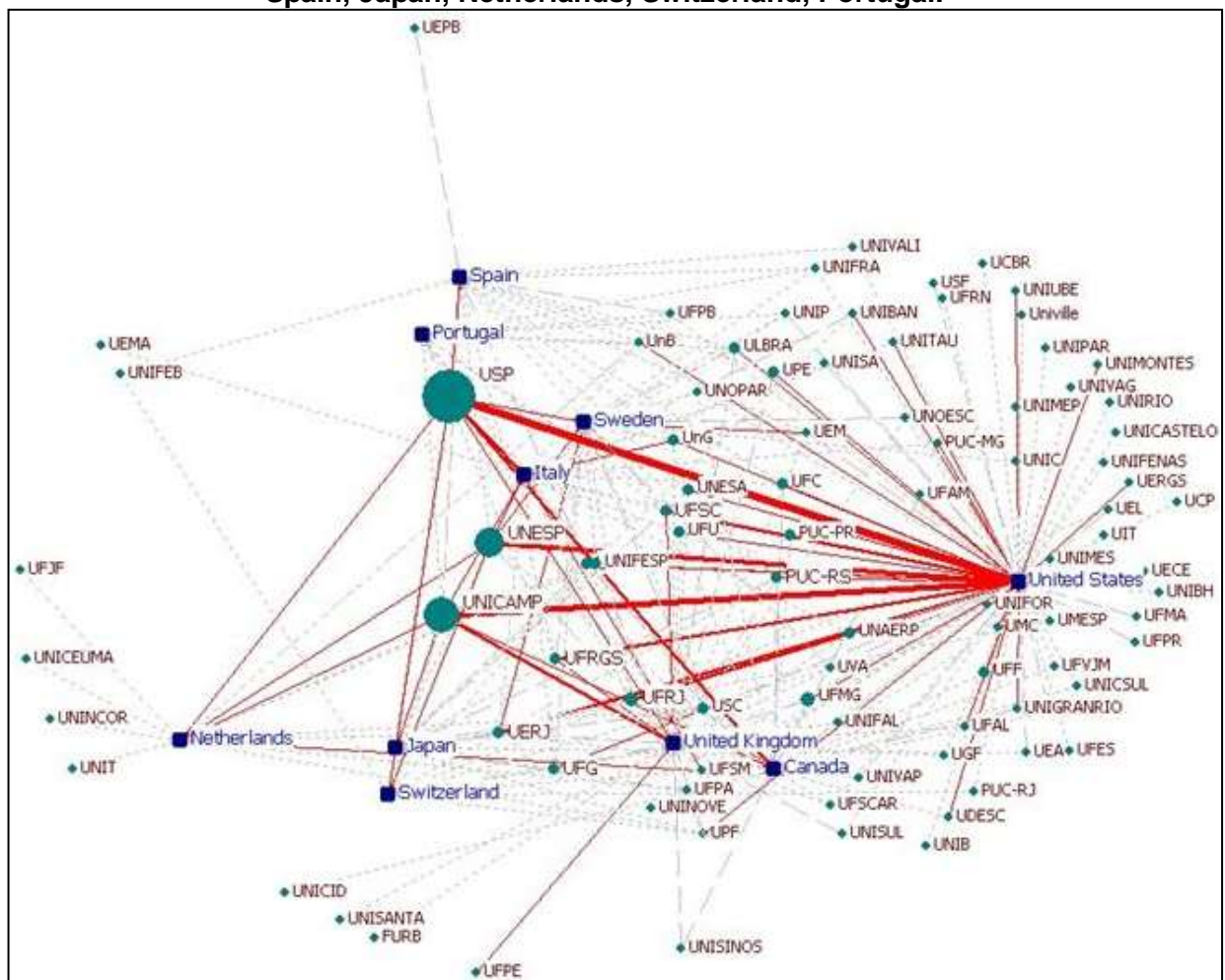
Figure 4: Social network of international collaboration of the 10 universities with the highest values of nodal degree: USP, UNICAMP, UNESP, UERJ, UFG, UFRJ, UFRGS, UFPEL, PUC-RS, UFSC.



There stand out in terms of their centrality *Universidade de São Paulo (USP)* and *Universidade Estadual de Campinas (UNICAMP)*. *Universidade de Passo Fundo (UPF)* occupies a noticeably relevant position in terms of betweenness.

Figure 5 shows the collaboration network of the 10 countries that obtained the highest values of nodal degree, the top six being United States, United Kingdom, Canada, Italy, Sweden, and Spain.

Figure 5: Social network of international collaboration of the 10 countries with the highest values of nodal degree: United States, United Kingdom, Canada, Italy, Sweden, Spain, Japan, Netherlands, Switzerland, Portugal.



4 CONCLUSION

The objective of this study has been to identify and analyze the scientific collaboration network of Brazilian universities which have published research in the Dentistry area. The methodological approach is readily applicable to other areas of science. It provides an instrument with which science policy makers can strengthen the effectiveness of research in the important area of Health Sciences represented by

Dentistry. In the present case, it has allowed us to identify the principal universities and research groups carrying out research in Dentistry in Brazil. It also provides the universities involved with the opportunity to use the results as a reference point to work towards becoming a member of one of the outstanding subgroups in this area of research.

The study shows the Brazilian university system to be fairly cohesive in the field of Dentistry; with apparently all the universities with research in this field being directly or indirectly related. *Universidade de São Paulo (USP)*, *Universidade Estadual Paulista (UNESP)*, *Universidade Estadual de Campinas (UNICAMP)* and *Universidade Federal do Rio de Janeiro (UFRJ)* are the universities most strongly connected in the network in terms of their number of collaborations. They also show themselves to be in privileged positions to monitor new information in the field and to disseminate it to other universities.

Other universities that stand out as being very well connected in the area are *Universidade Federal da Bahia (UFBA)*, *Universidade Federal de Uberlândia (UFU)*, and *Universidade Luterana do Brasil (ULBRA)*. *Universidade Federal da Bahia (UFBA)* has a leading position in terms of closeness and betweenness. This also makes it a major university in dental research in Brazil given its capacity for collaboration with other universities, and its potential role as intermediary between other universities which themselves have never worked together, a role that gives it the important potential of controlling and promoting the flow of information between those universities.

Of the 34 collaborative subgroups found (considering a minimum size of 8), five consisted of 9 universities and the rest of 8 institutions. Again, *Universidade de São Paulo (USP)*, *Universidade Estadual Paulista (UNESP)* and *Universidade Estadual de Campinas (UNICAMP)* stood out as being those belonging to most subgroups – 34 in the first case, and 33 the other two. Of the 146 universities studied, 43 did not belong to any of these collaborative subgroups. It would thus seem necessary for them to establish mechanisms by which they could approach some of those subgroups in their national research collaborations.

With respect to collaborations with institutions outside the country,

Universidade de São Paulo (USP) is again the dominant university in the network in all aspects of centrality: it has the most collaboration (nodal degree), the strongest character as an intermediate between other universities (betweenness), and the greatest collaboration capacity (closeness). Other universities that also stand out in the international network are *Universidade Estadual de Campinas* (UNICAMP), *Universidade Estadual Paulista* (UNESP) and *Universidade do Estado do Rio de Janeiro* (UERJ). *Universidade de Passo Fundo* (UPF) is also notable for its high values of betweenness connecting countries that have themselves not worked together through Brazilian universities, and of closeness with the different countries, reflecting a strong capacity for collaboration outside Brazil.

The countries preferred by Brazilian universities for collaboration are United States, United Kingdom, Canada, Italy, Switzerland, and Spain. Also notable in the international network are the collaborations with three Latin American countries – Argentina, Peru, and Mexico.

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Appendix A: Acronyms Used for the Brazilian Universities.

Acronyms	Universities
CESUPA	Centro Universitário do Pará
FURB	Universidade Regional de Blumenau
NEWTON-PA	Centro Universitário Newton Paiva
PUCCAMP	Pontifícia Universidade Católica de Campinas
PUC-MG	Pontifícia Universidade Católica de Minas Gerais
PUC-PR	Pontifícia Universidade Católica do Paraná
PUC-RJ	Pontifícia Universidade Católica do Rio de Janeiro
PUC-RS	Pontifícia Universidade Católica do Rio Grande do Sul
PUC-SP	Pontifícia Universidade Católica de São Paulo
UBC	Universidade Braz Cubas
UCB	Universidade Castelo Branco
UCBR	Universidade Católica de Brasília
UCG	Universidade Católica do Goiás
UCP	Universidade Católica de Petrópolis
UCPEL	Universidade Católica de Pelotas
UCS	Universidade de Caxias do Sul
UCSAL	Universidade Católica do Salvador
UDESC	Universidade do Estado de Santa Catarina
UEA	Universidade do Estado do Amazonas
UECE	Universidade Estadual do Ceará
UEFS	Universidade Estadual de Feira de Santana
UEL	Universidade Estadual de Londrina
UEM	Universidade Estadual de Maringá
UEMA	Universidade Estadual do Maranhão
UEPB	Universidade Estadual da Paraíba
UEPG	Universidade Estadual de Ponta Grossa
UERGS	Universidade Estadual do Rio Grande do Sul
UERJ	Universidade do Estado do Rio de Janeiro
UERN	Universidade do Estado do Rio Grande do Norte
UESB	Universidade Estadual do Sudoeste da Bahia
UFABC	Universidade Federal do Abc
UFAL	Universidade Federal de Alagoas
UFAM	Universidade Federal do Amazonas
UFBA	Universidade Federal da Bahia
UFC	Universidade Federal do Ceará
UFCG	Universidade Federal de Campina Grande
UFCSPA	Universidade Federal de Ciências da Saúde de Porto Alegre

Acronyms	Universities
UFES	Universidade Federal do Espírito Santo
UFF	Universidade Federal Fluminense
UFG	Universidade Federal de Goiás
UFJF	Universidade Federal de Juiz de Fora
UFLA	Universidade Federal de Lavras
UFMA	Universidade Federal do Maranhão
UFMG	Universidade Federal de Minas Gerais
UFMS	Universidade Federal de Mato Grosso do Sul
UFPA	Universidade Federal do Pará
UFPB	Universidade Federal da Paraíba
UFPE	Universidade Federal de Pernambuco
UFPEL	Universidade Federal de Pelotas
UFPI	Universidade Federal do Piauí
UFPR	Universidade Federal do Paraná
UFRGS	Universidade Federal do Rio Grande do Sul
UFRJ	Universidade Federal do Rio de Janeiro
UFRN	Universidade Federal do Rio Grande do Norte
UFRRJ	Universidade Federal Rural do Rio de Janeiro
UFS	Universidade Federal de Sergipe
UFSC	Universidade Federal de Santa Catarina
UFSCAR	Universidade Federal de São Carlos
UFSM	Universidade Federal de Santa Maria
UFTM	Universidade Federal do Triângulo Mineiro
UFU	Universidade Federal de Uberlândia
UFVJM	Universidade Federal dos Vales do Jequitinhonha e Mucuri
UGF	Universidade Gama Filho
UIT	Universidade de Itaúna
ULBRA	Universidade Luterana do Brasil
UMC	Universidade de Mogi das Cruzes
UMESP	Universidade Metodista de São Paulo
UNAERP	Universidade de Ribeirão Preto
UNAR	Centro Universitário de Araras
UNB	Universidade de Brasília
UNESA	Universidade Estácio de Sá
Unesp	Universidade Estadual Paulista "Júlio de Mesquita Filho"
UNG	Universidade de Guarulhos
UNIARA	Centro Universitário de Araraquara

Acronyms	Universities
UNIARARAS	Fundação Herminio Ometto
UNIB	Universidade Ibirapuera
UNIBAN	Universidade Bandeirantes de São Paulo
UNIBH	Centro Universitário de Belo Horizonte
UNIC	Universidade de Cuiabá
UNICAMP	Universidade Estadual de Campinas
UNICASTELO	Universidade Camilo Castelo Branco
UNICEUMA	Centro Universitário do Maranhão
UNICENTRO	Universidade Estadual do Centro Oeste
UNICID	Universidade Cidade de São Paulo
UNICSUL	Universidade Cruzeiro do Sul
UNIDERP	Universidade para o Desenvolvimento do Estado e da Região do Pantanal
UniEvangélica	Centro Universitário de Anápolis
UNIFACS	Universidade Salvador
UNIFAL	Universidade Federal de Alfenas
UNIFAP	Universidade Federal do Amapá
UNIFEB	Centro Universitário da Fundação Educacional de Barretos
UNIFEI	Universidade Federal de Itajubá
UNIFENAS	Universidade de Alfenas
UNIFESO	Centro Universitário Serra Dos Órgãos
UNIFESP	Universidade Federal de São Paulo
UniFOA	Centro Universitário de Volta Redonda
UNIFOR	Universidade de Fortaleza
UNIFRA	Centro Universitário Franciscano
UNIFRAN	Universidade de Franca
UNIGRANRIO	Universidade do Grande Rio
UNILAVRAS	Centro Universitário de Lavras
UNIMAR	Universidade de Marília
UNIMEP	Universidade Metodista de Piracicaba
UNIMES	Universidade Metropolitana de Santos
UNIMONTES	Universidade Estadual de Montes Claros
UNINCOR	Universidade Vale do Rio Verde
UNINOVE	Universidade Nove de Julho
UNIOESTE	Universidade Estadual do Oeste do Paraná
UNIP	Universidade Paulista
UNIPAC	Universidade Presidente Antônio Carlos
UNIPAR	Universidade Paranaense

Acronyms	Universities
UNIPE	Universidade de Ensino Superior do IPE
UNIPLAC	Universidade Planalto Catarinense
UNIRG	Universidade Regional de Gurupi
UNIRIO	Universidade do Rio de Janeiro
UNIRP	Centro Universitário de Rio Preto
UNISA	Universidade Santo Amaro
UNISANTA	Universidade de Santa Cecília
UNISANTOS	Universidade Católica de Santos
UNISC	Universidade de Santa Cruz do Sul
UNISINOS	Universidade do Vale do Rio dos Sinos
UNISUL	Universidade do Extremo Sul de Santa Catarina
UNIT	Universidade Tiradentes
UNITAU	Universidade de Taubaté
UNITRI	Centro Universitário Do Triângulo
UNIUBE	Universidade de Uberaba
UNIVAG	Centro Universitário de Várzea Grande
UNIVALE	Universidade Vale do Rio Doce
UNIVALI	Universidade do Vale do Itajaí
UNIVAP	Universidade do Vale do Paraíba
UNIVERSO	Universidade Salgado de Oliveira
Univille	Universidade da Região de Joinville
UNOESC	Universidade do Oeste de Santa Catarina
UNOESTE	Universidade do Oeste Paulista
UNOPAR	Universidade Norte do Paraná
UNP	Universidade Potiguar
UP	Universidade Positivo
UPE	Fundação Universidade de Pernambuco
UPF	Universidade de Passo Fundo
URG	Universidade do Rio Grande
USC	Universidade do Sagrado Coração
USF	Universidade São Francisco
USP	Universidade de São Paulo
USS	Universidade Severino Sombra
UTP	Universidade Tuiuti do Paraná
UVA	Universidade Veiga de Almeida



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