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ARTICLE

Determinant factors of the Rural Warehouse Condominium collective action model

Fatores determinantes em Condomínios de Armazéns Rurais: modelo de ação coletiva

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Abstract: The Rural Collective Actions are presented with the aim of facing and overcoming difficulties and particularities of the agricultural business, as well as obtaining gains and advantages, in an environment that suffers from constant transformations. This study investigates which reasons determine the choice of the Rural Collective Action model Rural Warehouse Condominium, under the perspective of the Theory of Logic of Collective Action. For this purpose, we conducted the Statistical Analysis, Multiple Correspondence and Correlation Analysis. The results indicate motivating factors for the rural model through Social, Logistics, Political, Economic, Management and Collective Action Logic variables, being of more significant burden: (i) smaller collective actions are easier to promote collective interest; (ii) rural producers work together to promote common interests; (iii) in a small collective group, individual efforts have a higher influence on results; and, (iv) the smaller is the collective group, the closer is the individual will be to achieving collective benefits. The correlation analysis shows stronger relationships between cost reduction with freight and cost reduction with transport (0.833); and, between the lack of financing lines for small and medium producers and the lack of financing lines for agricultural warehouse (0.741).

Keywords: multiple correspondence analysis, determinants, collective action logic, Rural Warehouse Condominiums.

Resumo: As Ações Coletivas Rurais apresentam-se com o intuito de enfrentar e driblar dificuldades e particularidades do negócio agrícola, como também obter ganhos e vantagens, num ambiente que sofre constantes transformações. Este estudo tem como objetivo investigar quais os motivos que determinam a escolha do modelo de Ação Coletiva Rural Condomínio Rural, sob a perspectiva da Teoria da Lógica da Ação Coletiva. Nesse intuito, foram realizadas Análise Estatística, Análise de Correspondência Múltipla e de Correlação. Os resultados indicam fatores motivadores para o modelo rural por meio das variáveis Sociais, Logísticas, Políticas, Econômicas, Gerenciais e Lógicas de Ação Coletiva, sendo de maior ônus: (i) menores ações coletivas são mais fáceis de promover o interesse coletivo; (ii) os produtores rurais trabalham juntos para promover interesses comuns; (iii) em um pequeno grupo coletivo, os esforços individuais têm maior influência nos resultados; e, (iv) quanto menor o grupo coletivo, mais próximo o indivíduo estará de alcançar os benefícios coletivos. Já as correlações evidenciam relações mais fortes entre redução de custo com frete e redução de custo com transporte (0,833); e, entre a falta de linhas de financiamento para pequenos e médios produtores e falta de linhas de financiamento para a armazenagem agrícola (0,741).

Palavras-chave: análise de correspondência múltipla, determinantes, lógica de ação coletiva, Condomínios Armazéns Rurais.

1. Introduction

Even with great representativeness and importance, Brazilian agribusiness still faces some challenges like inefficient and inadequate distribution logistics, and infrastructure problems

(Oliveira, 2011; Filippi, 2017; Lopes et al., 2017; Lima et al., 2018; Reis & Leal, 2015); exclusion and social conflicts (Porto, 2014); numerous, small, poorly organized, distributed and distanced rural producers throughout the territory (Araújo, 2013); production seasonality (Araújo, 2013; Abitante, 2008); perishability of agricultural products (Araújo, 2013); weather, pests and diseases; variations in supply and demand; and, difficult price and production predictability (Abitante, 2008).

In addition, the growing world demand for Brazilian commodities, driven by countries with large populations like China (Wilkinson, 2010), creates opportunities for Brazilian farmers in emerging markets (Hellin et al., 2009), notably also cases of natural disasters or unfavorable geopolitical scenarios are conditions in which rural collective action can favor rural producers, especially if they have the social capital to maintain collective action (Rayamajhee & Bohara, 2021). Given this, and aiming to circumvent these difficulties, rural collective actions such as the Rural Warehouse Condominiums emerge (Filippi & Guarnieri, 2019; Filippi et al., 2019).

The new model of collective actions is formed by neighbouring farmers who enable and share the same warehouse facilities through the division into warehouse quotas. In addition to circumventing the warehouse deficit, among other logistical bottlenecks, farmers reduce unnecessary costs, commercialize production without intermediaries and obtain advantages from the condominium system and warehouse (Filippi, 2017, 2020; Filippi et al., 2018b, 2019; Filippi & Guarnieri, 2018, 2019; Filippi et al., 2018a).

In addition, collective actions promote social, technological and innovative development; add value and create wealth (Almeida, 1999; Silva et al., 2014; Cefaï, 2009; Ribeiro et al., 2015; Medaets & Cechin, 2019; Filippi & Guarnieri, 2019; Iglécias, 2007; Wenningkamp & Schmidt, 2016); promoting decision-making; maximizing the profit of associates and the provision of goods or services (Saes, 2005); they are more efficient than disorganized individual actions (Olson, 1965); enabling costs' sharing (Filippi, 2017; Filippi & Guarnieri, 2018); assisting in the commercialization and access of production resources for small farmers, technical assistance to members and access to market information (Bijman & Hu, 2011); and, a market advantage in the commercialization of production (Francesconi & Heerink, 2011).

It is worth mentioning that among the different models of collective actions that arise (Hellin et al., 2009; Wilkinson, 2010; Bijman & Hu, 2011; Francesconi & Heerink, 2011; Filippi & Guarnieri, 2019; Filippi et al., 2019), there are specific characteristics and specificities. The variation stems from the forms of attachment, size, incentives adopted (Olson, 1965; Saes, 2005), dynamic nature (Meinzen-Dick et al., 2004) or Social Capital (Rayamajhee & Bohara, 2021), and it is essential to understand the reasons for the variability between the different forms of Collective Actions (Zylbersztajn, 2005; Meinzen-Dick et al., 2004).

The collective action is an attempt to form a collective good, more or less formalized and institutionalized through people who aim to achieve common goals through cooperation and competition with other groups (Cefaï, 2009). In this sense, the Theory of Logic of Collective Action reflects that groups of individuals with common goals, who have at least some kind of common goals, such as economic purpose, tend to promote these interests through collective actions (Olson, 1965).

Therefore, the objective of this study is to investigate the reasons that determine the choice of the rural collective action model, of the Rural Warehouse Condominium type, under the perspective of the Theory of Logic of Collective Action, through the Correlation and Multiple Correlation Analysis.

2. Theory of the Logic of Collective Action and the changes of Rural Warehouses: What factors are decisive?

Groups of individuals with common goals, who have at least some kind of common goals, such as economic, tend to promote these interests through collective actions. Mancur Olson (1965) showed this outcome in his theory on the Logic of Collective Action.

The Theory of Logic of Collective Action describes that from the moment that individuals with one same common or collective interest, the independent individual action will not be able to promote the common interest or will not be able to promote this goal properly. In this way, in the form of collective action, the group will be more likely to promote common interest and be able toachieve that goal effectively.

Rural Warehouse Condominiums are evident in this scenario. It is clear to observe that the new Brazilian rural model emerges from individual interests of the field that materialize under collective interests in the same action, while the main objective, which is not the only one. There are other common objectives and advantages that the Condominiums provide, the viability of the warehouse structure (Filippi & Guarnieri, 2019; Filippi et al., 2019).

Cefaï (2009) describes collective action as an attempt to constitute a collective good, more or less formalized and institutionalized, through people who aim to achieve common goals towards cooperation and competition with other collective groups. Similarly, Hardin (2004) reports that collective actions are social interactions driven by common collective objectives, which generate joint actions to achieve. In the case of Rural Warehouse Condominiums, there is a common objective, which is warehouse (Filippi & Guarnieri, 2019; Filippi et al., 2019).

It is vital to highlight that there are specific characteristics and specificities among the different models of collective actions emerging in the last years (Hellin et al., 2009; Wilkinson, 2010; Bijman & Hu, 2011; Francesconi & Heerink, 2011; Filippi & Guarnieri, 2019; Filippi et al., 2019; Rayamajhee & Bohara, 2021). Such variation may occur due to the form of attachment, size, incentives adopted (Olson, 1965; Saes, 2005); its dynamic nature (Meinzen-Dick et al., 2004) or its Social Capital (Rayamajhee & Bohara, 2021). It is particularly relevant to understand the reasons for the variability between the different forms of collective action (Zylbersztajn, 2005; Meinzen-Dick et al., 2004).

Accordingly, the theory of the logic of collective action has some important features that help understand groups' formation. There are differences between small and large groups. Small groups have advantages compared to the larger groups. The smaller the group, the closer it reaches the optimum point of obtaining the collective benefit. The more likely the individual will act to obtain a minimum amount of this benefit. Thus, the smaller the group, the more it will promote its collective interests, and the more effective and efficient the organization will be (Olson, 1965).

Olson (1965) also describes that social and economic incentives are inducers to make collective action more efficient and effective in smaller groups. This fact is explaineddue to social pressure and because social incentives work best in small groups, as everyone knows each other. This is one of the characteristics that Olson (1965) defends so that large organizations have offices and divisions to guarantee better functioning from small groups.

Additionally, Maeda & Saes (2009) report that the gain with collective action must be higher than that which would occur in an individual action. Small groups are more satisfactory for members, thanks to the ease of control and agility of actions.

It is worth mentioning that due to some weaknesses in Brazilian agribusiness (Oliveira, 2011; Filippi, 2017; Lopes et al., 2017; Lima et al., 2018; Reis & Leal, 2015), greater integration of the Brazilian economy with the world economy, and, greater exposure to international competition, the farmers become stronger through collective action (Iglécias, 2007). These facts explains

the creation of Brazilian collective actions, such as the Condominiums of Rural Warehouses (Filippi & Guarnieri, 2019; Filippi et al., 2019).

3. Research methods and techniques

Based on the Theory of Logic of Collective Action by Mancur Olson (1965), this article investigates the reasons that determine the choice of the collective action model Rural Warehouse Condominium, whose technical procedure was a *survey* with a standardized questionnaire. We analyzed the responses through Multiple Correspondence and correlation analyses.

The questionnaire was prepared based on the Theory of Logic of Collective Action by Mancur Olson (1965) and based on Filippi (2017), primary contributions on the subjects, and structured the questionnaire's theoretical basis. As for the scale, a five-point Likert scale (1932) (1-5) was used: (i) Strongly disagree (1); (ii) Disagree (2); (iii) Neither disagree nor agree (3); (iv) Agree (4); and (v) Totally agree (5).

This technique is used on a large scale in Social Sciences and mainly to measure social attitudes and perceptions, in which, it associates numbers to the levels of agreement (Likert, 1932; Costa et al., 2018). This type of scaleaims to register the preference relationship or agreement with the statements and the degree of the preference or agreement relationship (Corrar et al., 2009).

In addition, the questionnaire was developed and divided into six groups with closed questions: (i) social; (ii) logistics and infrastructure; (iii) economic; (iv) political; (v) logic of collective action; and (vi) management and quality. Each group has different questions for respondents to answer, divided into codes (S1, S2, S3, S4, S5, S6 and S7). Therefore, to operationalize the data analysis, SPSS 22 was used.

The data collection was conducted in July, August and September 2019, with prior scheduling and authorization from the Rural Warehouse Condominiums, in the cities of Palotina, Mercedes and Francisco Alves, in the State of Paraná; and, in the city of Ipiranga do Sul, State of Rio Grande do Sul, in Brazil. We sent the questionnaires via e-mail to the Condominium managers, and also we applied in person with the Condominium rural producers according to the availability of each individual. Subsequently, we tabulated the data in Excel, after importing and analyzing it in SPSS software.

The sample was defined by convenience and accessibility, that is, there is no registration or information on the location of the Condominiums and a greater concentration of them was observed in the region of Palotina, state of Paraná, Brazil. The sample was non-probabilistic, and the respondents should agree to participate. This sample consisted of 74 answered questionnaires, and a return of 65.49%, out of a total of 113 Rural Warehouse Condominium members. For the sample size, at least 50 observations are recommended, 100 cases for more robust results (Hair et al., 2009). Thus, samples between 50 and 100 cases are considered sufficient for this purpose.

Posteriorly, we analyzed the data using descriptive statistics and Multiple Correspondence Analysis (ACM) with the SPSS software, with the frequency of responses being complementarily verified (Field, 2009; Triola, 2017), reliability and correlations.

Multiple Correspondence Analysis is an interdependent multivariate statistical data technique that aims to simultaneously analyze the associations between variables in a study (Hair et al., 2009). Carvalho (2008) describes that in addition to being useful for simultaneous approaches of multiple indicators, the technique is particularly appropriate for the treatment of qualitative variables in a quantification process. Equation 1 shows the statistical variable for multivariate studies (Hair et al., 2009):

$$\text{Value of the statistical variable} = w_1X_1 + w_2X_2 + w_3X_3 + \ldots + w_nX_n \quad (1)$$

Where: The statistical variable of n weighted variables (x_1 to x_n), x_n is the observed variable and w_n is the weight determined by the multivariate technique.

Note that the dimensions given are on Multiple Correspondence Analysis are representations of an individual's perception about attributes or combinations thereof (Hair et al., 2009). Therefore, the most representative dimensions are the first two, since they have higher inertia values, and therefore, the closer to the upper limit that varies between 0 and 1, the more the variance is explained, that is, when it is closer to 1 the more the dimension is representative and determinant, and, graphically, the more distant projections and the point of origin, the stronger are the indicators of the reason to be explained (Carvalho, 2008). Thus, the table with the Discrimination Measures - an indicator that assesses the contribution of each variable in the definition of dimensions - is presented in the results. The value of 0.3 as a cut or close to 1 is subsequently considered to determine which statements are the most representative in this research, as well as the perceptual map.

In addition, Cronbach's Alpha was used for data reliability analysis. According to Hair et al. (2009) and Corrar et al. (2009) the Cronbach's Alpha aims to assess the consistency of the scale and reveals the absence of random error, ranging from 0 to 1, with 0.7 the minimum acceptable and the closer to 1, the reliability of the dimensions of the construct *(survey*) is more significant and satisfactory for applying multivariate analysis. Thus, Cronbach's Alpha reveals the reliability of the questionnaire applied in a survey, giving relevance to the survey and consistency in measurements (Hair et al., 2009; Corrar et al. 2009), and indicates the quality of fit of the model by dimension, if the dimensions show a good fit (Carvalho, 2008). Equation 2 shows the mathematical model of Cronbach's Alpha (Corrar et al., 2009):

$$\alpha = \frac{k\left(cov / var\right)}{1 + \left(k - 1\right)\left(cov / var\right)} \quad (2)$$

Where: *k* is the number of variables considered; *cov* is the average of the covariance; and, *var* is the average of the variances.

After finding the most significant variables for the rural model, a matrix of correlations between them was created to show the relationships between variables and how strong the association of a certain variable with another can occur (Ribas & Vieira, 2011). Thus, the closer to 1, the more intense is the correlation of one variable with another. If it is positive, the correlation is directly proportional, that is, the respondent agrees with one statement and agrees with another as well. If it is negative, the correlation is inversely proportional. That is, the respondent agrees with one statement but does not agree with another.

Together with the correlation analysis, the Intraclass Correlation Coefficient was determined to determine the values' consistency or agreement (Corrar et al., 2009. The closer to 1, the stronger the consistency. The following section presents the results of this study.

4. Results and Discussion

4.1 Descriptive Statistics

Table 1 shows the frequency of responses of producers belonging to Rural Warehouse Condominiums and participating in the *survey*. Based on the frequency of responses, some

results stand out among the groups. Table 1 shows the perception of member farmers in the social group.

Table 1 - Frequency of responses of member farmers from social group.

Group	Questions	Strongly disagree	I disagree	Neither disagree nor agree	I agree	I totally agree
		1	2	3	4	5
Social	The Rural Warehouse Condominium generates jobs	0.0%	0.0%	0.0%	45.9%	54.1%
	The Rural Warehouse Condominium is more competitive.	0.0%	1.4%	2.7%	31.1%	64.9%
	The Rural Warehouse Condominium strengthens rural activity.	0.0%	0.0%	1.4%	32.4%	66.2%
	The Rural Warehouse Condominium makes it possible to face social and economic crises.	2.7%	2.7%	12.3%	46.6%	35.6%
	The Rural Warehouse Condominium facilitates access to new technologies/ modernization.	0.0%	2.7%	12.2%	50.0%	35.1%
	The Rural Warehouse Condominium allows having its warehouse structure.	0.0%	0.0%	0.0%	31.1%	68.9%
	There is the ease with working through the Rural Warehouse Condominium.	0.0%	1.4%	4.1%	47.3%	47.3%

As for social characteristics, the responses of the tenants show, more remarkable unanimity as to i) the Condominium provides more significant generation of jobs; ii) the rural model is more competitive; iii) the Condominium strengthens rural activity, and, iv) through the Condominium, rural producers can have their warehouse structure.

These responses represent 54.1%, 64.9%, 66.2% and 68.9%, respectively, with social aspects that stand out in the view of rural producers who are part of the rural model Rural Warehouse Condominium. Having the warehouse structure itself is one of the main objectives of the Rural Warehouse Condominium model. Thus, it is clear that the frequency of responses is high among residents (68.9%), together with the strengthening of joint activity, and the model is more competitive in the market given the advantages and benefits that collective action provides.

Table 2 shows the perception of the producers that participate in the rural condominiuns in the logistics and infrastructure groups.

For the logistics and infrastructure characteristics, Rural Warehouse Condominiums stand out with: i) the reduction of the warehouse deficit; ii) logistical distribution operations are simplified; and, iii) there is a reduction in logistical bottlenecks, with respectively, 55.4%, 62.2% and 59.5% of response for member farmers.

Unlike producers, Rural Warehouse Condominiums have a low frequency for reducing transportation costs and freight costs, with only 12.2% and 9.5%. This fact already occurs since the Rural Warehouse Condominium model has warehouse as its main logistical activity. Thus, it implies little in other logistical aspects, such as in transport and freight, so that the cost of freight is included in the cost of transport. Thus, respondents do not realize that the Condominium provides a significant reduction in transportation and freight costs, but mainly to reduce logistical bottlenecks, such as the deficit in warehouse and distribution logistics operations.

Table 3 shows the perception of the member farmers in the political group.

Table 2 - Frequency of responses from the producers of the logistics and infrastructure group.

Group	Questions	Strongly disagree	I disagree	Neither disagree nor agree	I agree	I totally agree
		1	2	3	4	5
Logistics and Infrastructure	The Rural Warehouse Condominium reduces transportation costs.	0.0%	12.2%	18.9%	33.8%	35.1%
	The Rural Warehouse Condominium reduces freight costs.	0.0%	9.5%	20.3%	41.9%	28.4%
	The Rural Warehouse Condominium reduces warehouse costs.	1.4%	5.5%	17.8%	47.9%	27.4%
	The Rural Warehouse Condominium reduces downtime wasted in third-party warehouse lines.	0.0%	1.4%	4.1%	24.3%	70.3%
	Regions with a warehouse deficit are potential for creating Warehouse Condominiums.	0.0%	1.4%	5.5%	43.8%	49.3%
	Rural Warehouse Condominiums reduce the distance between the warehouse unit and the production site.	0.0%	1.4%	20.3%	48.6%	29.7%
	The Rural Warehouse Condominium reduces the warehouse deficit.	0.0%	0.0%	2.7%	55.4%	41.9%
	Logistical distribution operations are simpler with Rural Warehouse Condominiums.	0.0%	4.1%	21.6%	62.2%	12.2%
	There is a reduction of logistical bottlenecks (problems) with the Rural Warehouse Condominiums.	0.0%	1.4%	16.2%	59.5%	23.0%

Table 3 - Frequency of responses of member farmers from the political group.

Group	Questions	Strongly disagree	I disagree	Neither disagree nor agree	I agree	I totally agree
		1	2	3	4	5
Political	Public policies for Rural Warehouse Condominiums are lacking.	0.0%	17.6%	20.3%	41.9%	20.3%
	Financing lines are missing for Rural Warehouse Condominiums.	6.8%	34.2%	13.7%	37.0%	8.2%
	Financing lines for agricultural warehouse are lacking.	6.8%	32.4%	24.3%	29.7%	6.8%
	Financing lines are lacking for small and medium producers.	9.5%	31.1%	24.3%	24.3%	10.8%

Of the political aspects, 62.2% of the member farmers agree that specific public policies for Rural Warehouse Condominiums are lacking. Regarding the financing lines, the member farmers had the frequency of divided responses. Around 40.2% of them believe that there is no

lack of financing lines for the Condominiums, agricultural warehouse, and small and medium producers. On the other hand, 38.93% of the farmers consider that there is a lack of financing lines, mainly for Rural Warehouse Condominiums.

Currently, the mainline of financing for warehouse is the Program for the Construction and Expansion of Warehouses (PCA), which, in the view of some farmers, does not meet all the conditions they need, especially with an emphasis on the relatively new model that is the Condominiums of Rural Warehouses. It is also worth emphasizing the particularity of the static capacity, area and productivity of the profile of producers who are part of this model, concerning the elaboration and focus of specific public policies for this target audience and wharehouse, together with the high cost to make the composition of the project feasible model.

Table 4 shows the perception of the member producers in the economic group.

Table 4 - Frequency of responses of member producers from the economic group.

Group	Questions	Strongly disagree	I disagree	Neither disagree nor agree	I agree	I totally agree
		1	2	3	4	5
Economic	The Rural Warehouse Condominium reduces costs.	0.0%	1.4%	6.8%	66.2%	25.7%
	The Rural Warehouse Condominium increases profit.	0.0%	0.0%	1.4%	40.5%	58.1%
	The Rural Warehouse Condominium adds value to the product.	1.4%	0.0%	8.1%	33.8%	56.8%
	The Rural Warehouse Condominium facilitates the commercialization of production.	0.0%	0.0%	8.2%	49.3%	42.5%
	The Rural Warehouse Condominium allows the collective purchase of inputs.	0.0%	4.1%	18.9%	45.9%	31.1%
	The Rural Warehouse Condominium allows the insertion of the business in large-scale economies.	0.0%	4.1%	24.3%	58.1%	13.5%
	The implementation of a Rural Warehouse Condominium is of high cost.	1.4%	2.7%	16.2%	50.0%	29.7%
	The acquisition of seeds and inputs through the Rural Warehouse Condominium reduces costs.	0.0%	4.1%	18.9%	62.2%	14.9%
	The intermediary (middlemen) figure is eliminated in the commercialization of the product.	0.0%	10.8%	17.6%	47.3%	24.3%
	The cost to make the Rural Warehouse Condominium viable is diluted among all members.	0.0%	0.0%	1.4%	44.6%	54.1%

Regarding the economic aspects, it is noteworthy that the Rural Warehouse Condominium model reduces costs, with 92% agreement between the partners; increases profit, with 98.6% agreement; adds value to the product, with 90.5% agreement; facilitates the commercialization of production, with 91.8%; and, the cost to make the venture viable is shared among all partners, with almost 100% agreement. Such characteristics are of paramount importance for the economic-financial viability and success of the model since the economic activity must be profitable and profitable for all partners, as the division of advantages and benefits since they are part of collective action.

In this sense, the model still generates one of the main advantages: the increase in profit for each partner through the sale of products through the Rural Warehouse Condominium, being characterized by marketing without an intermediary, the highest quality product and without logistical bottlenecks. Such aspects contribute to a higher profit to farmers through the collective action model of Rural Warehouse Condominium.

Table 5 shows the perception of the member producers in the management and quality group.

Table 5 - Frequency of responses from member producers in the management and quality group.

Group	Questions	Strongly disagree	I disagree	Neither disagree nor agree	I agree	I totally agree
		1	2	3	4	5
Management and Quality	Management practices and meetings guarantee the success of the model.	0.0%	0.0%	0.0%	44.6%	55.4%
	There is a standardization of seeds to guarantee product quality in Condominiums.	0.0%	16.2%	21.6%	48.6%	13.5%
	There is greater agility to deliver the product/sell with the Rural Warehouse Condominium.	0.0%	1.4%	5.4%	58.1%	35.1%
	The interpersonal relationship between tenants can lead to disagreements.	1.4%	8.1%	20.3%	52.7%	17.6%
	There may be corruption in Rural Warehouse Condominiums.	6.8%	6.8%	18.9%	54.1%	13.5%

Additionally, in Management and Quality, the member producers were unanimous that management practices and meetings guarantee the model's success. Such measures ensure that the Condominium Statute is complied with and the good relationship between members, employees, and customers. In addition, the meetings help with decision-making for commercializing production, planting, collective purchase of inputs, operation of the model, and possible extensions.

It is also noted for the management of the enterprise that 93.2% of the member farmers agree that there is greater agility to deliver the product/sell with the Rural Warehouse Condominium. One of the main reasons for this is the efficiency in filling and unfilling the warehouse without queues. This aspect generates logistical bottlenecks, such as delays and queues, during peak seasons in other warehouses.

Finally, Table 6 presents the most significant frequencies for the Collective Action Logic group, organized according to the intensity to disagree or agree with the variables.

From the frequency table on the Collective Action Logic, the most representative variable to disagree "*Rural Warehouse Condominiums only work with small rural producers*" was the one that drew the most attention, with 56.6% of responses that disagree. Such finding, obtained with the response of the producers, reflects the diversity of their profiles in each Condominium, between small and medium, according to the region. In addition, the rural model is composed not only of small producers. Except for large producers who could have their warehouse structure, the collective action financially enables the entire warehouse structure and expenses with the model. This warehouse structure, which is one of the main common objectives of the model, according to 82.2% agreement.

Table 6 - Frequency of responses from member producers related to Theory of Logic of Collective Action.

Group	Questions	Strongly disagree	I disagree	Neither disagree nor agree	I agree	I totally agree
		1	2	3	4	5
Collective Action Logic Theory	Rural Warehouse Condominiums only work with small rural producers.	22.2%	44.4%	22.2%	8.3%	2.8%
	Rural producers participate only in the collective action model of the Condominium type.	8.2%	41.1%	20.5%	24.7%	5.5%
	The Rural Warehouse Condominium provides advantages to members.	0.0%	0.0%	0.0%	57.5%	42.5%
	The Rural Warehouse Condominium reduces the disadvantages of the rural environment to the partners.	2.8%	8.3%	4.2%	68.1%	16.7%
	The common objective of Rural Warehouse Condominiums is the warehouse structure.	1.4%	8.2%	8.2%	58.9%	23.3%
	As a small group, Condominiums have more advantages over larger groups.	6.8%	24.3%	24.3%	29.7%	14.9%
	Smaller organizations are easier to promote collective interest.	2.7%	17.6%	20.3%	45.9%	13.5%
	There are common economic objectives among rural producers in Rural Warehouse Condominium.	0.0%	1.4%	4.1%	64.9%	29.7%
	There are shared interests among rural producers at Rural Warehouse Condominium.	0.0%	0.0%	5.5%	67.1%	27.4%
	Rural producers act in common to promote interests.	1.4%	2.7%	15.1%	61.6%	19.2%
	Organizations perish when they do not promote the interests of their members.	0.0%	11.1%	13.9%	47.2%	27.8%
	Smaller groups have more advantages over larger groups.	4.1%	32.9%	30.1%	23.3%	9.6%
	In a small collective group, individual efforts will influence the final results more.	1.4%	23.3%	16.4%	43.8%	15.1%
	The collective group Rural Warehouse Condominium is more efficient.	0.0%	0.0%	9.5%	66.2%	24.3%
	The smaller the collective group, the closer the individual achieves collective benefits.	2.7%	23.0%	24.3%	41.9%	8.1%
	The individual effort of someone in a smaller group will be more effective.	0.0%	21.9%	21.9%	46.6%	9.6%
	Economic and social incentives promote the formation of groups.	1.4%	2.7%	21.9%	56.2%	17.8%
	Respect, friendship and prestige promote the formation of groups.	0.0%	0.0%	1.4%	44.6%	54.1%
	Social pressure in groups makes rules and obligations easier to comply .	0.0%	4.1%	12.2%	62.2%	21.6%
	Smaller groups more easily achieve collective benefit.	1.4%	21.9%	21.9%	39.7%	15.1%
	Common economic objectives are materialized with greater strength and effectiveness through collective action.	0.0%	2.7%	5.4%	56.8%	35.1%

In addition, concerning smaller groups and larger groups, rural producers disagree by 31.1% that smaller groups have more advantages than larger groups; 25.7% disagree that the smaller

the collective group, the closer is the individual, easierwill be to achieving collective benefits; and 21.9% disagree that individual effort in a smaller group will be more effective.

In the Theory of Logic of Collective Action, according to Olson (1965), smaller groups have more advantages than larger groups because the group will be closer to reaching the optimum point of obtaining the collective benefit. In the model of smaller groups and the case of Rural Warehouse Condominiums, it is noted that smaller groups are more efficient and effective. Social Incentives work better, the collective benefit is more easily achieved. They have fewer opinions and thus diverge lessdivergence of ideas and opinions. They are more easily controlled and organized, and decisions are more agile and easier to make.

It is worth remembering that the rural model brings several advantages of collective action, and, therefore, financial viability is not the only inducer to create a Rural Warehouse Condominium. Thus, other benefits are provided for large producers as well, such as social, economic and political. This fact is evidenced in 100% agreement among the member producers, concerning to the provision of advantages to the partners by the Rural Warehouse Condominium. The great majority are due to Collective Action regarding the existence of common economic and social objectives and incentives, and, the promotion and common interests, with emphasis on the importance of having common economic objectives among them, with 94.6% agreement.

In this sense, as for the Logic of Collective Action, the benefits of more significant agreement among rural producers stand out: (i) the Rural Warehouse Condominium reduces the disadvantages of rural areas to partners, with 84.7% agreement; (ii) the collective group Rural Warehouse Condominium is more efficient, with 90.5% agreement; and (iii) the common economic objectives materialize with greater strength and efficiency through collective action, with 92% agreement.

Other characteristics that converge with the Theory of Logic of Collective Action and presents high agreement among the producers are the relations of respect, friendship and prestige that help in the promotion of the formation of groups, with 98.6%; and, the social pressure in groups that makes rules and obligations more easily fulfilled, with 83.8%.

Additionally, around 74% consider that economic and social incentives promote the formation of groups. These two aspects stand out for the structuring of Rural Warehouse Condominiums and the member producers since from an economic point of view an activity needs to generate profit to maintain itself. Another important factor is that the Condominiums can sell their products at any time of the year, plus the higher income from the sale of the product, and dilution of the cost of making the warehouse structure in the group viable. According to research and theory, common economic objectives materialize with greater strength and effectiveness through collective action.

In the case of social incentives, there is a clear union of producers through Condominiums that provide better interpersonal relationships, exchange of knowledge, technical and professional growth, job creation and learning. Through them, there is respect and friendship between producers and easy to follow the rules and obligations through the 'social pressure' in collective action to achieve the collective benefit.

Finally, almost 50% of rural producers responded that they disagree about participating only in collective action, such as the Condominium. In addition to participating in Warehouse Condominiums, most producers also participate in other rural collective actions in the region, such as Cooperatives.

In some ways, the different types of rural collective actions generate beneficial competition between them and other ventures and companies. With the current scenario increasingly competitive and dynamic, groups and organizations need to be efficient and effective to gain

market share. Thus, the Rural Collective Actions are important for rural producers, generating advantages, strengthening, growth, and developing the rural activity.

4.2 Multiple Correspondence Analysis

After inserting the data obtained from the research into the SPSS program, the first summary of the model was obtained (Table 7) and the Discrimination Measures (Table 8) with all variables, without the selection of variables with representative loads.

Table 7 - Discrimination Measures with complete data.

Dimension	Cronbach's alpha	Variance accounted for	
		Total (eigenvalue)	Inertia
1	0.923	7.408	0.463
2	0.871	5.458	0.341
Total		12.866	0.804
Average	0.901	6.433	0.402

The summary of the model shows that Cronbach's Alpha is very close to 1, with dimension 1 resulting in 0.923 and dimension 2 resulting in 0.871. The result of Cronbach's alpha shows strong reliability of the dimensions of the construct, absence of random error and good adjustment for both dimension 1 and dimension 2. Thus, the analysis of Cronbach's alpha confirms high reliability and consistency for multivariate analysis.

Table 8 groups the main determinants of the model after eliminating the variables with lower loads.

The discrimination measures show the interviewees' perceptions regarding the statements that were asked through the Correspondence Analysis for the first two dimensions 1 and 2. Thus, Table 8 presents the indicators that evaluate the contribution of each variable in the definition of dimensions.

The closer to 1, the greater the representativeness to determine the reasons for choosing the Rural Collective Action model of the Rural Warehouse Condominium type, from the perspective of rural producers and according to the Theory of Logic of Collective Action.

Even from the most representative loads in the dimensions, it is possible to observe prominent variables in each group and a larger number of determining variables in the Collective Action Logic group. Social group, the Rural Collective Action Rural Warehouse Condominium model promotes the strengthening of rural activity, being critical in 0.922 in dimension 2. This result shows the link between member producers through the collective action model and the advantages it makes it possible - commercializing production, increasing profit, reducing logistical bottlenecks, etc. -, generating growth and development for everyone involved in collective action and agribusiness.

In this sense, the development of rural activity through collective action is more efficient and effective than if done individually. This characteristic is evident in the Theory of Logic of Collective Action and the Condominium model. This advantage was also noted by Wenningkamp & Schmidt (2016), as the collective rural action helps local and regional development. Therefore, it strengthens the rural activity of the region as a whole.

As for the logistics Infrastructure, the member producers correspond mainly about reducing costs of transporting and storaging with a determination of 0.603 in dimension 2. This variable is clear to motivate the collective action as Condominium of Rural Warehouses, since one

of the main objectives of the model is to make the warehouse viable in a small groups, and consequently, the costs are shared among them, since they no longer need to use third-party warehouses and face logistical distribution bottlenecks, together with the fact that they own the warehouse and this makes them their heritage.

Table 8 - Representative variables for determining the Rural Warehouse Condominium model.

		Dimension		Average
		1	2	
SOCIAL	1. Strengthens rural activity	0.922	0.304	0.613
	2. It makes it possible to face social and economic crises	0.529	0.540	0.534
	3. Work is easy	0.036	0.385	0.211
LOGISTICS AND INFRASTRUCTURE	4. Reduces transportation costs	0.156	0.583	0.370
	5. Reduces freight costs	0.200	0.507	0.353
	6. Reduces warehouse costs	0.015	0.603	0.309
POLITICAL	7. Financing lines for agricultural warehouse are lacking	0.311	0.298	0.304
	8. Credit lines are lacking for small and medium producers	0.079	0.369	0.224
ECONOMIC	9. Adds value to the product	0.045	0.290	0.168
	10. Facilitates the commercialization of production	0.071	0.359	0.215
	11. Its implementation is expensive	0.923	0.177	0.550
MANAGEMENT AND QUALITY	12. The interpersonal relationship between tenants can lead to disagreements	0.916	0.162	0.539
LOGIC OF COLLECTIVE ACTION	13. Smaller organizations are easier to promote collective interest	0.685	0.288	0.486
	14. Rural producers act in common to promote interests	0.918	0.219	0.569
	15. In a small collective group, individual efforts will influence results more	0.928	0.309	0.619
	16. The smaller the collective group, the closer the individual will be to achieving collective benefits	0.676	0.065	0.371
	Total assets	7.408	5.458	6.433

The Political and Economic parameters, in some way, are related to the variables of greatest determination for the Condominium model. The economic and financial viability of a warehouse is not feasible individually for small and medium producers in the region, as seen in determining 0.923 in size 1 “its implementation is costly”. In a collective action, the warehouse becomes

viable for this profile of producers, as costs and financing are shared among all partners. Thus, the importance of financing programs for this target group, specifically, of small and medium-sized farms, is evident, to boost the growth and development of the rural activity, circumvent logistical bottlenecks and obtain the advantages of this collective action.

For Management and Quality, the interpersonal relationship between the producers can cause misunderstandings and obtained 0.916 in dimension 1. Therefore, it is essential to have good management practices and neutral administration in the model to avoid this condition, providing smooth running of activities and interaction between the partners.

Finally, the variables in the Collective Action Logic group were the ones that obtained the highest dimensions and with the greatest number of variables, being important determinants for the rural model of the Condominiums "rural producers act in common to promote interests" and "in a small collective group, individual efforts will influence results more", with 0.918 and 0.928, respectively in dimension 1. In addition, Olson (1965) describes that one of the primary purposes for collective action is to have a common objective, which in the case of rural producers of the Condominium is to have its warehouse structure. Of course, along with this, other advantages and interests of the producers are promoted, as well as, each producer will do his best to influence the final result and the associates participate more actively in the activities. So, achieving these goals is more efficient and effective through a collective action, such as the Condominium of Rural Warehouses.

It is worth mentioning the other two variables of this collective action group since they are closer to the Theory of Logic of Collective Action concerning smaller groups and are also critical for the rural model: "smaller organizations are easier to promote collective interest" and "the smaller the collective group, the closer the individual will be to achieving collective benefits", obtaining 0.685 and 0.676 in dimension 1, respectively. In the Logic of Collective Action, smaller groups have more advantages than larger groups, since they reach collective benefit more easily, promote individual interest more easily, cohesion and efficiency are better, there are social incentives - friendship, prestige, respect etc. - among the partners, absence of *free-riders* (Olson, 1965), and, the results are more satisfactory due to the easy control and agility of the actions in the smaller group (Maeda & Saes, 2009).

4.3 Correlation

From the most significant variables, it was possible to elaborate a correlation matrix between them, showing the relationships and how strong one variable's association is with another (Table 9). In addition, Table 10 shows the Intraclass Correlation Coefficient.

Table 9 - Intraclass Correlation Coefficient.

	Intraclass correlation	95% Confidence Interval		F Test with True Value 0			
		Inferior limit	Upper limit	Value	df1	df2	Sig
Unique measures	0.152	0.101	0.223	3.857	69	1035	0.000
Average measurements	0.741	0.643	0.822	3.857	69	1035	0.000

The correlation coefficient intraclass resulted in 0.741, indicating high data consistency. The correlation matrix is then shown in Table 10.

Table 10 - Correlation Matrix for the Determining Factors of Rural Warehouse Condominiums.

	S3	S4	S7	L1	L2	L3	P3	P4	E3	E4	E7	D4	O7	O10	O13	O15
S3	1.000	0.451	0.284	0.188	0.172	0.245	- 0.065	0.092	0.218	0.302	0.182	0.138	0.137	0.122	0.040	0.104
S4	0.451	1.000	0.274	0.585	0.581	0.459	0.019	0.036	0.177	0.383	0.098	0.199	0.090	0.400	0.119	0.346
S7	0.284	0.274	1.000	0.379	0.242	0.214	0.006	0.103	0.164	0.350	0.073	0.052	0.078	0.258	- 0.064	0.134
L1	0.188	0.585	0.379	1.000	0.833	0.591	0.152	0.136	0.202	0.281	0.254	0.234	0.086	0.411	- 0.014	0.181
L2	0.172	0.581	0.242	0.833	1.000	0.573	0.239	0.227	0.267	0.197	0.166	0.250	0.004	0.328	- 0.101	0.101
L3	0.245	0.459	0.214	0.591	0.573	1.000	0.068	0.225	0.194	0.197	0.069	0.336	- 0.017	0.290	0.011	0.210
P3	- 0.065	0.019	0.006	0.152	0.239	0.068	1.000	0.741	0.266	0.119	- 0.061	0.130	- 0.344	- 0.095	- 0.349	- 0.115
P4	0.092	0.036	0.103	0.136	0.227	0.225	0.741	1.000	0.332	0.201	- 0.010	0.111	- 0.441	- 0.033	- 0.366	- 0.053
E3	0.218	0.177	0.164	0.202	0.267	0.194	0.266	0.332	1.000	0.346	0.150	0.114	- 0.051	0.096	- 0.167	0.115
E4	0.302	0.383	0.350	0.281	0.197	0.197	0.119	0.201	0.346	1.000	0.237	- 0.045	- 0.086	0.157	- 0.138	- 0.058
E7	0.182	0.098	0.073	0.254	0.166	0.069	- 0.061	- 0.010	0.150	0.237	1.000	0.040	0.213	0.282	- 0.038	- 0.163
D4	0.138	0.199	0.052	0.234	0.250	0.336	0.130	0.111	0.114	- 0.045	0.040	1.000	0.076	0.311	0.085	0.103
O7	0.137	0.090	0.078	0.086	0.004	- 0.017	- 0.344	- 0.441	- 0.051	- 0.086	0.213	0.076	1.000	0.387	0.497	0.390
O10	0.122	0.400	0.258	0.411	0.328	0.290	- 0.095	- 0.033	0.096	0.157	0.282	0.311	0.387	1.000	0.307	0.292
O13	0.040	0.119	- 0.064	- 0.014	- 0.101	0.011	- 0.349	- 0.366	- 0.167	- 0.138	- 0.038	0.085	0.497	0.307	1.000	0.464
O15	0.104	0.346	0.134	0.181	0.101	0.210	- 0.115	- 0.053	0.115	- 0.058	- 0.163	0.103	0.390	0.292	0.464	1.000

From Table 10, it is possible to notice that most of the correlations are directly proportional . There are also some stronger associations between the variables, such as cost reduction with freight (L2) and cost reduction with transport (L1), resulting in a coefficient of 0.833; and, there is a lack of financing lines for small and medium producers (P4) and there are no financing lines for agricultural warehouse (P3), resulting in a coefficient of 0.741.

From the first strongest association, L1 and L2, as the cost of freight is included in the cost of transportation, if one of them decreases, the other will also decrease. In addition, the Condominiums are close to the members' agricultural areas, at distances of a maximum of 50 km, and in strategic locations that facilitate the flow and distribution of production. Such conditions provide the reduction of the transport costs for the farmers.

In addition, there is a high correlation for the need for financing lines, emphasising certain profiles of farmers, such as small and medium-sized ones, and warehouse, with conditions that better serve this rural group financially, generating growth and development agribusiness.

In addition, there are four other representative associations. Among reduction of transport cost (L1) and a decrease in warehouse cost (L3) with 0.591; reduction in transport costs (L1) and the possibility of facing social and economic crises (S4) with 0.585; cost reduction with freight (L2) and the possibility of facing social and economic crises (S4) with 0.581; and freight cost reduction (L2) with swarehouse cost reduction (L3) with 0.573. These associations indicate that the rural model reduces logistic costs (freight, transport and warehouse). In the case of warehouse, as they have their structure, they can enjoy the space and the advantages it generates, such as strategic commercialization, at any time of the year. These conditions strengthen producers to face social and economic crises.

Finally, for the variables of the Collective Action Logic, the strongest correlations are: (a) in a small collective group, individual efforts will influence results more (O13) with smaller organizations are easier to promote collective interests (O7) resulted in 0.497; and (b) in a small collective group, individual efforts will influence the results more (O13) with the smaller the collective group, the closer the individual will be to achieving collective benefits (O15), resulted in 0.464. Such relationships are in line with Olson's Theory of Collective Action (Olson, 1965) tha presupposes that in smaller groups have more advantages than large groups since they can more easily reach interests and the results are more satisfactory, efficient and effective.

4.4 Discussion

The Collective Action Logic theory clearly demonstrates that from the moment that individuals have common economic objectives, a collective action can arise. This argument is apparent to Rural Warehouse Condominiums.

The small group of rural producers with common economic goals is present in the rural collective action model, through warehouse. Rural producers aspiring to have their own warehouse structure, taking advantage of the condominium system and warehouse, and overcoming logistical bottlenecks, structured the collective rural action present in Brazilian agribusiness through the division of quotas of warehouse.

The model is that of a small group, between 8 and 24 rural producers, who produce in an area of 4557.14 hectares on average, capable of generating income through the sale of production and warehouse. Thus, there is a financial-economic condition to make the warehouse structure viable and maintain the Condominium's costs over the long term.

In addition, the producers who belong to the Condominium already had experience and/or knowledge in other forms of collective actions, such as cooperatives, and many unit owners were

already part of other types of collective models. However, the Rural Warehouse Condominium differs from these other models, as it makes the warehouse structure a common asset for all member of rural condominium. In addition the model enables the strategic commercialization of production, direct product sales, superior profit from the sale, a less bureaucratic model, greater decision-making power over their products, reduced queues for loading/unloading the warehouse and entering the unit, and producers own their own warehouse structure. Individually, on the other hand, these small and medium producers are not able to make their own warehouse structure in a feasible way.

In this context, being a small, restricted and closed group, as is the case with Rural Warehouse Condominiums, is a determining factor for the success of collective action. Relationships of trust and friendship between the partners, with similar profiles and ideas, contributed to the smooth running of the model's decisions and activities.

Notably, the adequate structure, good organization and transparency, together with a neutral professional to manage the model, and financial-economic conditions, promote the longevity and expansion of Rural Warehouse Condominiuns, and competitivity for Brazilian Agribusiness.

It is worth noting that the country's political and economic conditions can encourage the structuring and expansion of the model. Government incentives, such as interest rates, rural credit and financing programs for warehouse and the profile of small and medium rural producers, are motivator factors to make Rural Condominiums viable. This characteristic can be seen in the study of Rayamajhee & Bohara (2021) who investigated how collective action can benefit from conditions such as Social Capital.

Together with the Logic of Collective Action Theory, the Rural Warehouse Condominiums, formed by small groups, present more benefits in relation to larger groups. Olson (1965) argues that small groups more easily reach the optimal point of obtaining the collective benefit.

Thus, economic goals, cohesion and efficiency, control and agility of actions, collective benefit, promotion of individual interest, social incentives, results and the absence of freeriders are more satisfactory in small groups. The small group also has few divergence of opinions and points of views, are easier to control and organize, and decisions can be taken faster and easier. Therefore, small groups have more advantages over larger groups, corroborating the statement of Olson (1965).

Remarkably, such characteristics can be seen among other models of class action similar to Warehouse Condominiums, such as Milk Condominiums (Olivo & Possamai, 2000; Gullo, 2001; Tesche, 2007; Kiyota et al., 2012), Swine Condominiums (Moyano-Estrada & Anjos, 2001), and, Agroenergy Condominiums (Paula et al., 2011; Barichello, 2015; Almeida et al., 2017). These other rural collective actions aim to divide together structures that are used in common to enjoy economic activity.

In this way, from the moment that individuals have common economic goals and seek to overcome challenges, a collective action presents tools to structure itself, mainly aimed at diluting the cost among all members and generating mutual benefits for the partners.

Additionally, descriptive statistics analyzed the frequency of responses from rural producers belonging to Rural Warehouse Condominiums within the Social, Logistics and Infrastructure, Political, Economic, Management and Quality groups, and Collective Action Logic. As for the Social characteristics, the model stands out with greater job generation, strengthening of rural activity, the viability of the warehouse structure itself through the group, and more competitive collective action.

For the Logistics and Infrastructure characteristics, there is a reduction in the warehouse deficit, simplification of logistics distribution operations and reduction of logistical bottlenecks.

As for the reduction of transport and freight costs, the rural model is not as representative, since the main activity of the collective is warehouse, which does not significantly influence transport and freight costs.

As for the Political aspects, there is a lack of specific public policies for the rural model of Rural Warehouse Condominiums, with a view to the profile of smaller rural producers and agricultural warehouse.

As for the Economic group stands out among all groups with levels of agreement around 90% in which the Rural Warehouse Condominium increases profit, adds value to the product, facilitates the commercialization of production, and the rural model promotes cost dilution among all partners.

For Management and Quality, the producers participating in the Condominiuns were unanimous to state that good management practices and meetings guarantee the success of the model. In addition, 93.2% agree that there is greater agility to deliver/sell the product through the Rural Warehouse Condominium due to the agility in the warehouse loading and unloading and not facing queues at the warehouses.

In the last group of the Logic of Collective Action, the farmers disagreed in 56.6% that the model works only with small rural producers. The Condominium model includes small, medium-sized rural producers in the region. Its operation takes place effectively due to this diversity of profiles, mainly to cover the costs of the entire structure.

About smaller groups, the perception of the residents was between 22% to 31% to disagree that smaller groups have more advantages than larger groups; that the smaller the collective group, the closer the individual can achieve the collective benefit; and individual effort in a smaller group will be more effective. In the Theory of Logic of Collective Action, smaller groups have more advantages than larger groups, since the group will be closer to reaching the optimum point of obtaining the collective benefit.

In addition, the model in the view of the producers and confronted with the theory reveals advantages beyond making the structure as a whole possible, such as: reducing the disadvantages of the rural environment; greater group efficiency; economic objectives materialize with greater strength and efficiency; and social pressure makes rules and obligations more easily enforced.

Together with the advantages, the relations of friendship and prestige, and the economic and social incentives, they promote the formation of groups according to the perceptions of the produces. In the Theory of Logic of Collective Action, these characteristics are also present and motivate the structuring of groups.

Additionally, the Multiple Correspondence Analysis allowed to analyze the associations between the research variables simultaneously. Among the groups, the Collective Action Logic was the one that obtained the most significant representation of loads in the dimensions and the largest number of determining variables, being critical for the structuring of collective actions Condominiums of Warehouses: (i) Smaller Collective Actions are easier to promote the collective interest; (ii) Rural producers act in common to promote interests; (iii) In a small collective group, individual efforts will influence results more; and, (iv) The smaller the collective group, the closer the individual will be to achieving collective benefits.

Of the other groups, the Multiple Correspondence Analysis also identified determining variables for the collective action of Warehouse Condominiums, such as (v) the strengthening of rural activity and the possibility of facing social and economic crises; (vi) reduction in warehouse and transportation costs; (vii) lack of financing lines for agricultural warehouse and small and medium rural producers; (viii) ease in selling the product; and (ix) high cost of implementation.

Finally, the correlations between the main reasons that determine the choice of the Rural Collective Action model Condominium Warehouse show the strongest relationships between these associations, being directly proportional in most part and between the cost reduction with freight (L2) and the reduction the cost of transportation (L1), resulting in 0.833; and, between the lack of financing lines for small and medium producers (P4) and the lack of financing lines for agricultural warehouse (P3), resulting in 0.741.

5. Final Considerations

This study investigated which reasons determine the choice of the Rural Collective Action model Rural Warehouse Condominium through a quantitative analysis from the perspective of rural producers and Collective Action Logic Theory.

The results indicate the main motivating factors for the Rural Warehouse Condominium model through Social, Logistics, Political, Economic, Management and Collective Action Logic variables. Among these, the Collective Action Logic resulted in a greater load for the dimensions and a more significant number of determining variables, with the following decisions: (i) Smaller Collective Actions being easier to promote the collective interest; (ii) rural producers act in common to promote interests; (iii) in a small collective group, individual efforts will most influence results; and, (iv) the smaller the collective group, the closer the individual will be to achieving collective benefits.

On the other hand, the correlations show stronger relationships between freight cost reduction and transport cost reduction (0.833); and, between the lack of credit lines for small and medium producers and the lack of credit lines for agricultural warehouse (0.741).

As future studies, we suggest: (i) to analyze and discuss the Rural Condominiums model under the Transaction Cost Theory approach; (ii) technical analysis and financial-economic feasibility studies for Silage and Solar Condominiums; (iii) prepare a methodology for measuring the cost (value) of the warehouse quota, considering the possibility of a partner leaving the model, selling the quota or family succession; (iv) measure the reduction in logistics costs with the Rural Warehouse Condominium model; (v) measure the agricultural sales margins through the Rural Warehouse Condominiums; and, (vi) apply the Multiple Correspondence Analysis with other collective groups or Rural Organizations.

Among the limitations of this study, we should point out that it is restricted to Warehouse Condominiums located in the region of Palotina, State of Paraná, as well as the city of Ipiranga do Sul, State of Rio Grande do Sul, Brazil. Furthermore, the study does not intend to generalize the results, in view of the criteria and procedures for determining the sample, which is non-probabilistic, defined by accessibility. Considering that the study approach is quali-quantitative, which also limits the extrapolation of results to other realities and contexts. The work is also limited to the analysis of results according to Olson's Theory of Collective Logic (Olson, 1965). Thus, confrontations with other organizational theories can lead to different results.

Finally, this paper contributes disseminating the collective action model of Condominiuns of Rural Warehouses; integrating the analysis under te lens of the Theory of Logic of Collective Action; providing inputs for decision-making, and contributing to fill a gap in the related- literature. This paper can be helpful for researchers, practitioners and public managers interested in this topic. In addition, this study opens new discussions in the public sphere and for private agents about the importance of warehouse for Agribusiness, the need to reduce the interest rate for financing warehouse, and the incentive for rural collective practices.

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