

## USE OF SOCIAL NETWORK ANALYSIS TO IDENTIFY THE COOPETITION IN A COMMERCIAL CLUSTER PLAN

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### ABSTRACT

*The cluster provides a greater commercial relationship between the companies that comprise it. This encourages companies to adopt competitive structures that allow solving problems that would hardly alone (Lubeck et al., 2011). With that this paper aims to describe the coopetition between companies operating on a commercial cluster planned, from the point of view of retailers, taking as a basis the theoretical models proposed by Bengtsson and Kock (1999) and Leon (2005) and operationalized by means of Social Network Analysis (SNA). Data collection consisted of two phases, the first exploratory aspect to identify the actors, and the second was characterized as descriptive as it aims to describe the coopetition among the enterprises. As a result we identified the companies that cooperate and compete simultaneously (coopetition), firms that only compete, companies just cooperate and businesses that do not compete and do not cooperate (coexistence)*

**Keywords:** *commercial cluster, core / periphery, coopetition*

### 1. INTRODUCTION

The commercial cluster, corporate conglomerate, provides better relationship between the companies comprising it, which is major factor, because relationships between the participants are created, causing them to exchange information and knowledge. It encourages the companies to adopt competitive structures allowing for solution of issues which they would hardly do severally (LUBECK *et. al.*, 2011). At the same time in which the companies cooperate, they compete thus creating a duality referred to as coopetition, which is found in clusters and networks of companies.

It is noted that the coopetition study is relevant to understand how the relationships between competing companies take place, mainly in the corporate conglomerates. By means of interactions created in networks between companies a company may develop and expand its businesses Bengtsson and Kock (1999).

The research issue presented is: how to identify the coopetition in a planned commercial cluster? The aim of this essay is describing coopetition between companies present in a planned commercial cluster, on the point of view of the retailers, being based on the theoretical models proposed by Bengtsson and Kock (1999) and Leão (2005) and operationalized by Analysis of Social Networks (ASN).

The work structure is comprised of five sections, including this introduction. In the following topic brief literature review is presented of the theoretical concepts which supported the study. In the third section description of the methodology used in the research is made. The fourth presents and analyzes the results found, also pointing out in the fifth the main study conclusions.

## 2. BIBLIOGRAPHIC REVIEW

This reference is comprised of three parts, to wit: commercial clusters, Analysis of Social Networks and competition which shall serve to analyze the data.

### 2.1 Commercial clusters

The commercial clusters, as defined by Teller and Reutterer (2008) and Teller and Elms (2010) are retail conglomerates specialized in a determined spatial area. They are rated as spontaneous, specialized trading streets arising out spontaneously and, planned meeting the interest of an organizer and usually located in easily accessible places and parking lot, as the shopping malls. For Teller (2008), in both cases grouping of stores may bring benefits and synergy to the traders.

The aspect of proximity between the stores in the commercial clusters benefits the companies and the consumers, by cooperation and competition occurring simultaneously between the companies located therein, thus increasing the customer flow in the stores and the number of product options for the consumers. It is also noted that the commercial companies established therein tend to share infrastructure costs between each other (Bachion, Abe & Monforte, 2011; Teller & Reutterer, 2008).

Cooperation, according to Anderson and Narus (1990, p. 45), may be defined as “situations in which separate parties work together to reach mutual goals or individual goals with reciprocity throughout time”. For Jonsson and Zineldin (2003), cooperation activities represent primary means that each company has to keep or improve their results, a joint effort so as to obtain mutual goals and benefits, which are essential to develop trust.

For this work, cooperation was defined as the mutual help between companies. According to Campos *et al.* (2003, p.25) “cooperating is acting together, coordinately, in the work or social relations to attain common goals. The people cooperate for the pleasure to share activities or to obtain mutual benefits”. Thus, it is construed that in a commercial cluster appointment of another store when a customer does not find what he/she wants at the store he/she is in is common. By proceeding this way the storekeepers mutually help each other for the purpose of reinforcing the relationships between them and obtaining mutual financial returns later. Telles *et al.* (2011) reported presence of cooperation between bars in the regions of Vila Madalena, state of São Paulo, for example.

### 2.2 Analysis of Social Networks

Throughout the last decades, the number of researches related to the theme of social networks has increased. Some of these researchers, such as for example, Stephen Borgatti and Virginie Lopez-Kidwell have tried to create a theory of the social networks based on the focus on the relationships (Borgatti *et al* 2009; Wellman 1983). Borgatti and Lopez-Kidwell by means of their studies rated two related types of theory of networks, one based on information flows and another one on relations uniting the individuals in a collective action (Borgatti and Lopez-Kidwell, 2011). The studies aimed at Analysis of Social Networks (SNA) have intensified (Burt, Kilduff & Tasselli, 2013), because, the social networks acquire major dimensions for comprehension of the dynamics of the organizational environment (PASCOTTO *et al.*, 2013), being able to be construed as a relationship chain (Masteralexis, Barr and Hums, 2009) which is created as of interaction between different subjects (Kirschbaum, 2006; Pinto & Junqueira, 2009).

Such interactions take place mainly by communication and shared knowledge, which intensifies the pace of the information exchanged and reciprocity of actions between individuals, as well as between organizations. The individuals agglomerate into groups searching for results and opportunities for interaction which somehow may benefit them (Burt, Kilduff & Tasselli, 2013). Thus, the group individuals due to the level of connectivity develop similar points of view, i.e., similar opinions and behaviors, because communication inside the group is more frequent and fluent than between different groups (Burt, 1992).

In this regard, existence of social networks (SNA) depends on a multiple and complex reality, in which recognition of the importance of interaction inside the group, considering definition of common goals, makes possible for construction of a social cloth (Masteralexis, Barr & Hums, 2009; Pinto & Junqueira, 2009) which comprises a network of relationships.

Marteleto (2001, p. 72) states a network of relationships as being “a set of autonomous participants gathering ideas and resources around shared values and interests”. These may be construed as an operative reality of mental constructs, symbolically established by us (actors) that can be people or organizations, being able to allow for understanding of the social reality and surpassing of the social issues accruing over the different actors (Silveira *et al.*, 2011).

In the meanwhile, the capacity of interconnecting the individuals into a network is intensified according to the frequency of the communication between them (Cross & Cummings, 2004). Thus, the ties of connectivity allow for viewing abilities not seen before which are made by exchange of information and knowledge between the actors in the network (Cross & Thomas, 2009; Silveira *et al.*, 2011).

Analysis of Social Networks makes possible for showing quality in the receipt of the information passed to the individuals comprising the network, improving both the individual performance and the performance of the network as a whole (Cross & Cummings, 2004). Thus, the interaction process (relationship) between the network members allow for generation of knowledge, settlement of mutual issues, as well as improvement in the learning of certain strategic practices.

The members of a network comprise smaller groups, sub-groups. These have specific properties of the relationships between them, named cohesion. The importance of studying cohesion in the sub-groups is given to the fact that there are social forces in direct contacts between their members, by indirect conduct transmitted by the intermediate parties or by relative cohesion inside the sub-group in relation to those out of it. The greater the direct contact between its actors, or by means of intermediate parties, more homogeneous (cohesive) the group will be; similarly, the lower such contact, less cohesive, the lower the homogeneity (Wasserman & Faust, 2009). A group with common goals will require greater internal cohesion to reach them, because it will need greater internal interaction to the group. Similarly, this is valid for the sub-groups (Granovetter, 1973).

Para Hanneman (2005) the actors of a sub-group may prefer to relate only with actors of their own sub-group, reinforcing the bounds between such relationships as well as, actors from a sub-group may prefer to relate only with other actors out of their sub-group. Thus, the author reports that there is a core concentrating many relationships and a periphery having few relationships. The core members may also have relationships with those of the periphery as well as those of the periphery may also have relationships with those of the core.

Borgatti and Everett (1999) report that there are two classes of knots for the core/periphery model. According to the authors there is a more cohesive core in which the actors are more strongly connected between each other and, a class of actors with lower cohesion to which they are more weakly connected named periphery.

Expressed in a matrix with four quadrants, as per Figure 1, the model proposed identifies the quadrant I as the core in which its components are strongly related between each other; in quadrant II one notes that some knots of the core are related to some knots of the periphery; in quadrant III some knots of the periphery are related to some knots of the core and, in quadrant IV few knots of the periphery are related to few knots of the periphery (Borgatti & Everett, 1999). An example of the statements is in Figure 2.

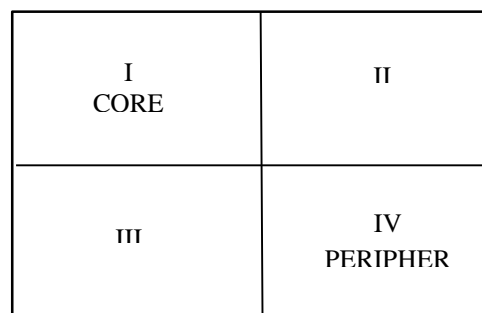


Figure 1. Core/Periphery Structure  
Source: Borgatti and Everett (1999)

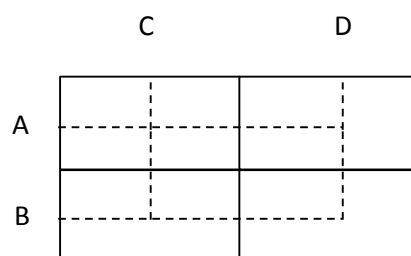


Figure 2. Example core/periphery model in the relationship between four companies  
Source: the authors

Observing Figure 2 one can note that quadrant I shows the strong relationship between the companies A and C (greater cohesion), because both are at the core; in quadrant II one notes that company A in the core is related to company D which is in the periphery, this relationship is not so strong; as well as in quadrant III one notes that company B present in the periphery is related to company C of the core; in quadrant IV the companies B and D are in the periphery, indicating that the relationship between them is weaker (lower cohesion). The relationship is strong or weak, as the actors have more or less number of relationships between them (greater or lower cohesion).

The relationship in the sub-groups comprising a cluster has as characteristics cooperation and competition (PORTER, 1998), but one of them prevails. Bengtsson and Kock (2000) and Nalebuff and Brandenburger (1996) argue that between two companies there may be simultaneously these characteristics.

### 2.3 Coopetition

The effects deriving from agglomeration of companies help creating a bigger market, because the geographic concentration creates complementarities which develop the market (Nalebuff and Brandenburger, 1996), usual in commercial clusters. The authors describe as an example the Broadway and off Broadway in New York, the several companies present in these locations are competitors for fighting for the same audience and become complementary when an orchestra uses a theater stage to present a concert. Such group attracts an audience which, in turn, attracts new companies. Another example of complementary products described by the authors are funding and insurance for cars, by safety someone who purchases a vehicle also acquires an insurance, as well as may also acquire a bank funding, thus both products are complementary and help selling the car.

As described, the complementary elements make the cake grow, i.e., they create values by gathering. By proceeding as such, they comprise the cooperation but, sharing the cake causes some to stay with a bigger part and others with a smaller part. In such regard, there is competition (Nalebuff & Brandenburger, 1996).

In the competition, the relationships are of conflict and rivalry among competitors, cooperation involves participation in collective actions with common goals (Bengtsson & Kock, 2000). In commercial clusters there is competition and there is internal cooperation, the companies establish a relationship of either competing or cooperating, such interaction is referred to as coopetition (Nalebuff & Brandenburger, 1996).

Leão (2005) analyzed several theoretical coopetition models and proposed a theoretical model for analysis of the coopetition, based on Bengtsson and Kock (1999), comprised of four quadrants: coopetition, competition, coexistence and cooperation, as per Figure 3.

COOPERATION	IV COOPERATION	I COOPETITION
	III COEXISTENCE	II COMPETITION
	COMPETITION	

Figure 3. Theoretical model proposed for coopetition analysis  
Source: adapted from Bengtsson and Kock (1999) and Leão (2005)

According to the author in quadrant I (coopetition) there is presence of cooperation and competition in any intensity; in quadrant II there is only competition with absence of cooperation; quadrant III is characterized by inexistence of competition and cooperation and in quadrant IV there is presence of cooperation and inexistence of competition.

### 3. METHODOLOGY

The data survey was comprised of two stages. The first one had an exploratory aspect, so as to identify the commercial cluster's actors to elaborate the data gathering instrument.

The planned commercial cluster chosen was a shopping mall specialized in vehicles, located in a municipality near the capital city of São Paulo, named Shopping K, selected by considering the accessibility of the researchers. Managers or sellers of the stores comprising the mall were researched, after due authorization of its administration.

For such, the researchers went on site mapping the existing stores. Twenty six car stores were found, one truck store, eight service provider stores (forwarder, financing companies and insurance companies, among others and also the administration), which amounts to 35 possible participants. Three car stores and one service provider did not allow for application of the questionnaire, reducing the sample to 31 participants.

On a second stage, the research was characterized as descriptive, because “it aimed at describing the characteristics of the situation involving an issue” (Boyd, 1978, p. 317). In such case, describing the cooperation between companies present in a planned commercial cluster on the point of view of the retailers.

The data gathering was made feasible by a questionnaire comprised of two blocks of questions: the first one aimed at identifying the company’s characteristics (size, dimension, type of vehicle traded, among others). The second block was comprised of two questions which aimed at identifying cooperation and competition. These were rendered operational by the use of a scale with values between zero (0) to five (5) as shown below.

**Question 1.** Cooperation – With which frequency when a customer looks for a car I don’t have, I appoint this store?

0= I don’t know this company.

3= Sometimes.

1= Never.

4= Frequently.

2= Rarely.

5= Very frequently.

**Question 2.** Competition – With which frequency you think this store competes with you?

0 = we’re not competitors

1 = we compete occasionally

2 = we compete sometimes

3 = we’re competitors

4 = we’re direct competitors customarily

5 = it’s my big competitor here in the mall

Each storekeeper identified in each question the intensity with which they cooperate and compete with each of the remaining participants of the cluster under study. The data was tabulated with the Excel software and, later, the Ucinet software was used for identification of the core/periphery relationship.

#### 4. PRESENTATION AND ANALYSIS OF THE RESULTS

The commercial cluster sells different types of cars, as shown in Table 1. It is noted that the stores which trade new and used passenger cars and only used passenger cars represent 23%, stores of used cars and utility trucks and new and used cars and utility trucks report 16%. Stores selling only used utility trucks and new and used utility trucks represent 3%. It was verified the presence of 13% of service providers and 3% of trucks and services. No companies selling only new cars and concessionaires of the car assemblers installed in the country were identified.

Table 1: Types of products traded at the cluster.

Product sold by the stores	Amount	Percentage
Only used passenger cars	7	23%
Only new and used passenger cars	7	23%
Only used utility trucks	1	3%
Only new and used utility trucks	1	3%
Used cars and utility trucks	5	16%
New and used cars and utility trucks	5	16%
Trucks and insurances	1	3%
Services	4	13%
	<b>31</b>	<b>100%</b>

Source: made by the authors.

In order to identify the size of the stores, the number of collaborators in each company was used as reference, according to table 2. As reference, the SEBRAE criteria were used as basis. The predominance of micro-companies (90%) and the small amount of small-sized companies (10%) was verified.

Table 2: Size of the companies in the commercial cluster

Company Size	Amount of Employees	Researched Companies	
		Amount	Percentage
Micro-companies	Up to 9	28	90%
Small-sized companies	From 10 to 49	3	10%
		<b>31</b>	<b>100%</b>

Source: made by the authors.

Concentration of specific retail of a type of product, in a same geographic location, characterizes the mall as a commercial cluster (Teller & Reuttere, 2008; Teller & Elms, 2010). The several stores comprising it associate with each other forming a chain of relationships (Masteralexis, Barr & Hums, 2009) which is established as of interaction between different individuals (Kirschbaum, 2006; Pinto & Junqueira, 2009). The importance of interaction in the group, considering definition of common goals, makes possible for building a social cloth (Masteralexis, Barr & Hums, 2009; Pinto & Junqueira, 2009) which creates a network of relationships.

Such network created is comprised of sub-groups having specific properties of the relationships generated between each other, named cohesion. In order to measure cohesion of the sub-groups created and check how the relationships between them occur, the core/periphery model was used in the questions related to competition and cooperation, as per Figures 4 and 5. For Wasserman and Faust (2009) the greater the direct contact between its actors, or by means of intermediate parties, the more homogeneous (cohesive) the group will be; similarly, the smaller the contact, less cohesive, there shall be less homogeneity.

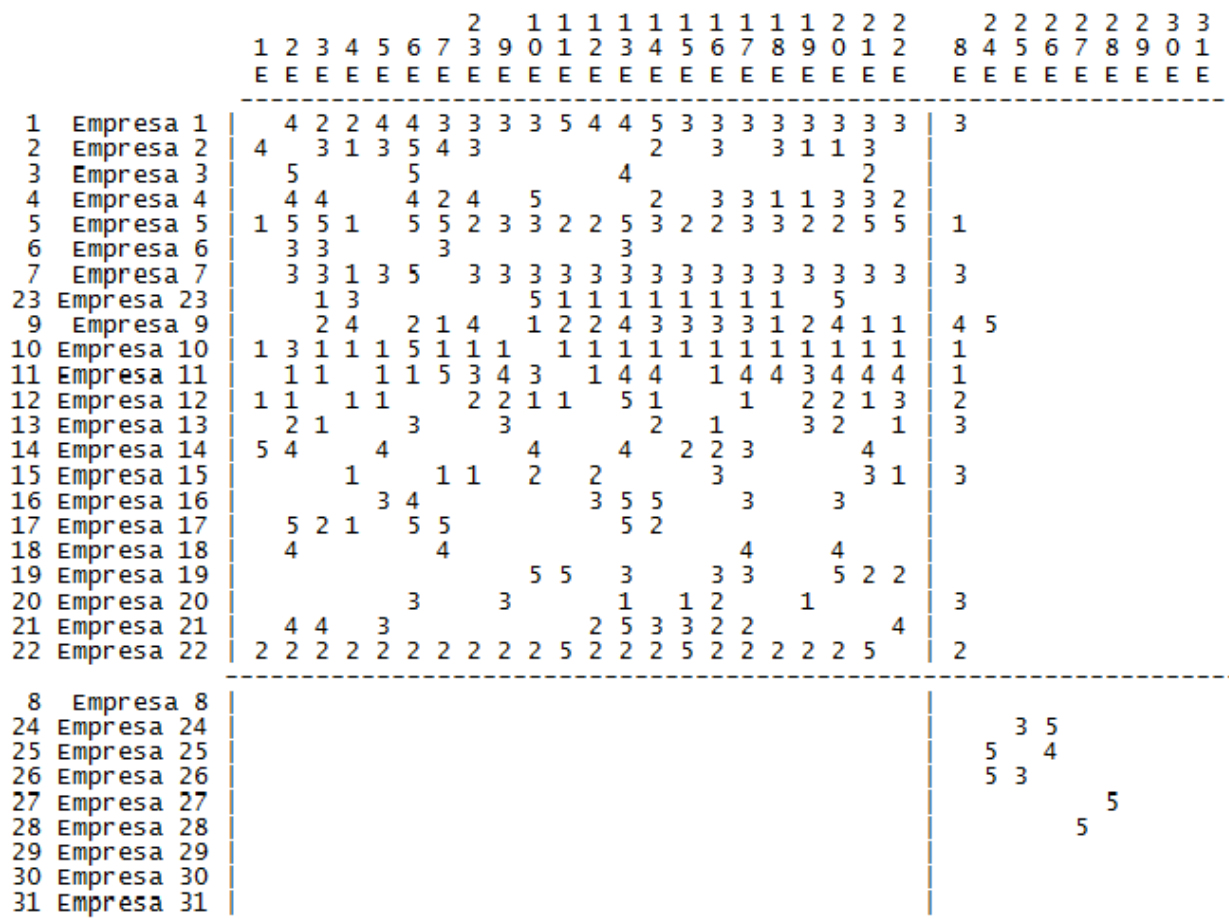


Figure 4. core periphery competition  
 Source: the authors



It can be seen in Figure 4 according to the perceptions of the interviewees that in the core, quadrant I, there is strong competition between the companies 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 and 23. In quadrant II some core companies (1, 5, 7, 9, 10, 11, 12 and 13) compete with few periphery companies (8 and 24). Quadrant III has no competition, i.e., no periphery company competes with the core companies. In quadrant IV one may note that competition takes place only between the companies 24, 25, 26, 27 and 28 which are in the periphery, the companies 8, 29, 30 and 31 do not compete between each other or with the core companies, as stressed by Borgatti and Everett (1999) few knots of the periphery are related to few knots of the periphery.

	1	2	3	4	6	7	9	10	11	12	13	14	16	17	18	19	20	21	22	23	24	25	26	27	28	5	8	15	18	29	30	31	
1 Empresa 1	5	3	1	4	3	2	5	2	3	2	5	2	3	2	2	5	2	4	2	2	1	2	2	2	2	1	4	2	2	1	3		
2 Empresa 2	4			2	4	3	3	5		5		5		2	3	2	4	1	1	3		3			1	3	4				1		
3 Empresa 3	5			3	3		5		5		5	3														5	5						
4 Empresa 4	4	4			4	4	2	5			5		2	3				4	3	1		4	3		1	4	4	2					
26 Empresa 26	5	5	5	5		5	5		5	3	5		5	5	5	5	2	5	5	5	5	5	5	5	5	2	3	5	5				
6 Empresa 6	3			3		1		3		3			3	3												3		3					
7 Empresa 7	1	2		5	4		5	1	4	1		1	1	1	1	5		1	2	1	1	1	1	1	1	1	5	5	1	1			
30 Empresa 30	1	1	1	1	1	1	1	1	1	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
9 Empresa 9		2	4	3	2	2	5		5	3	5	4	3	1	3	1		1	4	1	2	4	3	4	2	4	3	1	3				
24 Empresa 24	2	5	5	5		5	5		5		5		4	3	4	3		5	5	4	5	1	4	3	2	5			4	3			
11 Empresa 11	1	1	1	1	5	1	1	4	4	5		1	2	1	3	5	5	1	1	5	1	1	4	5	3	5	1	3	3	5	1		
29 Empresa 29	4	5		2		2	1	5		2		2	3	1	5			4	3	1	1	2	3	3	2	1		2	1	3			
13 Empresa 13				3		4	3	4	2	4	1				3					2				2	4	1	4	1					
14 Empresa 14	3	3			5		2	5		5		5	4		4	2	5							3			2	5	4	5			
21 Empresa 21		4	2		5		5		5		5		3		2	5		5			2					2	5	4	5				
16 Empresa 16				3		3		4		3	3	4	4	3				3	3	3		3		3		3							
28 Empresa 28	3	4	4	4		4	3	4		3		3	3	2	3			3	4	3	3	3		3	2	3					2		
10 Empresa 10					2	3					5																					5	
5 Empresa 5											5																					2	
20 Empresa 20											5																						5
18 Empresa 18				4				4	2		5																						4
12 Empresa 12				2		5	4	2																									5
23 Empresa 23				2	3	5					5																						5
17 Empresa 17				2	3	1	5	2	3	4		5			4	3																	5
8 Empresa 8							4	3		2	4	4	2		5					2													2
19 Empresa 19	1	1	1	1	4	1	1	5	1	5	3		1	1	2	3	5	2	1	4	1	1	1	1	1								3
27 Empresa 27																																	
25 Empresa 25							4																										2
22 Empresa 22							5	2	3	5		3	4		2																		3
15 Empresa 15				2	2	1	3		2	2																							1
31 Empresa 31																																	2

Figure 5. core periphery cooperation  
Source: the authors

It can be noted in Figure 5, according to the perceptions of the interviewees, that there is cooperation between the core and the periphery groups. In the core (quadrant I) the companies 1, 2, 3, 4, 6, 7, 9, 11, 13, 14, 16, 21, 24, 26, 28, 29 and 30 strongly cooperate between each other; in quadrant II the core companies 1, 2, 4, 6, 7, 9, 11, 13, 14, 16, 24, 26, 28, 29 and 30 cooperate with the periphery companies 5, 8, 10, 12, 15, 17, 18, 19, 20, 22, 23, 25, 27, and 31. In quadrant III the periphery companies 5, 8, 10, 12, 15, 17, 18, 19, 20, 22, 23, 25 and 31 cooperate with the core companies 1, 2, 3, 4, 6, 7, 9, 11, 13, 14, 16, 21, 24, 26, 28, 29 and 30, it is noted that the company 27 from the periphery does not cooperate with any core company. In quadrant IV the periphery companies 5, 8, 10, 12, 15, 17, 18, 19, 20, 22, 23, 25 and 31 have little cooperation between each other, once again it is stressed that company 27 does not cooperate with any other periphery company. Few knots from the periphery are related to few knots from the periphery (Borgatti & Everett, 1999).

Once identified the simultaneous presence of competition and cooperation between the cluster companies, existence of coepetition is verified (Bengtsson & Kock , 2000; Nalebuff & Brandenburger ,1996). Thus, it is necessary to know, according to the theoretical model of Leão (2005), which companies only compete, which companies only cooperate, which exercise coepetition and which do not exercise cooperation and competition.

For such, in Figures 4 and 5 the common companies to both charts which are located in the core were taken, because, as exposed the cohesion is greater in such quadrant. The result obtained from such crossing allows for identifying who cooperates and competes simultaneously (coopetition) with greater intensity, as a result, the companies 1, 2, 3, 4, 6, 7, 9, 11, 13, 14, 16 and 21 were found. The companies which only compete are: 5, 10, 12, 15, 17, 18, 19, 20, 22 and 23. The companies which only cooperate are: 24, 26, 28, 29 and 30. As a consequence, the companies which do not compete and do not cooperate are in the coexistence, which is represented by the companies 8, 25, 27 and 31, according to Figure 6. It is important to stress that this identification occurs at the time of application of this research, i.e., at another time researched there may be different results to those found.

COOPERATION	IV COOPERATION 24,26,28,29 & 30	I COOPETITION 1,2,3,4,6,7,9,11,13,14,16 & 21
	III COEXISTENCE 8, 25,27 & 31	II COMPETITION 5, 10, 12, 15, 17,18,19,20, 22 & 23
	COMPETITION	

Figure 6. Rating of the companies

Source: adapted from Bengtsson and Kock (1999) and Leão (2005) based on data found

In coexistence, according to the vision of the interviewees, the companies 8 and 31 are highlighted, which trade cars and trucks respectively, contrary to other companies which are service providers. A fact that calls the attention is a company which trades cars and does not cooperate and compete with its similar companies and such evidence may be exploited in future studies.

Based on the amount of companies rated in the quadrants (Figure 6) it may be verified that competition was identified in this commercial cluster and that it has a greater focus on competition than in cooperation between the companies.

## CONCLUSIONS

The aim of this essay was describing coopetition between companies present in a planned commercial cluster on the point of view of the retailers. Application of the theoretical model developed by Leão (2005), based on Bengtsson and Kock (1999), allowed for identifying the companies which cooperate, compete, coopete and coexist, as shown previously.

The relevance of using as a toll the analysis of social networks, core/periphery, is noted, which made possible for identifying coopetition in a planned commercial cluster, as well as operationalizing the theoretical model proposed by Leão (2005).

For new essays, we suggest development of means for applying the scale proposed by Leão (2005), so as to measure the degree of competition, cooperation, coopetition and coexistence present in organization networks. We also suggest replication of the study in industrial clusters.

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