

## **Factors that Disrupt Cooperation in Local Productive Arrangements: a Quantitative Study in the Clothing Sector in Tobias Barreto, Sergipe**

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### **ABSTRACT**

Due to the competitive environment faced by micro and small enterprises (MSEs) and the limitations caused by their size, these firms often seek solutions through new forms of organization, such as local productive arrangements (LPAs). Most articles on LPAs focus on the factors motivating the creation of these arrangements, while only a few analyze the factors that hinder cooperation in this type of network. The objective of this article is to identify the factors that can lead to disarticulation among the participants in the LPA formed by small clothing manufacturers in the city of Tobias Barreto, Sergipe. The study is quantitative in nature, based on the responses to 224 questionnaires answered by representatives of companies listed in the public record as participating in this LPA. We applied the Mann-Whitney test to analyze the hypotheses and univariate logistic regression to shed light on what factors have this influence. The results of the survey show that the number of participants, the lack of trust among them and the appearance of opportunistic behavior are the factors that contribute to disarticulation among the actors in local productive arrangements.

**Keywords:** Local productive arrangement (LPA). MSEs. Clothing sector. Disarticulation. Tobias Barreto.

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## 1 INTRODUCTION

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ith the increasing openness of the global economy, new theories and forms of business organization have appeared to attempt to enhance competitiveness, especially among micro and small enterprises (MSEs). These structures are mainly based on inter-firm collaboration, seen as an alternative for firms to survive the continuous changes in the business environment caused by expansion of consumer markets, demand for higher quality and the need for innovation, among other factors.

In response to macroeconomic changes in recent years, firms, especially MSEs, have perceived the need to establish more direct contacts with each other to be able to compete better and gain an edge on those that work alone. These companies, due to the inherent disadvantages of their size, have a high mortality rate. A study by the Brazilian Service to Support Micro and Small Enterprises (SEBRAE, 2011) indicated that 26.9% of them do not survive more than two years. In face of these difficulties, it is important to find ways to raise the chances of survival.

In this respect, according to Amato Neto (2000), new forms of organization among companies arise. As indicated by Verschoore (2006), due to the current economic situation, inter-organizational networks have appeared as a new structure to meet the needs of these firms, among them industrial districts, joint ventures, strategic alliances, clusters and local productive arrangements (LPAs).

Specifically regarding LPAs, Cassiolatto and Lastres (2001) argued that this type of agglomeration is fundamental in developing countries like Brazil, because it promotes regional growth and helps micro and small businesses to overcome barriers that impede their growth, by increasing efficiency and facilitating access to distant markets.

In this context of industrial agglomerations, in 2002 a project was launched in Brazil by SEBRAE, similar to one in Italy, called the PROMOs project. The stated aim was to promote the development of the regions previously chosen. Among the regions included in the project was that centered on the municipality of Tobias Barreto, in the state of Sergipe. The resulting local productive arrangement formed is the subject of this article.

Studies of cooperative arrangements among small firms mostly focus on the motives for their formation and the benefits of the cooperation to the participants (WEGNER; ZEN;

ANDINO, 2011). However, according to Lima (2007), the focus on successful cases of inter-organizational cooperative arrangements has resulted in a dearth of studies of the causes and/or reasons that lead to the failure of these arrangements.

The importance of cooperation as a basic factor for the formation of agglomerates among firms has been the focus of many studies, mainly in Europe and the United States. In Brazil this theme is fairly recent and there has been little theoretical development, according to Castro, Bulgacov and Hoffmann (2011).

The main focus of this study is to identify the factors that disrupt cooperation, from the perspective of entrepreneurs participating in the local productive arrangement among clothing producers in Tobias Barreto, in the state of Sergipe. Formally put, we analyze the following question: What are the factors that can disrupt the collaboration among the actors of the clothing-maker LPA in Tobias Barreto?

Our aim is to make a contribution to the literature on collaborative arrangements among micro and small enterprises, specifically in the wearing apparel sector, by identifying the factors that lead to disarticulation and lack of cooperation among the participants in the Tobias Barreto LPA. For this purpose, we identify the types of relationships currently existing among the actors of this LPA and verify what elements work to disrupt this LPA.

This article is organized into seven sections including this introduction. The second reviews the theory on LPAs; the third focuses on the cooperation factor; the fourth presents the factors that work against articulation in local productive arrangements; the fifth describes the methodological procedures; the sixth analyzes the results of the survey; and the seventh presents our final considerations.

## **2 LOCAL PRODUCTIVE ARRANGEMENTS – LPAS**

Castells (1999) defines a network as a set of nodes that are interconnected, with the nodes being the points where the connection curves cross. According to him, due to the changes in industrial society in the late 1960s and early 70s, the hierarchical organizational model faced restrictions by three interdependent processes: the revolution of information technologies; the economic crisis of capitalism and statism; and the restructuring of economies and appearance of new cultural and social movements (human rights, feminism). These processes triggered not only the movement for interdependence in the organizational and political field, but also among public and private actors, leading to a society of networks.

There are various forms of inter-firm networks: strategic alliances, productive chains, cooperatives, export consortiums, virtual organizations, joint ventures, clusters, innovative milieu, industrial districts and local productive arrangements (LPAs), among others. According to Aragão (2011), the expression local productive arrangement (*arranjo produtivo local* – APL in the original Portuguese) was developed by researchers belonging to the Research Network on Local Productive and Innovative Systems (REDESIST), centered at Rio de Janeiro Federal University. They defined a local productive arrangement as a territorial agglomeration of economic, political and social agents focused on a set of specific activities, with some form of interconnection, even if incipient.

Similarly, according to Castro (2009) a LPA is composed of a significant number of companies located in a region (part of a city, entire city, set of cities, river basin, valley, mountain region, etc.), specialized in a particular economic sector, that maintain ties of articulation, cooperation and learning among companies and other local actors (government, associations, teaching and research institutions).

Santos, Diniz and Barbosa (2006) present some characteristics that allow identifying the existence of a LPA in a determined region. Among them is spatial concentration of production of goods or services.

Further according to Castro (2009), the learning and innovation in LPAs happens through: (1) exchange of information on technologies and productive and marketing methods; (2) interaction of companies and other actors; and/or (3) integration of diverse competencies. However, this interaction of course depends on a commitment to cooperation.

For Santos, Diniz and Barbosa (2006), cooperation is an important factor that differentiates LPAs from other types of agglomerations. In this sense, Castro (2009) identifies two types of cooperation within LPAs: (1) productive cooperation, with the aim not only of obtaining economies of scale and scope, but also of improving quality and productivity indices; and (2) innovative cooperation, to reduce the risks, costs and time of innovation.

In the next item we further explain the cooperation factor, to show its importance in the development of LPAs.

## 2.1 THE COOPERATION FACTOR

As stated in the previous section, cooperation among the agents of local productive arrangements is a key element for them to prosper (DINIZ; LEMOS, 2005; IACONO; NAGANO, 2007; CASTRO; BULGACOV; HOFFMANN, 2011). According to Abramovay

(2000), many companies perceive that it is better to forgo competition with local rivals and cooperate to become more competitive in the broader market. This can be achieved by partnerships, strategic alliances and other forms of cooperation among firms.

According to Craig (1993), this cooperation involves collaborative behavior in benefit of common interests or expectations about a form of reward. This behavior can be formal or informal, voluntary or involuntary.

In a more organizational sense, Mulford (1980) and Warren et al. (1974, cited in Hall, 1991) define cooperation as a process by which firms pursue their own goals while at the same time their actions have common objectives and direction. According to Schmitz (1999), cooperation among companies can occur in two ways: among competitors (horizontal); and among the participants in a supply chain (vertical), and can also be between two companies (bilateral) or among various firms (multilateral). Table 1 presents the different types of cooperation.

	<b>Bilateral</b>	<b>Multilateral</b>
<b>Horizontal</b>	Sharing equipment	Sectorial association
<b>Vertical</b>	Improvement of components by producers and users	Alliance along value-added chain

Table 1 - Examples of Types of Cooperation  
Source: Take from Schmitz (1999, p. 1634).

In turn, Ramírez and Rangel (2001) have a simpler vision of cooperation, according to which the mere informal exchange of information between companies can be considered cooperation.

When speaking of cooperation within local productive arrangements, SEBRAE (2003) affirms that this occurs when there are initiatives, projects or actions carried out among companies or other actors that compose this arrangement. According to Albagli and Maciel (2004), these can be classified as: a) economic agents (partners, competitors, customers and others); b) knowledge agents (universities, consultancies and others); c) regulatory agents (actors of the government at its different levels); and d) social actors (associations, unions, etc.).

For Escobar, Ferreira and Crespo (2000), the cooperation factor explains the functioning of networks formed by organizations and underpins the importance of this type of agglomeration to the context and region where it is inserted, since it permits enhancing the advantages obtained by the participating companies. This reality can be observed in the

information technology cluster in Estonia, composed mainly of micro and small enterprises. In this case, the government cooperates with the companies to enable the development of information technology for the government and also of ideas and innovations that permit the cluster to export products and services to other countries, to promote their development (HIRT; SANNAMEES; ZALJEVIC, 2013). However, these arrangements face obstacles over their lifetime and can wind up falling apart. In the next section we highlight the factors that contribute to the breakup of local productive arrangements.

## 2.2 FACTORS THAT CONTRIBUTE TO THE BREAKUP OF LOCAL PRODUCTIVE ARRANGEMENTS

Many authors (SOUZA; GOMES, 2005; HOFFMANN; MOLINA-MORALES; MARTINEZ-FERNANDEZ, 2007; KÖCKER; GARNATZ; KERDEL, 2010) have presented factors that favor the formation of networks of companies, but few have addressed the problems that contribute to the inefficiency of these networks and consequently their breakup. In this section we present some hypotheses about the adversities that contribute to disarticulation that have been addressed in the literature.

Based on the factors mentioned above, we formulated the following hypotheses to be verified later based on the information collected:

### ***H1: The number of actors influences the breakup of the network.***

According to the authors cited previously, the number of participants in a network can influence the effort required to maintain it. In this sense, Valdés-Llaneza and García-Canal (2006) sought to discover the influence of the number of participants on the longevity of joint ventures. According to their results, a large number of participating companies has a negative influence on the coordination of activities and cooperative relations. These studies are the basis for H1.

The studies of Barney and Hesterly (1996), Messner and Meyer-Stamer (2000), Meyer-Stamer (2002), Souza and Gomes (2005), Iacono and Nagato (2007), Camargo et al., (2010) and Andreola et al. (2012) indicate that trust is the fundamental factor for the development and growth of networks of companies. According to Park and Ungson (2001), mistrust leads to problems of coordination, generates conflicts and increases transaction costs within a network. In this context, Camargo et al. (2010) concluded that only through trust is it possible to reduce opportunistic behavior of the actors in the network and maintain the necessary flexibility in the relationship for its longevity. In turn, Iacono and Nagato (2007) state that

lack of trust makes articulation among the companies of the LPA impossible. These findings underpin the second hypothesis:

***H2: Trust is an overarching factor for the development of networks.***

According to the literature on inter-firm agglomerates, conflict can influence the network in two ways: either leverage or impairing the network's development and longevity (PONDY, 1997; MESSNER; MEYER-STAMER, 2000; PEREIRA, 2005; WEGNER; PADULA, 2008). According to Messner and Meyer-Stamer (2000), when conflict occurs in moderate doses, it can be considered a catalyst for the formation of networks. In contrast, Pondy (1997), in a study in the United States of the success or failure of franchisees in the period between 1983 and 1993, indicated that conflicts in this type of network increase the chance of failure of franchisees, supporting the idea that conflict impairs the articulation of networks. Corroborating this finding, Esser (2011) reported that conflict in a network of firms can arise due to rivalry between the members, complexity of management and cultural divergences, undermining the advantages of this type of organization. This leads to the third hypothesis:

***H3: Too much conflict impairs networks.***

Another important factor that can lead to the breakup of networks is opportunistic behavior (WILLIAMSON, 1985; PARK; UNGSON, 2001; MEYER-STAMER, 2002; DAS; KUMAR, 2011). This happens when a company tries to obtain advantages over the other companies. According to Park and Ungson (2001), when opportunistic behavior is perceived, cooperation becomes impossible, consequently destabilizing the network. However, for Kumar (2011), the influence of opportunistic behavior on disarticulation of a network depends mainly on the tolerance of the other members. Hence, in some cases where opportunism appears, the other companies can have a high level of tolerance, allowing the alliance still to bear fruit. On the other hand, when the firms have low tolerance for opportunistic conduct, this will certainly cause the alliance to fall apart. Based on this premise, we formulated the fourth hypothesis:

***H4: The appearance of opportunistic behavior undermines cooperation.***

Souza and Gomes (2005) and Iacono and Nagato (2007) report that the existence of firms with a selfish vision, causing them to seek only their own benefits, as well as the lack of commitment to the network, undermine the success of the network. In this respect, the study by Barcellos et al. (2012) of six networks of firms that had already failed found that

individualism and lack of commitment are factors for the failure of networks. This finding leads to our fifth hypothesis:

***H5: The lack of commitment by some firms impairs cooperation.***

According to Pereira (2005) and Iacono and Nagato (2007), the failure to generate revenue for the participating firms in a network encourages them to leave, in search of better opportunities for profit and growth outside the group. It also causes difficulties for the development of products and other joint operations. The study of Uzea (2010) indicates that economic incentives contribute to the development and longevity of networks, while the lack of these incentives impairs cooperation among the network's actors. In this same context, the study of Hu (2013) of failed alliances in China shows that one of the main factors behind failure was the lack of financial resources. Based on this premises, we formulated our sixth and last hypothesis:

***H6: The lack of profit by the members of a local productive arrangement makes its breakup more likely.***

We next describe the methodological procedures used in the study.

### **3 METHODOLOGICAL PROCEDURES**

This study is quantitative in nature, because according to Creswell (2009), quantitative analysis is best to identify factors or variables that can influence a result. In particular, our central aim is to elucidate the factors related to cooperation that can influence the breakup of the local productive arrangement among clothing manufacturers in Tobias Barreto, Sergipe, from the perspective of its actors.

This study is also explanatory, because we try to establish causal relations between the variables (SAUNDERS, LEWIS, THORNILL, 2007), and also because we study a known problem or one that has already been described (NEUMAN, 1997). We rely on the definition of LPA formulated by Castro (2009), as a significant number of firms located in a region (part of a city, entire city, set of cities, river basin, valley, mountain region, etc.) specialized in certain types of goods or services (economic sector) that maintain articulation, interaction, cooperation and/or learning among the firms and with other local actors (government, associations, teaching and research institutions), to analyze the factors that can lead to the breakup of this LPA.

We chose a survey because it is a quantitative method that is generally associated with a deductive approach (SAUNDERS, LEWIS, THORNILL, 2007). According to Freitas,

Oliveira, Saccol and Moscarola (2000), the survey method can be used in explanatory studies to test a theory and causal relations, which is our aim.

We gathered data by a questionnaire rather other survey methods because according to Saunders, Lewis and Thornill (2007), this instrument is suitable to collect a large quantity of data, and also allows collating information in standardized form. In the questionnaires, we posed closed questions because these are uniform and easy to code, were each hypothesis was measured according to the items that describe it (SAUNDERS; LEWIS; THORNILL, 2007).

According to Babbie (2003), the population of a survey is the group theoretically specified. In our case, the population was composed of the firms potentially belonging to the LPA of clothing makers in Tobias Barreto and enrolled with the Sergipe State Commercial Registry Board (JUCESE). Of the total of 418 such firms, we chose the sample randomly.

In such cases, according to Babbie (2003), to form the sample the researcher first enumerates all the firms on the list and then chooses those to be questioned randomly. For this purpose, we used the BioEstat 5.3 software, which is free and has specific modules for forming various types of samples. Our initial sample was composed of 300 firms (71.77%). However, it turned out that some of these firms had changed address or gone out of business, and some of the respondents did not completely answer the questionnaire, so our final sample contained 224 firms.

The data collected was inserted in the SPSS version 20 program for calculation of the relations between the variables. We first tested the data for normality, and since they were not normally distributed, we used the Mann-Whiney test. We also employed logistic regression to verify our hypotheses about the factors that can promote breakup of the LPA of interest. We also measured Cronbach's alpha to ascertain the reliability of the questionnaire.

#### **4 ANALYSIS OF THE RESULTS**

In the initial phase, we calculated Cronbach's alpha to assess the reliability of the questionnaire, attaining values between 0 and 1 (MARTINS; THEÓPHILO, 2007). In particular, Cronbach's alpha for the questions related to the cooperation factor was 0.878, which according to Hill and Hill (2000) is considered good.

We also applied the Kolmogorov-Smirnov and Shapiro-Wilk tests, which permit analyzing whether or not sample data are normally distributed. For both tests, the p-value needs to be greater than 0.05 to accept the null hypothesis (MAROCO, 2007). We applied the tests to all the factors that theoretically could influence the breakup of the LPA. The p-values

of all the variables were below 0.05, meaning rejection of the null hypothesis in all cases, indicating that the variables were not normally distributed. For this reason, we applied a nonparametric test. Among the nonparametric tests, the Mann-Whitney test is one of the most efficient according to Siegel and Castellan (2008), so we applied it to the data.

However, before applying this test, it was necessary to obtain two independent samples. For this purpose, we divided the initial sample into two subsamples: one composed of firms that had already cooperated and the other of firms that had never cooperated with the members of the Tobias Barreto LPA, because although being listed as members, some firms had never in practice participated. In an attempt to eliminate bias in the answers of the respondents, we presented some alternatives to determine when there is cooperation between companies, establishing the following responses as indicative of cooperation: exchange of information (RAMÍREZ and RANGEL, 2001); exchange of products (SEBRAE, 2003); collaboration in projects (SEBRAE, 2003); sharing of equipment (SCHMITZ, 1999); participation in an association (SCHMITZ, 1999); and joint research and development of products (SEBRAE, 2003).

We also defined alternatives to reveal actions not considered as cooperation, namely purchase of products from suppliers or other companies, and the option not to respond. The interactions considered are shown in Table 2 below.

**Table 2 - Interactions of the Firms in the LPA**

Interactions	Frequency	Percentage	Valid percentage	Accrued percentage
Exchange of Information	63	28.1	28.5	28.5
Exchange of Products	3	1.3	1.4	29.9
Sharing of Equipment	1	0.4	0.5	30.3
Participation in Associations	2	0.9	0.9	31.2
Joint Research and Development of Products	23	10.3	10.4	41.6
Purchase of Products	129	57.6	58.4	100.0
Total	221	98.7	100.0	
Did not Respond	3	1.3		
Total	224	100.0		

Source: Prepared by the authors, 2013.

The majority of the firms (58.9%) had never cooperated with other agents of the LPA while 92 (41.1%) had engaged in some form of cooperation.

The results of the Mann-Whitney test indicated the existence of significant differences between the means of the firms that had and had not cooperated, obtained in the analysis of each hypothesis.

Among the hypotheses analyzed, some items were included to demonstrate how they can promote breakup of the local productive arrangement. Each item was measured on a Likert scale from 1 to 7, with 1 being the lowest intensity, i.e., little or no influence on disarticulation, and 7 having the highest intensity, meaning a strong influence for disarticulation of the LPA.

**H1** was validated by the Mann-Whitney test, so it can be inferred that according to the responses of the entrepreneurs, the number of actors has a positive influence on the breakup of the network. This result corroborates the findings of Messner and Meyer-Stamer (2000), who indicated that clusters with a large number of members can be unwieldy because of the greater difficulty of negotiations and hence at greater risk of falling apart. The same phenomenon was noted in the empirical study of Wegner and Padula (2008), in which the authors found that the number of firms (high or low) can affect the growth of the network, as also observed by Valdés-Llaneza and García-Canal (2006).

**H2** was also confirmed by the test, indicating what various authors (BARNEY; HESTERLY, 1996; MESSNER; MEYER-STAMER, 2000; MEYER-STAMER, 2002; SOUZA; GOMES, 2005; IACONO; NAGATO, 2007; CAMARGO *et al.*, 2010; ANDREOLA *et al.*, 2012) have reported, in the sense that trust among the actors of a productive arrangement has great importance for the arrangement to develop and survive, mainly when it is composed of firms in the same sector, i.e., firms that can be considered to be rivals (IACONO; NAGATO, 2007), the type of LPA in Tobias Barreto.

Trust is also associated with other factors that benefit the network, such as reduction of transaction costs, speed of finding solutions to mutual problems and increased flow of information (BOSS, 1978, cited in BALESTRIN; VARGAS, 2004).

According to the data tested, **H3** was also validated, confirming that conflict is harmful to the network. This result corroborates that of the exploratory study of Assel (1968), who defined conflict as an important factor for the result of trade associations, as well as the results of Messner and Meyer-Stamer (2000), to whom conflict is seen as a factor that catalyzes the exit of firms from clusters of firms. Pondy (1997) also found conflict to be a factor promoting the failure of an agglomeration of firms.

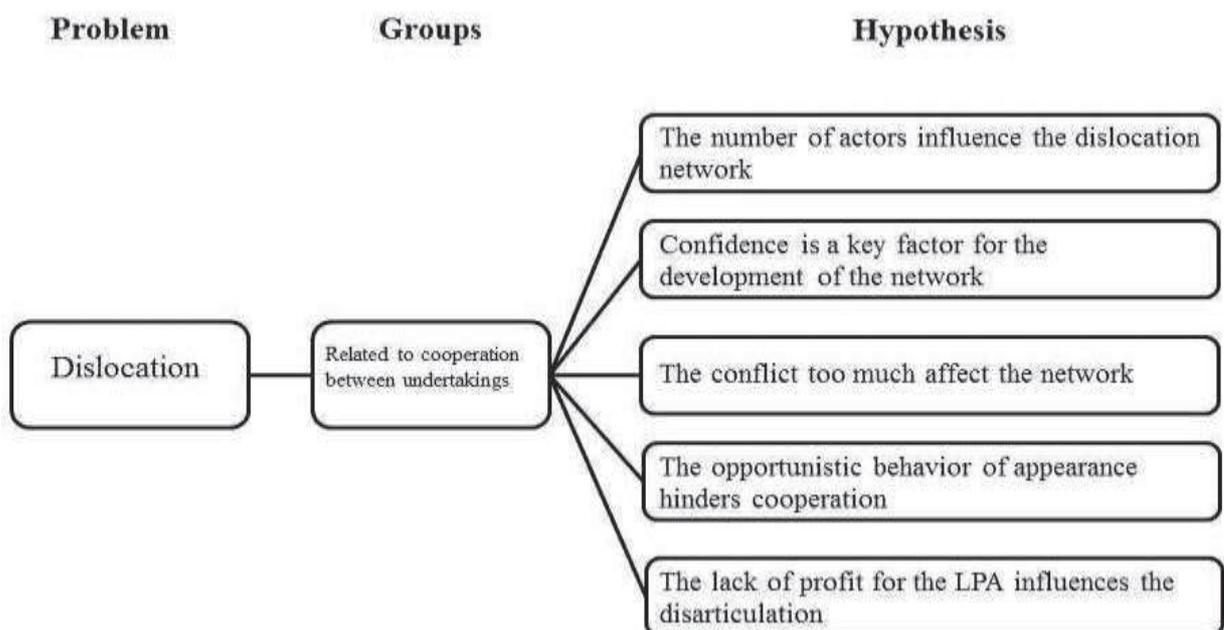
**H4** associates opportunistic behavior with the breakup of LPAs. According to the responses, this hypothesis was also confirmed. Opportunistic behavior increases the transaction costs and the mistrust between the agents of the network, consequently undermining its continued existence (WILLIAMSON, 1985; PARK; UNGSON 2001; MEYER-STAMER, 2002; DAS; KUMAR, 2011).

The only hypothesis that was not validated, meaning there was no significant difference between the two subsamples, was **H5**: the lack of commitment by some firms impairs cooperation. With this, our results do not allow confirming that the lack of interest or of an overview of the network by the entrepreneurs can impair the network, as found by Souza and Gomes (2005), Iacono and Nagato (2007) and Barcellos et al. (2012).

The last hypothesis tested was **H6**, which associates the lack of profits of participants in the LPA with the likelihood of its breakup. According to the Mann-Whitney test, this hypothesis was also confirmed, corroborating the findings of Iacono and Nagato (2007), Uzea (2010) and Hu (2013), all of whom reported the lack of profits or financial resources as factors that generate difficulty for the continuity of networks of firms, mainly affecting the development of products. Therefore, five of the six hypotheses were confirmed (H1, H2, H3, H4 and H6).

Figure 1 presents the hypotheses analyzed that confirm the factors that can lead to the breakup of the Tobias Barreto LPA.

Figure 1 - Model of LPA Disarticulation.



Source: Prepared by the authors, 2013.

To understand how the validated hypotheses can lead to the breakup of the network, we applied univariate logistic regression. The specific aim was to identify the factors associated with the hypotheses and the relative weights of these factors in the breakup process.

Table 3 presents the hypotheses with their respective measurement factors.

Hypotheses	Factors
<b>H1:</b> The number of actors influences the breakup of the network.	A large number of participants impairs the LPA; The number of participants limits the profits obtained by the LPA members A low number of participants hampers the visibility and development of the LPA
<b>H2:</b> Trust is an overarching factor for the development of networks.	Importance of trust among the companies and support institutions Lack of trust for exchange of information Lack of trust for joint sales and production Lack of trust for joint purchase of goods or machines
<b>H3:</b> Too much conflict impairs networks.	Different objectives and visions of the market among the firms Difference in size of companies hampers cooperation
<b>H4:</b> The appearance of opportunistic behavior undermines cooperation.	Favoritism of one company in relation to others Firms trying to obtain advantages to the detriment of others Costs to avoid this behavior
<b>H5:</b> The lack of commitment by some firms impairs cooperation.	Selfish vision of entrepreneurs Lack of time to deal with matters involving the LPA Neglect of entrepreneurs regarding development of the LPA
<b>H6:</b> The lack of profit by the members of a local productive arrangement makes its breakup more likely.	Low generation of profit of the participations in the LPA Lack of public and/or private investment in the LPA Financial difficulties of the firms

Table 3 - Hypotheses and their Factors  
Source: Prepared by the authors, 2013.

According to Hosmer and Lemeshow (2000), univariate logistic regression is a technique employed to develop models to predict or understand the relation between a categorical variable and a set of explanatory variables.

Of the 18 factors, only 10 were accepted by the Wald test, i.e., had p-values less than 0.05. These 10 accepted factors are all included in the hypotheses that were accepted by the Mann-Whitney test, so no accepted factor was included in the hypothesis that was rejected, corroborating the result of the previous testing.

These results indicate that the first hypothesis, **the number of actors influences the breakup of the network**, based on the studies of Messner and Meyer-Stamer (2000), Wegner and Padula (2008) and Valdés-Llaneza and García-Canal (2006), is influenced in two ways. First, the involvement of a large number of firms in a network can hamper its development and continuity by making the joint decision-making process unwieldy, and can also reduce the profits potentially generated for each firm. Second, a small number of members can limit the

visibility and scope of action of the network. It is noteworthy that H1 was the only hypothesis with all its factors accepted by the logistic regression.

The second hypothesis, **trust is an overarching factor for the development of networks** was based on the studies of Barney and Hesterly (1996), Messner and Meyer-Stamer (2000), Meyer-Stamer (2002), Souza and Gomes (2005), Iacono and Nagato (2007), Camargo et al. (2010) and Andreola et al. (2012). According to our results, the lack of trust works to break up the network, by making firms reluctant to exchange information and/or engage in joint production or acquisition of machinery and inputs, which would reduce the firms' transaction costs.

The first factor that was not validated was that trust in institutions helps productive arrangements to succeed. According to Huggins (2001), a fundamental factor for the formation of networks is the action of support institutions. However, according to the respondents in Tobias Barreto, the lack of trust in these actors appears not influence the disarticulation of the LPA.

The third hypothesis, **too much conflict impairs networks**, was based on the studies of Pondy (1997), Messner and Meyer-Stamer (2000) and Pereira (2005). According to the survey results, this conflict occurs mainly due to the difference in size among the LPA members. In other words, the lack of homogeneity can disrupt the network. However, the factor "different visions of the market" was not validated, contrary to Child (1999), who reported that the existence of firms with different objectives generates conflicts and hence impairs the existence of networks.

The fourth hypothesis, **the appearance of opportunistic behavior undermines cooperation**, was based on Park and Ungson (2001) and Das and Kumar (2011). This type of behavior destabilizes the network by creating mistrust among the members. However, the costs factor reported by Williamson (1985), Park and Ungson (2001) and Meyer-Stamer (2002) was not considered decisive for disarticulation of the network.

The sixth hypothesis, **the lack of profit by the members of a local productive arrangement makes its breakup more likely**, was based on the findings of Pereira (2005), Iacono and Nagato (2007), Uzea (2010) and Hu (2013). According to the respondents, this occurs in the Tobias Barreto, first due to the low profits obtained by most of the firms, which induces them to leave the arrangement. This is aggravated when firms face financial

difficulty, prompting them to seek other means to assure their survival rather than relying on the resources of the LPA.

We also used logistic regression, a technique that enables measuring the weight of each accepted factor by the Wald test. Therefore, we could verify the degree of impact of each factor in the hypotheses on the disarticulation of the LPA according to the respondents. The results are reported in Table 4.

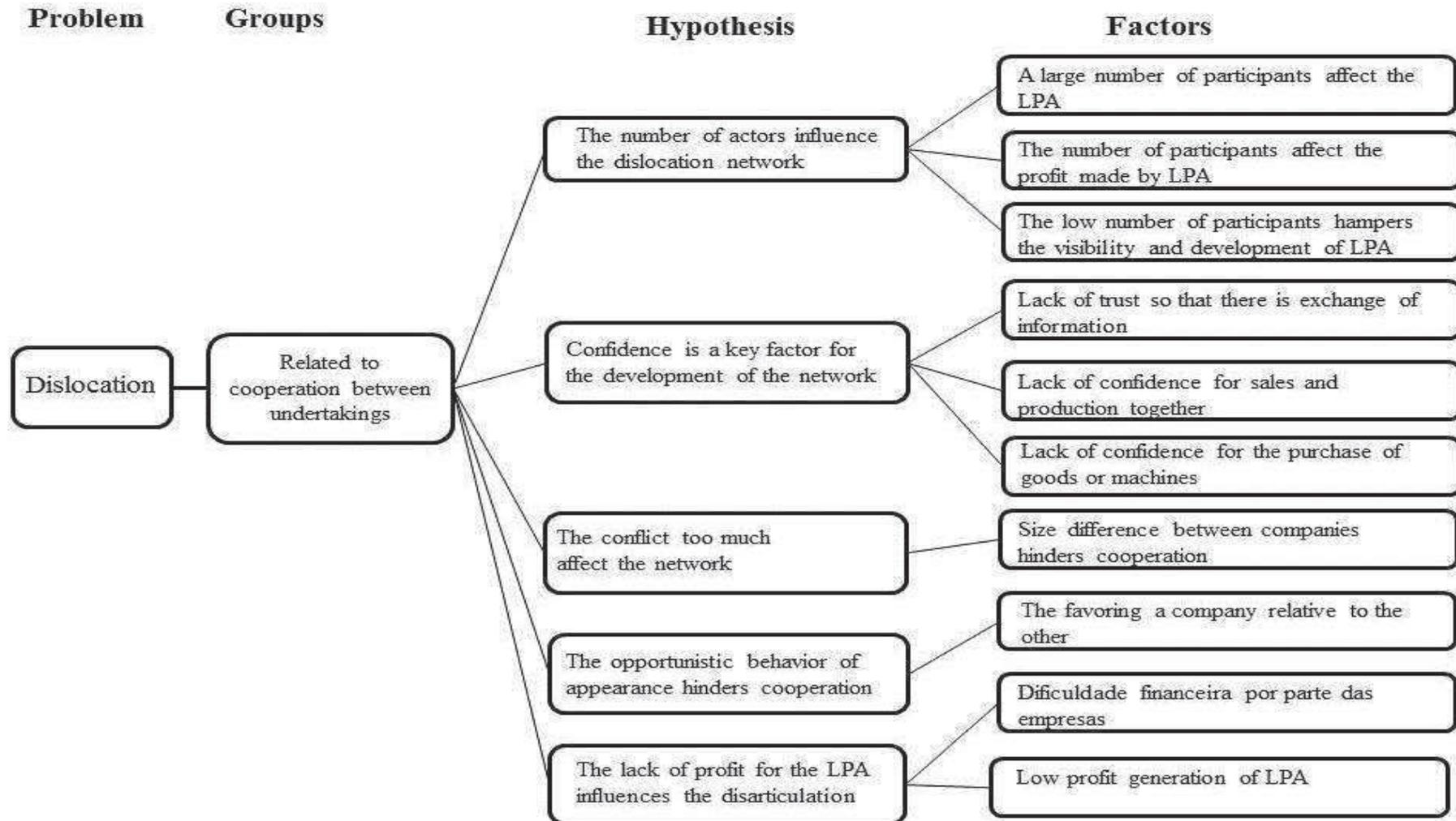
**Table 4 - Relative Impacts of the Disarticulation Factors within the Tobias Barreto LPA**

<b>Factors</b>	<b>Weights</b>
<b>H1:</b>	
A large number of participants impairs the LPA	36.5%
The number of participants limits the profits obtained by the LPA members	36.4%
A low number of participants hampers the visibility and development of the LPA	45.2%
<b>H2:</b>	
Lack of trust for exchange of information	32.2%
Lack of trust for joint sales and production	41.8%
Lack of trust for joint purchase of goods or machines	30.4%
<b>H3:</b>	
Difference in size of companies hampers cooperation	38.2%
<b>H4:</b>	
Favoritism of one company in relation to others	40.4%
<b>H6:</b>	
Financial difficulties of the firms	41.5%
Low generation of profit of the participations in the LPA	39.2%

Source: Prepared by the authors, 2013.

In Table 4, three factors have particularly large weights (impacts), above 41%. Of these, the one with the lowest weight, “financial difficulties of the firms”, can increase the chance of disarticulation within the LPA by 41.5%. In turn, “lack of trust for joint sales and production” can increase the chance of disarticulation by 41.8%. Finally, the factor with the greatest impact, “a low number of participants hampers the visibility and development of the LPA” can increase the chance of disarticulation by 45.6% according to the respondents. Figure 2 depicts the results obtained regarding the factors that influence the disarticulation of a productive arrangement.

Figure 2 - Factors that Disarticulate a Local Productive Arrangement.



Source: Prepared by the authors, 2013.

## **5 FINAL CONSIDERATIONS**

The main focus of this study was to identify the factors that influence the disarticulation of a local productive arrangement, specifically that involving the wearing apparel sector in the city of Tobias Barreto, Sergipe state.

The study is quantitative in nature, based on an intersectional survey. We analyzed six hypotheses developed based on the theory of networks and tested them based on 18 items. The survey involved a sample of 300 firms of the 418 enrolled with the Sergipe State Commercial Registry Board (JUCESE), of which it was possible to analyze information from 224 firms from which valid questionnaires were received.

Not all the factors described in the relevant literature could be validated statistically. Nevertheless, based on the responses from the entrepreneurs surveyed, it was possible to statistically confirm five of the six hypotheses about disarticulation of the LPA in question. The results indicate that the number of actors participating in the LPA can affect it in two ways: by excess or low number, because having a large number of participants creates difficulties in reaching joint decisions while a very small number of actors impairs articulation since it diminishes the network's visibility.

As described in a large number of studies, lack of trust is considered a factor for disarticulation in any type of inter-organizational group. Another factor that impairs the continuity of the LPA is conflict among the participating firms. In this study it was possible to identify that the difference in the structures of the participants generates strong conflicts, in turn impairing cooperation.

The appearance of opportunistic behavior by one or more firm also hampers cooperation. The same can be said for financial problems experienced by the firms that take part in a LPA, since this makes the managers unmotivated to continue participating in the network. In this respect, Rereira (2005) reported that the failure to generate benefits by business networks is one of the main reasons for their dissolution.

Like other similar studies, this one has some limitations. The first is the use of the survey method, which did not allow in-depth questions, and the second is related to the relatively small number of questionnaires that were answered completely, due to lack of time of the receivers or our inability to contact some companies that had participated in the LPA studied, due to change of address.

In closing, we can suggest future studies of other LPAs, or other types of networks, to verify the existence or not of divergences with our findings. Also, since this study was quantitative in nature, we can suggest qualitative studies to shed more light on the research question, as well as to obtain new discoveries.

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