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The Development of Social Relationships in Local Retail Clusters: An Investigation Based on Network Analysis

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Abstract
The literature of business clusters has been studied in the last 30 years. However, the influence of networks' social relations on local retail clusters is not known, and what impacts they have on the economic development of their regions. This article explored the existing social relations between companies belonging to local retail clusters and regional economic developments in the Rio Grande do Sul. For this, 558 managers of companies belonging to 20 local retail clusters were interviewed. This study used a quantitative methodology. Structural properties of social relations were mapped using the UCINET software. Business clusters were grouped. The SNA measures and economic performances of such groups were analyzed and compared using the SPSS software, showing differences between them by applying the Teste Anova. We observed that business clusters with higher economic performance showed weak social relations in terms of density, number of ties, reciprocity, out-degree, indegree, and greater average distance. This article contributes to the literature of business clusters by investigating the social relations of local retail clusters using the SNA method. It also contributes to regional development by exploring the relationship between business clusters and regional service's gross value.
Keywords: Retailer Clusters. Social Networks Analysis. Regional Development.

O Desenvolvimento de Relações Sociais em Aglomerados Varejistas Locais: uma Investigação com Base na Análise de Redes

Resumo
A literatura de redes de aglomerações de empresas tem sido estudada nos últimos 30 anos. Porém, não se conhece com clareza a influência das relações sociais das redes nos aglomerados varejistas locais (LRCs), e quais impactos estes LRCs geram no

desenvolvimento econômico de suas regiões. Este artigo explorou as relações sociais existentes entre empresas pertencentes a LRCs e desenvolvimentos econômicos regional do Rio Grande do Sul. Para tanto, 558 gestores de empresas pertencentes a 20 LRCs foram entrevistados. Esse estudo empregou uma metodologia quantitativa. Propriedades estruturais das relações sociais foram mapeadas por meio do software UCINET. Aglomerados foram agrupados, sendo que as medidas de SNA e desempenhos econômicos de tais grupos foram analisadas e comparadas por meio do *software* SPSS, evidenciando-se diferenças entre eles por meio da aplicação do Teste Anova. Observou-se que aglomerados com maior desempenho econômico apresentaram relações sociais fracas em termos de densidade, número de laços, reciprocidade, *outdegree*, *indegree* e maior distância média. Este artigo contribui para a literatura de aglomerados ao investigar as relações sociais de LRCs a partir da utilização do método de SNA. Também, contribui para o desenvolvimento regional do ao explorar a relação entre aglomerações e o valor agregado bruto de serviço regional.
Palavras–chave: Aglomerados Varejistas Locais. Análise de Redes Sociais. Desenvolvimento Regional.

El Desarrollo de las Relaciones Sociales en los Grupos Minoristas: Una Investigación Basada en el Análisis de Redes

Resumen
La literatura sobre redes de aglomeraciones empresariales se ha estudiado durante los últimos 30 años. Sin embargo, no se conoce claramente la influencia de las relaciones sociales de las redes en las aglomeraciones minoristas locales (AVL) y qué impactos tienen estos AVL en el desarrollo económico de sus regiones. Este artículo exploró las relaciones sociales existentes entre las empresas pertenecientes a las AVL y los desarrollos económicos regionales en Rio Grande do Sul. Para ello, se entrevistó a 558 gerentes de empresas pertenecientes a 20 AVL. Este estudio empleó una metodología cuantitativa. Las propiedades estructurales de las relaciones sociales se mapearon utilizando el software UCINET. Se agruparon las aglomeraciones y se analizaron y compararon las medidas de SNA y el desempeño económico de dichos grupos utilizando el software SPSS, mostrando diferencias entre ellos mediante la aplicación del Test Anova. Se observó que las aglomeraciones con mayor desempeño económico mostraron débiles relaciones sociales en cuanto a densidad, número de vínculos, reciprocidad, *outdegree*, *indegree* y mayor distancia promedio. Este artículo contribuye a la literatura de aglomeraciones al investigar las relaciones sociales de AVL utilizando el método SNA. También contribuye al desarrollo regional al explorar la relación entre las aglomeraciones y el valor agregado bruto del servicio regional.
Palabras clave: Clusters Minoristas locales. Análisis de Redes Sociales. Desarrollo Regional.

1 Introduction

The paradigm that dominated most studies on strategy in Administration emphasizes competition as an essential element for the survival of economic agents. The purely competitive view on the strategic positioning of organizations has been enriched by the idea that organizations can coexist in the same environment while competing and cooperating to pursue individual and collective goals (HENDERSON, 1989; BRANDENBURGER; NALEBUFF, 1995). This complementarity of competitive and cooperative actions between companies occurs in Local Retail Clusters (LRCs). LRCs are groups of companies in the commercial sector that concentratedly operate in the urban sphere, sharing similar conditions of infrastructure, customers and suppliers (TELLER, 2008; TELLER; ELMS, 2012). Studies have already shown that LRCs

are relevant to metropolises and regions' development and prosperity (MEI-XIAN; ZHEN-QUAN; FEI, 2013) since geographical proximity favors the interaction between agents. It is noteworthy that even though there is no formal coordination between companies or a definition of a specific type of business, the established social networks foster cooperative actions in this context of intense competition.

This tension between cooperation and competition in networks has been studied, emphasizing the last 30 years. In this sense, studies demonstrate the structure of the network in clusters of companies (HE and GEBHARDT, 2014), as well as the nature of the established relationships that sustain the regions (BROWN, 1987) the flows of information and knowledge arising from these relationships (PROVAN; FISH; SYDOW, 2007), the understanding of the relationship structure (TELLER, 2008), and how relationships help stabilize or strengthen the strengths of a region. More recently, authors have incorporated analyzes on the impact of e-commerce on demand for commercial space and the reduction of physical retail, especially in clusters in developed countries (ZHANG; ZHU; YE, 2016). Some issues were not adequately understood in these studies, including the fact that the influence of informal social networks on LRCs is not known. Also, little progress has been made on the impact of these clusters on the economic development of their regions.

In this context, the general objective of this article is to explore the existing social relations between companies belonging to 20 LRCs and the data of regional economic developments in the state of Rio Grande do Sul. To do this, we aim to identify the social relationships of informal networks of companies belonging to retail clusters; compare such social relations with the economic development data of the clusters, and formulate proposals for future studies based on the discussion of findings with the literature

To this end, the study used descriptive and exploratory analyzes of the structural properties of the social networks of 558 companies belonging to 20 LRCs in the Rio Grande do Sul. The Social Network Analysis (SNA) perspective allowed exploring the social characteristics within the network of each cluster, such as information on the structure of relations between companies.

The results of each cluster were analyzed in the light of primary data on regional economic development published by the Government of the State of RS (FEE, 2017). It is worth highlighting that LRCs contribute significantly to the gross added value of services (VAB SERV), which, in turn, represent about 60% of the total GDP of the state of Rio Grande do Sul (FEE, 2017). This study contributes to the cluster literature by investigating the social relationships of LRCs using the SNA method. It also contributes to the analysis of LRCs in the southern region of Brazil.

The article is structured in five sections. The theoretical foundation discusses the LRC literature. The methodological section details the criteria for choosing the clusters, data collection techniques and includes summaries of the statistical tests performed in each of the stages of the investigation. The results of the research are then presented and discussed. From this discussion, propositions are elaborated for the direction of studies on the phenomenon. In section five, considerations are presented regarding the implications and limitations of the study.

2 Clusters

The term clusters in economic literature was introduced by Alfred Marshall in "Principles of economics: introductory treatise" and disseminated by Adna Weber in work entitled "The Growth of Cities in the 19th Century". The author considered economic forces, technological progress, the development of trade, and the territorial division of labor as the leading causes of the urban concentration of the population (WEBER, 1899). It also developed statistical methods for measuring clusters and studied their influence on national economic development (SHMIDT; ANTONYUK; FRANCINI, 2016).

In a more recent perspective, Shmidt, Antonyuk and Francini (2016) explain the phenomenon of clusterization by the characteristics of the territorial migration of the population preconditioned by the economic-natural, historical-economic and ethnic characteristics of the population. They also add the specificity of the network formed in the dispersion of villages united by spatial, economic and social connections. Other authors argue that clusters may be just the result of inertia - a local decision made at some point in the past, but without current relevance (BLOOMSTEIN; NIJKAMP; VAN VEEDENDAAL, 1980).

The literature identifies three forms of proximity between companies: geographical, organizational, and technological proximity. The coexistence between people in the exact geographical location facilitates the search for a certain product or service for the groups of consumers who frequent the place (TELLER, 2008; TELLER; ELMS, 2012) and can generate a great exchange of knowledge, as there is greater socialization among members, being a link of similarity that connects companies within a network. Regions that initially developed competencies concerning an industry obtain initial advantages and, with time, new entrants are forced to locate themselves within that dominant region. According to Hoyt (1939), cities are formed by radio concentric sectors along the main transport axes, with a certain homogeneity in land use along and in the vicinity of these roads (ARANHA; FIGOLI, 2001). In this sense, for example, companies organized in clusters benefit from the same transit infrastructure and transport systems.

In parallel, organizational proximity refers to the cultural, cognitive, social and institutional aspects between organizations (KNOBEN; OERLEMANS, 2006). Technological proximity concerns the technological knowledge base of organizations, in which the highest levels of knowledge generate greater sophistication of language and communication.

Clusters have positive and negative influences in the economic and social spheres (SHMIDT; ANTONYUK; FRANCINI, 2016). According to the central place's theoretical proposition, there is a direct and positive relationship between the population and the number and types of establishments present in a community (FIK, 1988; MULLIGAN, 1984).

From a political perspective, population limits provide economic development planners with an idea of the types of retail industries they can expect to find in their communities (THILMANY; MCKENNEY; MUSHINSKI; WEILER, 2004). From this perspective, the possibility of inter-municipal development arrangements arises (MAZZALI; NIERO, 2015). From the commercial perspective, there is the emergence of LRCs, which will be discussed in the next section.

3 Local Retail Clusters

In economic terms, clusters have a competitive orientation. Their formation originates either from a need to meet demand or productive aspects (GEREFFI, 1999; CANINA; ENZ; HARRISON, 2005). The literature on productive industrial clusters emphasizes the production efficiency of conventional industries, which come together to generate competitive advantages over competitors (PORTER, 1980). On the other hand, LRCs are a vital component of urban and suburban markets (TELLER, 2008).

Such groupings of establishments and service providers can be classified as to their origin as spontaneous or planned. Unlike planned clusters, which are created on purpose in a specific location and with administrative management (TELLER, 2008; TELLER; ELMS, 2012), spontaneously-created establishments are characterized by the absence of planning concerning constructions, to types of products offered to the population, and the lack of joint management concerning commercial issues. They are sometimes called "shopping streets", "open-air shopping", "shopping street" or "street market" (WEI; TIMMERMANS; DE, 2006; OZUDURU; VAROL; YALCINER-ERCOSKUN, 2014).

The principle of cumulative attraction proposed by Richard Nelson (1958) advocates that, among the several explanatory reasons in the evaluation of the location points of stores, the chosen location must be accessible to the area of influence, have the growth potential and be on the path taken by consumers: when there are more people, more infrastructure will be installed, and more people will circulate (DONAIRE; BOAVENTURA; SIQUEIRA; TELLES; ZACCARELLI, 2008). According to Chang and Tsou (2005), the main factor influencing retail location is the degree of urbanization of the economy and the breadth of the market.

A certain number of stores will be more likely to do business if they are located close to each other than if they are located far from each other (BROWN, 1987). Customers go shopping in these places for single or multiple purposes (ARENTZE; OPPEWAL; TIMMERMANS, 2005). The store's sales volume may occur due to the customer's interest shown in the specific items sold by it. Also, the sales may occur due to the customer's interest in items sold by nearby stores because of the opportunism of joint selling (which occurs when a client goes to the bakery to buy bread and ends up buying a magazine, for example) (ARANHA; FIGOLI, 2001).

In this sense, in seeking to maximize their attractiveness and the potential for sale or profit, retailers neglect the importance of thinking and acting collectively. Therefore, companies located in these centers cooperate and compete indirectly. Cooperation can take place either out of necessity or opportunity. Coopetition strengthens relationships between its owners, motivating the formation of social networks among them (BRANDENBURGER; NALEBUFF, 1995; BENGTSSON; KOCK, 2000). In this perspective of networks, when analyzing the stages of evolution of clusters, Donaire, Boaventura, Siqueira, Telles, and Zaccarelli (2008) argue that the most advanced stages of a cluster will occur only if there is governance. In this case, institutionalization patterns would occur in the network to control and align the actions of the participating organizations.

4 Methods & Procedures

For the development of this study, we used primary data obtained in conjunction with the Store Operational Diagnosis (DOL) project, coordinated by the Brazilian Micro and Small Business Support Service (SEBRAE / RS) in the Rio Grande do Sul. This project is part of a series of actions to support commercial companies as part of the "Mais Varejo" (More Retail) Program. The program seeks to increase the attractiveness and competitiveness of street retailers, making spaces more attractive to consumers, increasing public circulation, and increasing the visibility and sales of participating companies. The space revitalization projects are developed in the municipalities in partnership with public institutions, business entities and entrepreneurs.

The retail companies belonging to the studied clusters are small. Small and medium-sized companies do not have the vertical or horizontal specialization that makes them heavy, slow and costly. Besides, our country is composed mainly of small companies (SEBRAE, 2014). The study was carried out with small business owners to improve customer service and improve business management practices. To this end, municipalities with main shopping streets were selected, considering that each municipality corresponds to a retail cluster. Among the Regional Capitals, the Sub-Regional Centers and the Center Zone of the state of Rio Grande do Sul, the selected municipalities were: Bagé, Camaquã, Carazinho, Cruz Alta, Erechim, Getúlio Vargas, Ijuí, Lajeado, Marau, Passo Fundo, Rio Grande, Santa Cruz, Santo Ângelo, São Borja, Santana do Livramento, Sarandi, Sobradinho, Soledade, Tapejara and Uruguaiana.

These centers are configured as smaller clusters and operate restricted to their immediate area, have more than 10k inhabitants, and portray most of the state's clusters' reality. Besides, the clusters selected for the study do not have a large urban center equipped with shopping centers, considering that their presence could distort traditional patterns of retail activity (BROWN, 1987).

The chosen clusters are among the 145 in the state with the largest Gross Domestic Product (GDP), Gross Value Added (GVA) and Gross Value Added for Services (GVA SERV) (FEE, 2017). Gross Value Added (GVA) is a measure of performance that more adequately portrays the economic activity performed by the companies analyzed in the present study. The clusters were segmented into four different groups formed according to the cluster's GVA SERV - the sum of the GVA of the service segments' value ranges. These locations concentrate 22% of the total GVA and 15% of the total GDP of the state of Rio Grande do Sul. The metropolis of Porto Alegre and the Regional Capital of Caxias do Sul were excluded due to the concentration of 24% of the state's GDP, which could skew the research's results. We disaggregated the Frederico Westphalen Sub-Regional Center. Also, we disaggregated border clusters between the Rio Grande do Sul and Santa Catarina because they are located in the extreme north of Rio Grande do Sul and strongly influenced by the polarity of the western Santa Catarina's city (i.e., Capecó) (IBGE, 2007).

Table 1 shows the socioeconomic characteristics of the clusters in which the research was carried out. When dividing the sample into four groups according to the GVA service, we observed that Group 1 is comprised of 156 companies located in the region with the highest GVA in the study (between R$ 1,924,822 up to the highest value). Group 2 is comprised of 157 companies in the region with GVA between R$ 1,328,133 and R$ 1,924,821. Group 3 is comprised of 121 companies in the region with

GVA between R$ 709,307 and 1,328,132. Finally, group 4 contains 124 companies and has the lowest GVA (up to R $ 709,306).

Table 1 – Selected Cluster Group and correspondent GAV Serv and GDP data for 2014

Groups	**AVL**	**GAV SERV (thousand R$)***	**GDP (thousand R$)***
Group 1 GAV SERV between R$ 1.924.822 and R$ 5.291.266	Cruz Alta	1.924.822	2.678.502
	Erechim	2.181.366	4.096.603
	Lajeado	2.059.564	3.240.933
	Passo Fundo	5.291.266	7.385.322
	Rio Grande	4.313.001	7.355.045
	Santa Cruz do Sul	3.679.677	7.984.011
Group 2 GAV SERV between R$ 1.328.133 an R$ 1.924.821	Bagé	1.645.440	2.231.476
	Carazinho	1.498.468	2.163.639
	Ijuí	1.806.431	2.577.030
	Santo Ângelo	1.328.133	1.872.948
	Uruguaiana	1.556.646	2.295.321
Group 3 GAV SERV between R$709.307 and R$ 1.328.132	Camaquã	960.915	1.651.833
	Marau	709.307	1.660.333
	Sant'Ana do Livramento	1.079.275	1.459.030
	São Borja	914.754	1.505.300
Group 4 GAV SERV between R$ 709.306	Getúlio Vargas	270.540	445.219
	Sarandi	426.727	712.313
	Sobradinho	223.078	312.520
	Soledade	395.835	625.887
	Tapejara	315.701	683.784

Source: Elaborated by the authors
Note: * GDP e GAV SERV numbers are from 2014 (FEE, 2015)

Therefore, micro and small retail companies of goods and services from various segments (such as clothing, food, construction material) located in the central commercial area of their city were invited to participate in the research. This choice is supported by Yeates and Jones (1998). They argue that urban centers of traffic-oriented retail have interconnected facilities with high pedestrian traffic flows and can offer retailers advantages.

The primary data collection occurred in person, systematically and in a controlled environment so that the answers were provided without external interference and directly to the researcher. The team that carried out the data collection was composed of nine researchers with higher education in management and business, four of them post-graduated. The researchers were trained for a week to ensure that the collection was conducted in a standardized manner. In total, data collection reached 652 companies belonging to 20 LRCs. All respondents were interviewed in person *in loco*. Valid responses totaled 558 companies.

The collected data went through a Social Network Analysis (SNA) (RADOMSKY; SCHNEIDER, 2007). SNA is, in theory, applicable to any empirical subject and has stood out as an efficient instrument for studies regarding the interaction between actors (MIZRUCHI, 2006; BORGATTI; MEHRA; BRASS; LABIANCA, 2009). Examples of relationships studied in inter-organizational projects are knowledge transfer flows and information exchange relationships (PRYKE, 2012). In this study, SNA allowed for the mapping of the structural properties of the social relations of commercial clusters (PRYKE, 2012). Respondents were asked to respond to a single provocation regarding their relationships in the cluster: "In the list below, identify the companies that you know the owner or manager personally". We delivered a printed list to each respondent. The list detailed the other managers' names belonging to the same cluster as the respondent.

The SNA metrics used in the analysis for comparison include density, number of ties, average distance, reciprocity, out-degree and indegree. **Density** is configured as the level of connectivity between network organizations (PROVAN; FISH; SYDOW, 2007). It is calculated based on the proportion between links on the network over the total number of possible links. Density can be related to the strength of the ties formed between the companies. In this sense, **Ties** refer to the establishment of links between companies. The number of ties includes the number of companies with which each company individually relates (WASSERMAN; FAUST, 1994). **Average distance** refers to the shortest path a company takes to access another company and shows the number of relationships between them (SCOTT; CARRINGTON, 2011). **Reciprocity** is measured by the division between the number of ties considered reciprocal and the total number of ties (BORGATTI; EVERETT; JOHNSON, 2013). The existence of many reciprocal ties indicates asymmetry in the relationships between companies (HANNEMAN; RIDDLE, 2005; KADUSHIN, 2012) and high levels of mutual recognition between companies making their relationship positive.

We measure network dynamics through the homogeneity or heterogeneity of the actors' **centralization degree** (SCOTT, 2009). The greater the centralization, the greater the probability that few predominant actors will make the others peripheral (WASSERMAN; FAUST, 1994). Thus, in networks with low centralization, relations are more dispersed, with connections spread more evenly. In this sense, *in-degree* and *out-degree* are configured as centrality measures based on the number of direct links maintained by an organization with others on the network (PROVAN; FISH; SYDOW, 2007). Centrality concerns how much a company's assets (for example, its resources, information, and customers) are transiting between companies. ***In-degree*** refers to the flow of assets entering a company's network (originated from another network company). At the same time, ***Out-degree*** is a measure of centrality that refers to the flow of assets sent from a company to other companies in the network.

These elements can also contemplate the flow of receiving and/ or sending resources, customers and information between companies in a way to demonstrate the position that a particular company occupies in the network (PROVAN; FISH; SYDOW, 2007).

Calculations of SNA metrics were performed using UCINET 6.0 software. Statistical tests for analysis of SNA measurements between the designated groups were performed using the SPSS v. 19 software. The comparison and examination of the groups' differences were carried out by applying the Anova Test (HAIR; BABIN; MONEY; SAMOUEL, 2009). A descriptive analysis was also carried out to explore each of the four groups' characteristics concerning the ANS measures. The results are presented in the next section.

5 Analysis & Discussion of Results

The studied clusters were born spontaneously and organically due to the attractive force of geographical proximity, as discussed in the literature by Wei, Timmermans and De (2006), Ozuduru, Varol and Yalciner-Ercoskun (2014). None of them are in the last stages of cluster formation (DONAIRE; BOAVENTURA; SIQUEIRA; TELLES; RELLI, 2008). The companies belonging to the analyzed clusters indicated establishing alliances and partnerships of an informal nature (TELLER, 2008; TELLER; ELMS, 2012).

Initially, the results demonstrate that the simple geographic proximity in retail clusters does not strengthen social relations between those involved. Table 2 shows the descriptive analysis of the social networks of the selected clusters

Table 2 – Descriptive Analysis of the Social Networks of the Selected Clusters

Local Retail Cluster (LRC)	Number of companies belonging to the LRC	Density	Total number of ties	Reciprocity	Average Distance (Level of Separation)
Bagé	43,00	0,17	313,00	0,17	217,00
Camaquã	17,00	0,57	219,00	0,52	132,00
Carazinho	34,00	0,40	477,00	0,34	164,00
Cruz Alta	44,00	0,47	549,00	0,41	154,00
Erechim	36,00	0,41	518,00	0,37	162,00
Getúlio Vargas	31,00	0,61	575,00	0,61	139,00
Ijui	41,00	0,30	498,00	0,37	180,00
Lajeado	15,00	0,26	161,00	0,28	155,00
Marau	32,00	0,58	539,00	0,59	144,00
Passo Fundo	43,00	0,25	469,00	0,37	185,00
Rio Grande	21,00	0,30	251,00	0,34	164,00
Santa Cruz do Sul	16,00	0,25	138,00	0,27	182,00
Santana do Livramento	55,00	0,26	779,00	0,26	178,00
Santo Ângelo	44,00	0,38	729,00	0,40	167,00
São Borja	39,00	0,27	589,00	0,23	164,00
Sarandi	39,00	0,57	848,00	0,48	143,00
Sobradinho	21,00	0,72	304,00	0,61	127,00
Soledade	28,00	0,59	448,00	0,56	142,00
Tapejara	29,00	0,58	414,00	0,52	141,00
Uruguaiana	26,00	0,15	283,00	0,20	224,00
Média		0,40	455,05 (67%)	0,39	163,20

Source: Elaborated by the authors

These findings confirm the proposals of previous studies on the cooperation between companies and reinforce the need for a third party to induce cooperation activities (VERSCHOORE; BALESTRIN, 2011). As can be seen in the table, density and reciprocity presented data below 0.50, i.e., there is a low level of connectivity between network organizations (PROVAN; FISH; SYDOW, 2007), and there is an asymmetry in the relationships between companies (HANNEMAN; RIDDLE, 2005; KADUSHIN, 2012). Public agents motivate companies to interact and exchange information on the network by executing activities that will lead them to strengthen their social and business relationships (LUNDBERG; JOHANSON, 2011).

Although the cluster companies all belong to the same geographic region, to the same context and focus on street retail, the lack of governmental entities active in managing the clusters contributes to the low number of social relations between those involved (BATHELT; GLUCKLER, 2011).

P1 Proposition. *The geographic proximity in local retail clusters does not strengthen the social relationships between the participants.*

The Social Network Analysis results indicated an uncooperative stance of the companies belonging to the clusters, explained in part by the absence of a formal organization (WEI; TIMMERMANS; DE, 2006; OZUDURU; VAROL; YALCINER-ERCOSKUN, 2014). As a result, companies end up obtaining benefits from geographical proximity, such as the high circulation of customers on the streets where they are located. Still, they cannot develop more elaborate joint actions. These results allow us to formulate two propositions about LRCs:

P2 Proposition. *The geographic proximity in local retail clusters does not make cooperative actions of greater complexity more feasible.*

For analysis, the clusters were separated into four groups, as summarized in Table 3. These four groups of clusters presented statistically significant differences in the SNA indicators analyzed. Group 4 (with a lower range of GVA SERV up to R$ 709,306) showed higher density (Sig 0,000) and reciprocity (Sig 0,000) when compared to the results presented by the other groups.

Table 3 - Results of the Social Network Analysis evaluation

Indicators	Group	N	Average	Standard Deviation	Average Standard Error
Density	1	156	0,3443	0,00758	0,09464
	2	157	0,3022	0,00764	0,09577
	3	121	0,3755	0,01364	0,15009
	4	124	0,6033	0,00425	0,04728
Number of Ties	1	156	409,6282	12,53709	156,58823
	2	157	502,6433	12,92236	161,91669
	3	121	600,1570	15,50402	170,54418
	4	124	554,5484	17,47378	194,57974
Average Distance	1	156	166,8077	1,02633	12,81890
	2	157	184,6178	1,83472	22,98900
	3	121	160,3636	1,49766	16,47422
	4	124	139,4677	0,45090	5,02099
Reciprocity	1	156	0,3587	0,00373	0,04660
	2	157	0,3184	0,00720	0,09027
	3	121	0,3602	0,01418	0,15602
	4	124	0,5463	0,00472	0,05252
Outdegree	1	156	14326,9231	718,77593	8977,50843
	2	157	12242,0382	619,87084	7766,95934

	3	121	15148,7603	836,71445	9203,85893
	4	124	17895,1613	600,26860	6684,30822
Indegree	1	156	14102,5641	704,42178	8798,22525
	2	157	12496,8153	582,95402	7304,39296
	3	121	15140,4959	739,60247	8135,62719
	4	124	18822,5806	645,14654	7184,04781

Source: Elaborated by the authors

Nevertheless, the results also pointed out differences between the groups. According to Table 4, which presents the results of the Anova test, it is possible to verify the significance of the differences in the averages between the six SNA indicators analyzed. The results indicate a statistically significant difference between the four groups with regard to density ($F = 228.597$, $p < 0.05$), number of tiers ($F = 32.350$, $p < 0.05$), average distance ($F = 185.369$, $p < 0.05$), reciprocity ($F = 155.300$, $p > 0.05$), outdegree ($F = 11.113$, $p > 0.05$) and indegree ($F = 15.582$, $p < 0.05$). This difference pointed out in the results indicates that group 4, characterized by a lower GVA SERV, is denser, reciprocal, has a shorter average distance, and has a greater number of ties between companies than the other groups with higher GVA SERV.

Table 4 – Anova

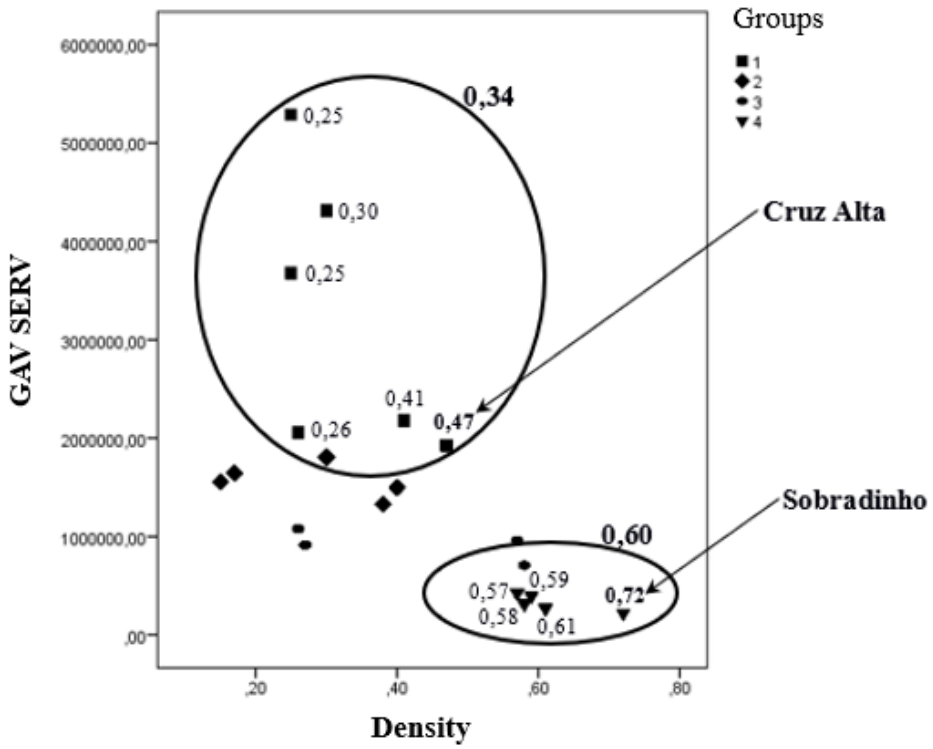
Indicators		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Density	Between Groups	7,177	3	2,392	228,597	0,000
	Within Groups	5,798	554	0,010		
	Total	12,975	557			
Number of Ties	Between Groups	2809468,031	3	936489,344	32,350	0,000
	Within Groups	16037609,19	554	28948,753		
	Total	18847077,22	557			
Average Distance	Between Groups	144130,074	3	48043,358	185,369	0,000
	Within Groups	143584,172	554	259,177		
	Total	287714,246	557			
Reciprocity	Between Groups	4,094	3	1,365	155,300	0,000
	Within Groups	4,868	554	0,009		
	Total	8,962	557			
Outdegree	Between Groups	2260457713,311	3	753485904,437	11,113	0,000
	Within Groups	37564088881,671	554	67805214,588		
	Total	39824546594,982	557			
Indegree	Between Groups	2920522983,234	3	973507661,078	15,582	0,000
	Within Groups	34612315726,444	554	62477104,199		
	Total	37532838709,677	557			

Source: Elaborated by the authors

In this sense, retailers located in economically less developed Local Retail Clusters have a more intense relational proximity, which allows them to act cooperatively and exchange information more easily (KNOBEN; OERLEMANS, 2006). Image 1 and Image 2 illustrate these findings at the LRC level. Among the municipalities in group 4, the LRC of Sobradinho stands out in terms of high density and high reciprocity of social ties, with values of 0.72 and 0.61, respectively. At the other extreme, among the municipalities in group 1 with the highest GAV SERV, the

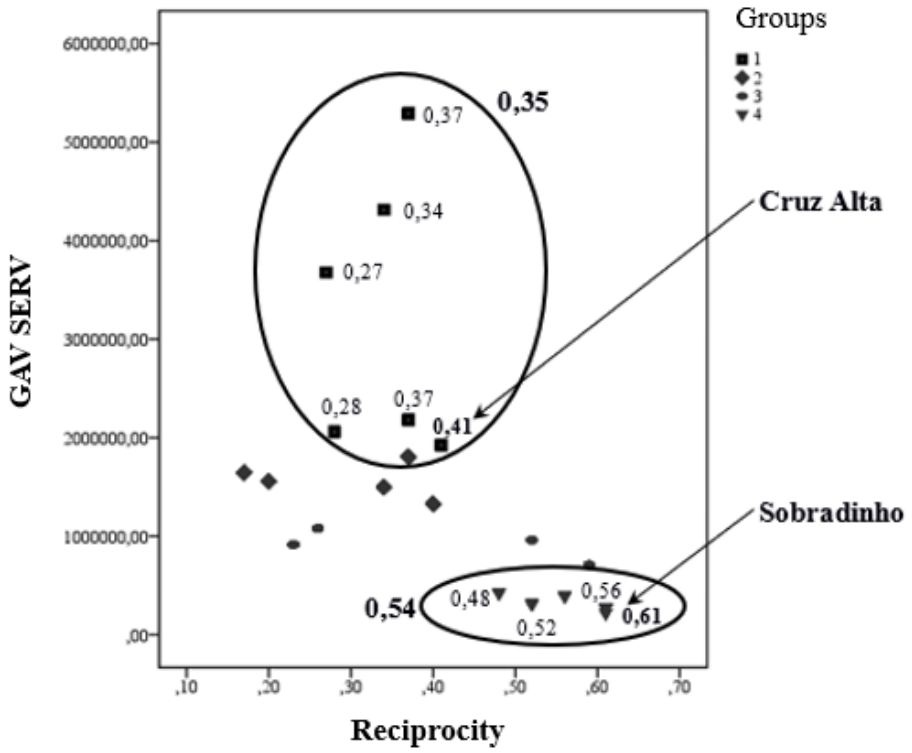
Cruz Alta LRC stands out in terms of low density (0.47) and low reciprocity of social ties (0.41).

Image 1: Cluster Groups Analyzed by Density



Source: Elaborated by the authors

Image 2: Cluster Groups Analyzed by Reciprocity



Source: Elaborated by the authors

The findings reinforce the theoretical assumptions of the organic growth of the LRCs, as a large number of customers with purchasing power are attracted to the location, which attracts even more stores to the region's commerce (DONAIRE; BOAVENTURA; SIQUEIRA; TELLES; ZACCARELLI, 2008). LRCs in more economically developed municipalities possibly have more resources available for investments in infrastructure. The revitalization of public roads and leisure spaces are benefited by these resources, making shopping streets more attractive for the circulation of people. On the other hand, LRCs in economically less developed municipalities might have fewer resources available for investments in infrastructure. The lack of resources may require companies to be more involved in developing the Local Retail Cluster. There is a need for a local organization, which results in greater social interactions between companies in the retail cluster. Proposition P3 summarizes this finding:

P3 Proposition. *The lower the economic potential of a municipality, the stronger the social relations between the companies in the local retail cluster.*

This study advances in a proposition that expands the theoretical framework of clusters. Through the visualization of the panorama outlined, this study raises a reflection about the retail sector. Online retail has been approached, in the literature of LRCs, as a substitute or complement to physical retail (ZHANG; ZHU; YE, 2016). The popularization of digital technologies and increased sales through online commerce have influenced the retail industry's spatial arrangement. Thus, new structural features for the spatial patterns of these industries are being created (CHANG; TSOU, 2005). With the advent of the internet, numerous applications have been changing the form of marketing and various practices associated with retail Administration, such as supply chain management, marketing, payment methods, and customer relationships (GALINARI; JUNIOR; JUNIOR; RAWET, 2015).

The three propositions of this study are summarized in Chart 1.

Chart 1 – Study Propositions

Number	Proposition
P1	*The geographic proximity in local retail clusters does not strengthen the social relationships between the participants.*
P2	*The geographic proximity in local retail clusters does not make cooperative actions of greater complexity more feasible.*
P3	*The lower the economic potential of a municipality, the stronger the social relations between the companies in the local retail cluster.*

Source: Elaborated by the authors

The propositions generated in this work broaden the debate about LRCs, providing new avenues for studies and new managerial approaches to promote and develop initiatives.

6 Final Considerations

This study aimed to explore the existing social relationships between companies belonging to 20 LRCs and the data on regional economic development in the Rio Grande do Sul. Through a quantitative approach and using the Social Network Analysis method, it became possible to present the clusters where social relations are stronger and show that, in clusters with higher Gross Value Added of Services, these relations are weaker, in terms of density, number of ties, reciprocity, out-degree, indegree, and greater average distance. This way, the study contributes to retail mapping clusters, the regional development of the regions studied, and the social relations existing between the companies in these clusters. This study goes on to show that there is a relationship between the low level of development of specific regions that have stronger social relationships. The union between entrepreneurs is necessary for places with less infrastructure and resources than other regions. Understanding the relationship between regional economic development and the dynamics that occur in LRCs is highly relevant to public policies. Governments can develop programs strategically targeted at low GVA regions, bringing the entrepreneur to the center of the stage to develop such projects. Based on these results, it is believed that there will be a more significant role for the entrepreneurs of these local LRCs with low regional GVA, as they show more cohesion within the informal networks in which they participate.

Despite the contributions made in this study, there are some limitations. The survey covered a single region of the country and selected some specific metrics to meet the objectives of the study. Therefore, to better understand the relationship between economic development and social relations, it is suggested that future studies use metrics of development analysis at the business level. Looking at the billing data of clusters companies could serve as a performance metric for assessing the clusters' performance.

Also, qualitative questions that deepen the understanding of what information is shared between companies in the clusters could help researchers better understand what information is transmitted in the communication flows between the actors and, consequently, what knowledge is created and shared inside clusters.

In this assertion, other units of analysis in comparative studies between clusters at the national level, between developed and developing countries may be an interesting topic to be explored in future research. Future research may also explore the influence of the increase in e-commerce in the regions in recent years and its impact on physical commerce activities. The increase in the clusters' access to digital technologies may influence retailers to disconnect locally. Besides, it can generate less information exchange and less socialization of knowledge among members, causing retailers to lose the social ties that connect them in a Local Retail Cluster. The migration of retailers to online commerce will increase their online social network, interaction with online customers, and other retail companies that operate globally. As a result, it will bring about a decrease in local social ties with retailers that are located in the same physical space. Therefore, given this scenario, it is suggested that future studies assess whether there is any relationship between *the scope of e-commerce* and *the social relationships that exist between companies in the Local Retail*

Cluster. Is it likely that clusters of greater regional economic development and low social relationships have easier access to retail e-commerce? Would there be a relationship between the possible occurrence of a reduction in social interaction between retailers belonging to the same cluster as e-commerce is consolidated in the region? These studies can assess whether internet shopping reduces consumers' dependence on physical commerce and influences disconnection and weakening of relationships between local retailers.

Therefore, there are future possibilities for expanding the understanding of clusters and understanding their contribution to regional, national, international and electronic development. Understanding the existing relationships between retail companies can expand the scope of studies and the literature on clusters, development of regions, and the retail sector. We hope that this study will make it possible to broaden the academic debate in this regard.

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