Cooperativismo como factor de impulso de las cooperativas agropecuarias que integran el ecosistema del NODESS del valle de Serdán

Cooperativism as a driving factor for the agricultural cooperatives that make up the NODESS ecosystem of the Serdán Valley

O cooperativismo como fator impulsionador das cooperativas agrícolas que compõem o ecossistema NODESS do Vale do Serdán

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Resumen

La investigación analiza el impacto del cooperativismo en la competitividad de cooperativas, sociedades y PYMES agropecuarias que forman parte del ecosistema del Nodo de Desarrollo Económico y Social Sostenible (NODESS) del Valle de Serdán. El estudio busca fortalecer la colaboración interorganizacional mediante la implementación del modelo cooperativo, con el objetivo de promover el desarrollo sostenible a nivel local. Se empleó un enfoque cuantitativo y correlacional, y se recopilaron datos a través de encuestas estructuradas aplicadas a 213 miembros activos.

Los resultados, analizados mediante la correlación de Spearman, revelaron una correlación positiva significativa entre el nivel de cooperativismo y las percepciones de los participantes sobre la economía social y solidaria. Con un coeficiente de correlación de 0,630 ($p < 0{,}01$), los hallazgos indican que el cooperativismo no solo fortalece la eficiencia y capacidad productiva de las entidades participantes, sino que también impulsa el desarrollo económico y social del Valle de Serdán, conforme a los objetivos de NODESS. Esta investigación destaca la importancia del cooperativismo como herramienta organizativa en comunidades rurales, facilitando el acceso a nuevos mercados, el intercambio de conocimientos y el aumento de la competitividad en el sector agrícola. El estudio sugiere que el modelo cooperativo puede jugar un papel crucial en el crecimiento sostenible de estas organizaciones dentro del ecosistema NODESS, promoviendo el desarrollo económico y social local.

Palabras clave: competitividad, economía social y solidaria, educación solidaria, emprendimiento comunitario.

Abstract

The research analyzes the impact of cooperativism on the competitiveness of cooperatives, societies, and agricultural SMEs that are part of the Sustainable Economic and Social Development Node (NODESS) ecosystem in the Serdán Valley. The study aims to strengthen interorganizational collaboration through the implementation of the cooperative model, with the objective of promoting sustainable development at the local level. A quantitative and correlational approach was used, and data were collected through structured surveys applied to 213 active members.

The results, analyzed using Spearman's correlation, revealed a significant positive relationship between the level of cooperativism and the participants' perceptions of the social and solidarity economy. With a correlation coefficient of 0.630 ($p < 0.01$), the findings

indicate that cooperativism not only enhances the efficiency and productive capacity of participating entities but also drives the economic and social development of the Serdán Valley, in alignment with NODESS objectives. This research highlights the importance of cooperativism as an organizational tool in rural communities, facilitating access to new markets, knowledge exchange, and increased competitiveness in the agricultural sector. The study suggests that the cooperative model can play a crucial role in the sustainable growth of these organizations within the NODESS ecosystem, promoting local economic and social development.

Keywords: Competitiveness, Social and solidarity economy, solidarity education, community entrepreneurship.

Resumen

Os setores secundário e terciário são uma chave fundamental para o fornecimento de produtos e serviços a uma sociedade. Esses setores baseiam-se diretamente nos processos e atividades envolvidos na produção. Ou seja, o planeamento e a gestão da cadeia de abastecimento com base nas necessidades e especificidades de cada setor desempenham um papel fundamental na sua definição.

A pesquisa analisa o impacto do cooperativismo na competitividade das cooperativas, sociedades e PME agrícolas que compõem o ecossistema NODESS do Vale do Serdán. Este estudo centra-se no fortalecimento da colaboração entre organizações através da implementação do modelo cooperativo, integrando o Nó para o Desenvolvimento Económico e Social Sustentável (NODESS), e visa promover o desenvolvimento sustentável a nível local. Utilizando uma abordagem quantitativa e correlacional, os dados foram recolhidos através de inquéritos estruturados a 213 membros activos de cooperativas, sociedades agrícolas e PME. Os resultados, analisados através da correlação de Spearman, revelaram uma correlação positiva significativa entre o nível de cooperativismo e as percepções dos participantes sobre a economia social e solidária. Com um coeficiente de correlação de 0,630 (p < 0,01), estes resultados sugerem que o cooperativismo não só fortalece a eficiência e a capacidade produtiva das entidades envolvidas, mas também promove o desenvolvimento económico e social no Vale do Serdán, em linha com os objectivos do NODESS. Esta investigação destaca a importância do cooperativismo como ferramenta organizacional nas comunidades rurais, facilitando o acesso a novos mercados, a troca de conhecimento e aumentando a competitividade no setor agrícola. O estudo sugere que o modelo cooperativo

pode desempenhar um papel crucial no crescimento sustentável destas organizações dentro do ecossistema NODESS, promovendo o desenvolvimento económico e social local.

Palavras-chave: Competitividade, Economia social e solidária, educação solidária, empreendedorismo comunitário.

Introduction

This research analyzes the role of cooperativism in the development and competitiveness of cooperatives, partnerships, and small and medium-sized enterprises (SMEs) in the agricultural sector, within the context of the local economy of the Serdán Valley. The project, entitled *"Cooperativism as a driving force for the agricultural cooperatives that make up the NODESS ecosystem of the Serdán Valley ,"* focuses on exploring and enhancing the positive impact of cooperativism on regional socioeconomic development. Despite the area's vast agricultural potential, the Serdán Valley faces significant challenges in terms of competitiveness and sustainability, which directly affect agricultural cooperatives and SMEs, which constitute an essential foundation of its economy.

The Sustainable Economic and Social Development Node (NODESS) is an initiative that seeks to promote regional development through collaboration between different economic and social actors. In this sense, NODESS acts as a catalyst for sustainable practices that improve production conditions, promote employment, and strengthen the social and economic fabric. Cooperativism, in its role as an organizational model, facilitates the integration of these actors and allows cooperatives and SMEs to share resources, knowledge, and strategies. Through this collaborative dynamic, an environment conducive to the growth and resilience of the organizations participating in the NODESS ecosystem is created.

The main objective of the study is to determine whether cooperativism positively impacts the competitiveness of these organizations within the NODESS ecosystem. To this end, a quantitative methodology is used to analyze the relationship between cooperative practices and competitiveness indicators. The hypothesis is that cooperativism, by fostering an organizational model based on participation and collective benefit, can significantly improve the competitiveness of cooperatives, corporations, and agricultural SMEs. This relationship is assessed by correlating key variables such as productive efficiency, innovation, and the sustainability of practices.

Adopting the cooperative model not only represents an advantage for the organizations involved but also contributes to the economic and social well-being of the region. This form of organization allows cooperatives and SMEs to improve their processes, reduce costs, and access new markets through an organizational structure that promotes equitable participation and the commitment of all its members. In addition to representing an advantage for the organizations, the cooperative model contributes to regional economic and social well-being by promoting a structure based on equitable participation, solidarity, and local commitment.

In summary, the main objective of this research was to analyze whether cooperativism is a driving factor in the competitiveness of agricultural cooperatives, societies, and SMEs integrated into the NODESS ecosystem of the Serdán Valley, for the development of the Social and Solidarity Economy (SSE). To achieve this objective, a quantitative study was conducted, using surveys to collect data and Spearman correlation analysis to evaluate the relationships proposed. This approach aims to contribute to the design of public policies aimed at strengthening integration, collaboration, and sustainability within the NODESS ecosystem, thus promoting economic and social development in the region.

Materials and Method

The study uses a correlational research design, focusing on the relationship between cooperativism and competitiveness. It was approached from a quantitative perspective, based on deductive reasoning, from which hypotheses were proposed and empirically validated. This approach uses data collection to objectively test hypotheses, ensuring that the study variables are not influenced by the researcher (Hernández et al., 2014).

Operation aligning the variables:

Table 1 presents the relationship between the variables, dimensions, indicators and measurement units used in the research.

Table 1 the research variables

Variable	Dimensions	Indicators	Units of Measurement
Cooperativism	Knowledge of the competitiveness of cooperatives	Level of agreement on competitiveness	Likert scale (1-5)
	Knowledge to promote cooperativism	Participation in promotional activities	Number of activities participated in
	Knowledge of social support	Opinion on support strategies	Likert scale (1-5)
	Knowledge of environmental development	Perception of environmental impact	Likert scale (1-5)
Competitiveness	Knowledge of management skills for cooperativism	Assessment of management skills	Number of skills identified
	Knowledge of solidarity economy	Level of familiarity with principles of solidarity economy	Likert scale (1-5)
	Knowledge of development strategies	Identification of relevant strategies	Number of strategies identified

Note: Operationalization of variables used in the data collection instrument. Source:

Prepared by the authors.

Variables

Two main variables are identified: one independent (competitiveness) and one dependent (cooperativism). These variables represent the fundamental concepts to be analyzed and validated through their corresponding operationalization. In this case, they are:

Cooperativism: Refers to the set of practices, knowledge and approaches related to cooperation between individuals and entities.

Competitiveness: Related to the capabilities and strategies that allow an entity to stand out and remain in the market.

Dimensions: These are the specific aspects of each variable that will be evaluated. Each dimension focuses on a particular area:

The following dimensions were assessed in the "cooperativism" variable: knowledge of cooperative competitiveness, promotion of cooperatives, social support, and environmental development. The "competitiveness" variable was analyzed through management skills, knowledge of the solidarity economy, and development strategies. The indicators and measurement units are detailed in Table 1.

The research was retrospective, analyzing data collected through surveys that asked participants about past events, with the aim of testing the proposed hypothesis. It was also a cross-sectional study, as data were collected at a single point in time, between March and August 2024. This methodology provided a timely view of the relationship between cooperativism and competitiveness.

Population and Sample

The target population consisted of active members of cooperatives, agricultural societies, and SMEs located in the Serdán Valley of Puebla. This valley includes the municipalities of Serdán City (Chalchicomula de Sesma), Tlachichuca , Esperanza, Aljojuca , Atzitzintla , San Nicolás Buenos Aires, San Salvador El Seco, San Juan Atenco, and Cañada Morelos.

A representative sample was selected from this population using stratified random sampling, taking into account the diversity of cooperative sectors, societies and SMEs in the region.

The sample size was calculated with a confidence level of 95% and a margin of error of 6.72%. The general formula for calculating the sample size in unknown populations was used.

Figure 1the sample size.

$$n = \frac{Z^2 \cdot p \cdot q}{e^2}$$

Note: Formula applied to calculate sample size. Source: Hernández Sampieri (2014). Giving a sample size of 213 study subjects.

Data Collection Methods

A document review was conducted, examining relevant documents such as cooperative success stories, books, and academic papers to supplement the information collected. A structured survey was then designed and administered to the sample to collect quantitative data on the research variables.

In this quantitative study, data collected from a representative sample of cooperatives, agricultural societies, and SMEs were analyzed to explore the relationship between competitiveness and cooperativism. The data were obtained through structured surveys that addressed both aspects related to the adoption of cooperative practices and competitiveness indicators.

Data Analysis

The information that was analyzed is as follows:

Respondent profile: The sample included active cooperatives, agricultural societies and SMEs, ranging from small to medium-sized organizations.

Cooperativism Indicators: Specific indicators were used to assess the adoption of cooperative practices, such as participation in decision-making, shared ownership, and democratic management.

Using SPSS for data analysis

SPSS software (version 26), a tool widely used in quantitative research, was used. The data collected through surveys were organized into a structured Excel database for subsequent analysis.

Using Spearman's Rho Correlation Analysis with SPSS

The Spearman correlation was used in this study, a nonparametric measure used to assess the association between two ordinal variables or when the variables do not meet the normality assumptions required by the Pearson correlation. Specifically, the Spearman correlation (ρ or "Spearman's rho") measures the strength and direction of the monotonic relationship between two variables. Unlike the Pearson correlation, which assumes a linear relationship, Spearman only requires that the variables maintain a monotonic relationship, that is, one in which, as one variable increases, the other also increases or decreases consistently, although not necessarily proportionally.

Results

The first result obtained corresponds to the reliability test of the data collection instrument.

Table 2. Reliability results

Case Processing Summary		
	N	%
Valid Cases	212	99.5
Excluded ^{to}	1	0.55
Total	213	100

a. Listwise deletion is based on all variables in the procedure

Note: Table 2 shows the results of the study of the total data for the reliability analysis, source: Prepared by the author with the help of SPSS 26

Table 3. Cronbach 's Alpha Analysis

Reliability statistics	
Cronbach's alpha	Number of elements
.966	34

Source: Prepared by the authors with the help of SPSS 26

Cronbach's alpha is a measure used to assess the reliability or internal consistency of a set of items in a questionnaire or measurement scale. Figure 2 shows a Cronbach's alpha of 0.966 for 34 items. This indicates that the questionnaire items are highly correlated, suggesting excellent internal consistency. A Cronbach's alpha close to 1 reflects that the items consistently measure the same construct.

The Cronbach's alpha obtained was 0.966, indicating excellent internal consistency for the instrument, given that the items were highly correlated. According to George and Mallery (2003), an alpha greater than 0.9 is considered "excellent," confirming the reliability of the questionnaire.

Knowledge for the Promotion of Cooperativism

The promotion of cooperatives has been a key factor in the development of agricultural cooperatives, partnerships, and small and medium-sized enterprises (SMEs), especially in rural areas such as the Serdán Valley in the state of Puebla. The cooperative model is based on principles of solidarity, democratic participation, and shared benefits, making it a powerful tool for the economic and social strengthening of communities. Through the Social and Solidarity Economy Node (NODESS), agricultural organizations in this region This allows them to structure their operations under a framework oriented toward sustainable development, social inclusion, and member participation. Knowledge about promoting cooperatives is essential for these organizations to understand not only the immediate benefits of working together, but also the importance of structuring their operations under a framework of sustainable development, social inclusion, and member participation.

The relationship between cooperatives and agricultural SMEs is reflected in the way these businesses can improve their resilience and adaptability to market changes and technological demands. By promoting cooperatives, opportunities are created for agricultural cooperatives and SMEs to access better marketing, financing, and training conditions— essential elements for addressing the challenges of the agricultural sector in the 21st century. Furthermore, this approach promotes greater equity in the distribution of economic benefits, which contributes to the comprehensive development of rural communities. Therefore, promoting cooperatives not only strengthens the local economy but also fosters social cohesion and the empowerment of small producers.

Table 4. Identification if they know the promotion of cooperativism

Knowledge for the Promotion of Cooperativism				
		Frequency	Percentage	Valid percentage
Valid	Totally agree	33	15.5	15.5
	Somewhat agreed	95	44.6	44.6
	Neither agree nor disagree	67	31.5	31.5
	Disagree	18	8.5	8.5
	Total	213	100.0	100.0

Note: Table 4 presents the classification of respondents according to their level of knowledge of the promotion of cooperativism. Source: prepared by the authors with the help of SPSS

Figure 2. Percentage of respondents who identify the promotion of Cooperativism
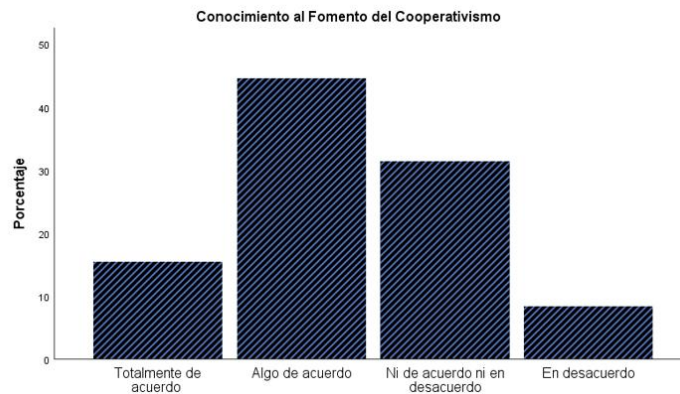
Note: Percentage of people surveyed who identify as cooperatives, source: own elaboration with the help of SPSS

The majority of respondents, 44.6%, somewhat agree with the need to promote cooperativism, while 31.5% have a neutral position (neither agree nor disagree). 15.5% strongly agree, and only 8.5% disagree. This suggests a favorable trend toward cooperativism among those surveyed.

In summary, the results show a favorable trend toward cooperativism, although a significant percentage of people also adopt a neutral stance, which could indicate the need for more education and promotion on the topic to increase awareness and support.

Table 5. Identification of development strategies

Knowledge of Development Strategies				
		Frequency	Percentage	Valid percentage
Valid	Totally agree	37	17.4	17.4
	Somewhat agreed	123	57.7	57.7
	Neither agree nor disagree	42	19.7	19.7
	Disagree	7	3.3	3.3
	Totally disagree	4	1.9	1.9
	Total	213	100.0	100.0

Note: percentage of people who identify development strategies, source: prepared by the authors with the help of SPSS.

Respondents' responses regarding their awareness of development strategies. Most respondents agree or express a positive attitude toward their awareness of these strategies.

Thus, based on the responses obtained, the majority of respondents (75.1%) at least agree with the development strategies. This indicates significant support from the population, although the 19.7% who remain neutral point to a possible lack of communication or understanding of these strategies. The small percentages of disagreement (3.3% and 1.9%)

reflect a minority who see no value in these strategies, which could suggest the need to reevaluate or adjust certain aspects of them to increase their acceptance or visibility.

Knowledge of Solidarity Economy

In this research, understanding the solidarity economy within the framework of cooperativism refers to an understanding of an economic model centered on cooperation, equity, and democratic participation, where the primary objective is collective well-being rather than the maximization of individual benefits. The Solidarity Economy emerges as an alternative to conventional economic systems, prioritizing values such as social justice, sustainability, and inclusion. In the context of cooperativism, this understanding implies the ability to manage organizations where members actively participate in decision-making and the equitable distribution of benefits.

As Coraggio (2008) notes, cooperatives operating under the principles of the Solidarity Economy foster an environment where resources are managed collectively, seeking to meet community needs and generate a positive impact on local development. This approach not only promotes economic growth but also strengthens the social fabric and respects the environment. Knowledge of the Solidarity Economy, therefore, "implies not only a theoretical understanding of these principles, but also the ability to apply them in practice by creating more just and sustainable production models" (Coraggio , 2008, p. 20).

Table 6. Identification of principles, foundations and initiatives of the Solidarity Economy

Knowledge of Solidarity Economy				
		Frequency	Percentage	Cumulative percentage
Valid	Totally agree	36	16.9	16.9
	Somewhat agreed	102	47.9	64.8
	Neither agree nor disagree	63	29.6	94.4
	Disagree	7	3.3	97.7
	Totally in disagreement	5	23	100.0
	Total	213	100.0	

Note: Table 6 shows the percentage of respondents who identify the principles, foundations and initiatives of the Solidarity Economy, source: Prepared by the authors with the help of SPSS.

The results indicate that 64.8% of respondents express some degree of agreement with the principles of the solidarity economy, while 29.6% remain neutral and 5.6% disagree. These data reveal a moderate level of awareness and acceptance, although they also highlight opportunities to strengthen the dissemination and understanding of these principles within the NODESS ecosystem.

Table 7. Number of people who relate the solidarity economy and cooperativism

I understand how the solidarity economy relates to cooperativism.				
		Frequency	Percentage	Cumulative percentage
Valid	Totally agree	29	13.6	13.6
	Somewhat agreed	106	49.8	63.4
	Neither agree nor disagree	57	26.8	90.1
	Disagree	16	7.5	97.7
	Totally disagree	5	23	100.0
	Total	213	100.0	

Note: Table 7 shows the percentage of respondents who identify the relationship between the two dimensions studied , source: Prepared by the authors with the help of SPSS.

The majority of respondents (63.4%) "Strongly Agree" or "Somewhat Agree" that they understand the relationship between the Solidarity Economy and cooperativism. Only a small percentage "Disagree" or "Strongly Disagree" (7.5% and 2.3%, respectively). This suggests a high level of acceptance or understanding of the principles that link the two ideas. This finding is significant, as it indicates a growing interest in obtaining training on this form of organization.

Table 8. Identification of Solidarity Economy successes

I am familiar with successful examples of solidarity economy initiatives.				
		Frequency	Percentage	Cumulative percentage
Valid	Totally agree	37	17.4	17.4
	Somewhat agreed	87	40.8	58.2
	Neither agree nor disagree	53	24.9	83.1
	Disagree	26	12.2	95.3
	Totally disagree	10	4.7	100.0
	Total	213	100.0	

Note: Table 8 shows the percentage of respondents who identify the successes of Solidarity Economy initiatives, source: Prepared by the authors with the help of SPSS.

Table 8 reflects the results of the survey assessing respondents' level of familiarity with successful examples of solidarity economy initiatives. The results are distributed across five response categories, ranging from "Strongly Agree" to "Strongly Disagree," with each category indicating the number of respondents (frequency), the corresponding percentage, and the cumulative percentage.

These data reveal that the majority of respondents have some level of familiarity with successful examples of solidarity economy initiatives, with over 58% falling into the agree category. However, a significant proportion (24.9%) maintains a neutral stance, which may suggest that, although they have heard about solidarity economy initiatives, they are not entirely sure of their success or relevance. Finally, a small percentage (16.9%) is unfamiliar with these initiatives, indicating a potential area for improvement in dissemination and education about the achievements of the solidarity economy movement.

The survey results demonstrate relatively broad recognition of successful examples in the field of the solidarity economy, but also reveal areas of opportunity to increase visibility and awareness among respondents.

Correlation Analysis

Correlation analysis between Cooperativism and the Social and Solidarity Economy

Table 9. Spearman Rho correlation analysis between Cooperativism and the Social and Solidarity Economy

Correlations				
			Cooperativism	Social and Solidarity Economy
Spearman's Rho	Cooperativism	Correlation coefficient	1,000	.630 **
		Sig. (bilateral)	.	.000
		N	213	213
	Social and Solidarity Economy	Correlation coefficient	.630 **	1,000
		Sig. (bilateral)	.000	.
		N	213	213
**. The correlation is significant at the 0.01 level (two-tailed).				

Note: Table 9 shows the Spearman correlation analysis of the two study variables, source:

Prepared by the author with the help of SPSS.

Table 9 presents the results of the Spearman correlation between two variables: "Cooperativism" and "Social and Solidarity Economy". The Spearman correlation coefficient (ρ) is a non-parametric measure of the correlation between two ordinal or continuous variables. This coefficient has a range between -1 and 1, where: 1 indicates a perfect positive correlation, 0 indicates no correlation, and -1 indicates a perfect negative correlation.

The Spearman correlation coefficient between cooperativism and the social and solidarity economy was 0.630, with a p-value < 0.01, indicating a moderate and statistically significant positive correlation. This suggests that the higher the level of cooperativism, the greater the agreement with the principles of the social and solidarity economy.

Significance (Sig.):

The two-tailed p-value associated with this correlation is 0.000, indicating that the correlation is statistically significant at the 99% confidence level (p < 0.01). This means that it is highly unlikely that this correlation occurred by chance.

Number of cases (N):

The total number of cases considered for the correlation analysis is 213, which provides a sufficiently large sample to perform the analysis and strengthen the statistical validity of the results.

Correlation between "Cooperativism" and "Knowledge of Solidarity Economy"

Table 10. Spearman Rho correlation analysis between "Cooperativism" and "Knowledge of Solidarity Economy"

Correlations			Cooperativism	Knowledge of Solidarity Economy
Spearman's Rho	Cooperativism	Correlation coefficient	1,000	.610 **
		Sig. (bilateral)	.	.000
		N	213	213
	Knowledge of Solidarity Economy	Correlation coefficient	.610 **	1,000
		Sig. (bilateral)	.000	.
		N	213	213
**. The correlation is significant at the 0.01 level (two-tailed).				

Note: Table 10 shows the Spearman correlation analysis of a study variable and the knowledge dimension of the Solidarity Economy, source: Prepared by the author with the help of SPSS.

The correlation coefficient between "Cooperativism" and "Knowledge of the Solidarity Economy" is 0.610. This positive value indicates a moderate positive correlation between the two variables, suggesting that as the level of knowledge about cooperativism increases, knowledge about the solidarity economy also tends to increase, and vice versa.

The value of 1.000 on the main diagonal represents the correlation of each variable with itself, which will always be equal to 1, since a variable is completely correlated with itself.

The significance level associated with the correlation between "Cooperativism" and "Knowledge of the Solidarity Economy" is 0.000. This indicates that the correlation is statistically significant, given that the significance level is lower than the commonly accepted level of 0.05. In other words, there is sufficient statistical evidence to affirm that there is a relationship between knowledge about cooperativism and knowledge about the solidarity economy, and that this relationship is not due to chance.

The correlation of 0.610 indicates a moderate association, implying that people with greater knowledge of cooperativism also tend to have a better understanding of the solidarity economy, and vice versa. Although this is not an extremely high correlation, its value is significant and suggests a considerable relationship between the two variables.

This result can be useful for educational programs and training strategies that seek to strengthen knowledge in both cooperativism and the solidarity economy, as it indicates that both areas of knowledge are interrelated. Institutions could, for example, develop comprehensive programs that address both topics jointly, taking advantage of the positive relationship between them to improve learning and understanding in both areas.

Discussion

This study analyzed the perceptions of members of agricultural cooperatives in the NODESS ecosystem in the Serdán Valley regarding cooperativism and competitiveness. The results show that these perceptions reflect the integration of cooperative principles into everyday organizational practices, as well as their influence on competitiveness. These findings are consistent with previous research conducted in rural contexts (George & Mallery , 2003; Coraggio , 2011).

Based on data collected through structured surveys, it was observed that a significant proportion of participants positively valued cooperativism as an organizational tool. The majority identified it as a key mechanism for strengthening collaboration and productive

efficiency, supporting its relevance as an organizational model for community development. However, a considerable proportion adopted a neutral stance regarding competitiveness indicators, suggesting the need to strengthen awareness of the tangible benefits of cooperativism. This finding is consistent with previous studies that emphasize the importance of training to consolidate the impact of cooperativism in rural communities (Hernández Sampieri et al., 2014; Arroyo, 2003).

Regarding the solidarity economy, Spearman's correlation analysis ($\rho = 0.630$) showed a moderate to high positive correlation between cooperativism and the perception of the principles of the social and solidarity economy. This finding is consistent with previous research highlighting how cooperative values such as equity and democratic participation strengthen social cohesion and economic development in rural contexts (Apel, 1991; Chávez, 2008). However, a low level of familiarity with the principles of the solidarity economy was identified by 83.1% of respondents. This deficit could hinder the long-term impact of the cooperative model, considering that the solidarity economy constitutes an essential component for achieving comprehensive sustainability (Coraggio , 2011).

Regarding competitiveness, the results indicate that respondents recognize cooperatives as a key factor in improving market access and facilitating knowledge exchange. However, assessments of their impact on innovation and sustainability were mixed. This result is consistent with research that emphasizes the need to integrate technology and sustainable practices as strategic components to strengthen the competitiveness of the agricultural sector (Chávez, 2008; Arroyo, 2003). This underscores the importance of developing technical and managerial skills among cooperative members.

In conclusion, the study demonstrates that cooperative members' perceptions of cooperativism and competitiveness are mostly positive. The correlation between the two variables highlights the potential of the cooperative model as a driver of socioeconomic development in the region. However, key challenges are identified related to the understanding and practical application of the principles of solidarity economy and competitiveness, which must be addressed through training strategies, community integration, and technology adoption. These findings are consistent with previous studies, reinforcing the validity of the recommendations aimed at maximizing the impact of cooperativism within the NODESS ecosystem.

Conclusion

The research showed that cooperativism is a key element in improving the competitiveness and sustainability of agricultural cooperatives and SMEs in the Serdán Valley. The data obtained reveal significant relationships between knowledge of the principles of cooperativism and the solidarity economy, as well as the organizations' capacity to collaborate and share resources. The positive correlation between cooperativism and perceptions of the social and solidarity economy suggests that, as the former strengthens, understanding and support for more just and equitable economic models also increases.

Furthermore, the results indicate that promoting cooperatives not only benefits individual entities but also contributes to the region's economic and social development. The high level of acceptance of cooperative principles among respondents highlights the need to continue promoting education and training in this area, which could translate into greater empowerment of small producers and improved resilience in the agricultural sector.

Future lines of research

The findings of this study highlight key aspects that could be explored in future research to strengthen understanding and implementation of cooperativism as an economic and social development strategy. The following lines of research are proposed as complementary and relevant.

1. Conduct qualitative studies focused on the internal dynamics of cooperatives to understand the factors that influence decision-making, group cohesion, and organizational performance.

2. Relationship between cooperativism and community resilience: Investigate how cooperative practices contribute to community resilience in the face of economic , social, and environmental crises. This would include an analysis of how cooperatives promote solidarity, self-sufficiency, and resilience in adverse scenarios.

3. Evaluating the impact of cooperative leadership: To study the role of democratic leadership in cooperatives, identifying how inclusive and participatory leadership practices influence organizational cohesion, decision-making, and overall cooperative performance.

4. Impact of cooperativism on gender equity: Explore how cooperatives foster women's equal participation in leadership roles and benefit sharing, promoting gender equality in rural and agricultural communities.

Recommendations

Development of Training Programs: Implement continuing education programs in cooperatives and the solidarity economy, aimed at cooperative members and SMEs. These programs should include practical workshops on management, financial administration, and marketing tailored to the needs of the agricultural sector.

Promoting Collaboration Networks: Establish strategic alliances between cooperatives, SMEs, and other local stakeholders to promote collaboration and knowledge sharing. Create communication platforms that facilitate access to best practices and shared resources.

Public Policy Promotion: Advocate for public policies that support the development of cooperatives and the social economy. This includes tax incentives, access to financing, and the creation of a legal framework that favors the formation and operation of cooperatives.

Community Awareness and Education: Conduct awareness campaigns to increase awareness of the benefits of cooperativism and the solidarity economy in the community. This may include talks, seminars, and informational materials highlighting success stories and best practices.

Evaluation and Monitoring: Establish evaluation and monitoring mechanisms to measure the impact of cooperative initiatives on the competitiveness of cooperatives and SMEs. This will allow for continuous adjustments and improvements to the strategies implemented.

By implementing these recommendations, we hope to not only strengthen the cooperative movement in the Serdán Valley, but also contribute to the sustainable development and well-being of rural communities by promoting a more inclusive and equitable economic model.

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