Entrepreneurial Capabilities and Sustainable Innovation in Cajamarca's "MYPES": A Transdisciplinary Study for the New Regional and Global Economy

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Abstract – The study on micro and small enterprises (MYPES) in Cajamarca focuses on achieving Sustainable Development Goals 8 (Decent Work and Economic Growth) and 9 (Industry, Innovation, and Infrastructure) by analyzing how entrepreneurial capabilities and sustainable innovation are linked to regional development. The overall objective was to examine this interplay by considering managerial competencies, financial resources, collaborative networks, and technological, environmental, and social innovation. This was a qualitative study involving interviews with entrepreneurs, supplemented by triangulation of sources. The population consisted of local actors from Cajamarca's micro and small enterprises (MYPES); the sample included entrepreneurs from the provinces of Chota, Cajamarca, and Jaén, selected for their productive heterogeneity. The results revealed inequalities in productivity, formalization, and access to financing, highlighting that Cajamarca lags behind in innovation and sustainability. The study identified managerial skills, formal credit, and collaboration as critical factors for resilience and competitiveness. The conclusion underscores the need for tailored policies that promote digitalization, green innovation, and regional cooperation, thereby consolidating MSMEs as drivers of sustainable economic and social development in the new global economy.

Keywords: Entrepreneurship, innovation, sustainable development, and regional economy.

I. Introduction

In the regional and global economy, micro and small enterprises (MSEs) have faced common challenges over the past four years, with tensions in Africa, Asia, Europe, and Oceania linked to the energy transition, uneven digitalization, and limited resilience—all of which are exacerbating the global crisis. Reference [1] indicates that, in Africa and Asia, more than 40% of entrepreneurs lack education and financing, making it difficult for startups to transition into established businesses. In Europe and Oceania, small industries are making progress in sustainability, but technological and gender gaps persist in manufacturing [2]. Reference [3] highlights that MSEs account for 90% of businesses and two-thirds of global employment, although their productivity is only one-third that of large corporations. Financing remains limited, and regarding innovation, reference [4] notes that financing remains limited, with high costs and a concentration of investment in artificial intelligence sectors. The central problem is the sustainability and innovation gap, which hinders the achievement of Sustainable Development Goals (SDGs): SDG 8, related to Decent Work and Economic Growth, and SDG 9, linked to industrial development, innovation, and infrastructure. This is compounded by a lack of equitable access, financing, digital education, and sustainable technologies, creating a double deficit: low productivity and limited resilience in the face of climate and economic crises. Overcoming this requires public policies and private-sector strategies that strengthen ecosystems of open innovation, inclusive financing, digital literacy, and the adoption of artificial intelligence, along with sustainable models aligned with the energy transition and the circular economy; this model encourages entrepreneurs to transform vulnerability into opportunity and establish themselves as drivers of regional and global development.

In Latin America and the Caribbean, micro and small enterprises (MSEs) are the backbone of the business sector, yet they face vulnerabilities stemming from low productivity, insufficient investment in research and development (R&D), and economic and environmental crises—factors that hinder their full contribution to the SDGs. Reference [5] notes that MSMEs account for more than 99% of businesses and generate nearly 61% of formal employment in the region; however, their contribution to GDP is less than 30%, representing a productivity gap. Reference [6] indicates that in Latin America, only 18% of MSEs invest in technological innovation, compared to 40% of large companies—a fact that limits the transition toward sustainable models. Chile leads with 35%, while Haiti lags behind at less than 10%. Reference [4] highlights that financing costs are 20% higher than the OECD average, which restricts the adoption of digital and green technologies; Mexico performs better, while Venezuela has an informality rate of over 70%. The region shows a 35% gap compared to advanced economies; Colombia and Uruguay stand out with progress in entrepreneurship (25%) and digitalization (60%), compared to Bolivia, which stands at 12%, and Nicaragua, which has a 50% digital divide relative to the region's leaders [7]. The central problem is the unequal capacity for sustainable innovation, which limits progress toward SDGs 8 and 9 and creates a vicious cycle of low productivity, informality, and limited resilience. The analysis identifies regional best practices in Chile, Costa Rica, and

Uruguay as replicable models and highlights the need for tailored policies focused on inclusive financing, digitalization, and regional cooperation to strengthen ecosystems of sustainable innovation and global competitiveness.

In Peru, the MYPES are key players in the national economy; their performance, entrepreneurial capacity, and sustainable innovation vary according to the country's geographic location and heterogeneity factors that influence their development and global competitiveness. Reference [8] specifies that the country's business sector accounts for 99.2% of the economy and generates more than 10 million jobs, but the capacity for sustainable innovation is marked by regional inequalities. Lima accounts for 44% of formal MSMEs, generates more than one million jobs, and leads in financing and digitalization; Arequipa, with more than 144,000 MSMEs, stands out in commerce and services driven by tourism and agribusiness [5]; La Libertad is experiencing sustained growth thanks to agricultural exports and manufacturing, with progress in financing, digitalization, and value integration [6]. In contrast, regions such as Puno, Huancavelica, and Cajamarca lag behind in productivity, formalization, and sustainability. Inequality in entrepreneurship and innovation limits the contribution of MSMEs to achieving SDGs 8 and 9, creating vulnerability to economic and climate crises. The analysis suggests replicating the best practices of Lima, Arequipa, and La Libertad through tailored policies on formalization, technological training, and access to credit in the most underdeveloped regions, while strengthening transdisciplinary networks that integrate sustainable innovation and enhance national competitiveness.

The Cajamarca region is home to numerous micro and small enterprises (MSEs), which are characterized by their multiculturalism and their role in generating employment and social cohesion; their performance varies by province, and there are structural inequalities that limit their competitiveness and their full contribution to SDGs 8 and 9. Reference [8] indicates that, within the region, Cajamarca accounts for more than 35% of formal MSMEs, which have greater access to training and financing programs, while San Marcos has a high level of informality, with more than 70% of MSMEs operating outside the tax system. Jaén exhibits agro-industrial and commercial dynamism, with more than 25,000 MSMEs linked to coffee and cocoa exports [6]. Chota reports that 20% of its MSMEs are integrated into digital platforms, compared to San Miguel, where the figure is less than 15% [5]. Celendín is characterized by low investment in innovation, with less than 10% of its MSMEs linked to sustainable programs [7]. This heterogeneity points to disparities in innovation and entrepreneurship among provinces, where informality, low productivity, and limited use of technology necessitate the replication of successful policies that integrate sustainable innovation throughout the department.

In light of the above, the general research question is formulated as follows: How do entrepreneurial capabilities, sustainable innovation, and regional development interrelate in Cajamarca's micro and small enterprises (MYPES), taking into account managerial competencies, financial resources, collaborative networks, and technological, environmental, and social innovation practices, within the framework of the region's economic, social, and sustainable development?

This research seeks to understand how entrepreneurial capabilities are linked to technological, environmental, and social innovation in Cajamarca's micro and small enterprises (MYPES), following the guidelines set forth in references [9], [10], and [11], which highlight these as critical factors for competitiveness and business resilience; reference [12] emphasizes that regional development depends on integrating innovation and sustainability into local economies. Theoretically, the study provides a transdisciplinary framework that links entrepreneurship, sustainability, and innovation with regional development, broadening the discussion on the new global economy. Its scientific contribution lies in the creation of a conceptual framework that integrates theories of entrepreneurship and sustainable innovation with regional development approaches, filling gaps regarding emerging economies and peripheral territories.

In practice, the research made it possible to identify the perceptions, experiences, and narratives of entrepreneurs and local stakeholders, providing valuable input for the design of tailored public policies and business-strengthening strategies, and offering tools to facilitate the replication of best practices and the overcoming of barriers related to financing, collaboration, and sustainability. The study stands out for providing contextualized empirical evidence capable of guiding training programs, inclusive financing schemes, and regional innovation policies, with a direct impact on improving the competitiveness of micro and small enterprises.

From a methodological perspective, the qualitative study allows for an in-depth exploration of the perceptions and experiences of entrepreneurs, institutions, and associations through interviews and focus groups that generate narratives on managerial competencies, access to financing, collaborative networks, and sustainable innovation. This approach makes it possible to capture the subjective and contextual dimensions of the phenomenon, complementing the previously defined quantitative indicators. The triangulation of sources and techniques ensures the rigor and validity of the analysis, while the transdisciplinary nature of the study integrates economic, social, and environmental perspectives by linking objective indicators with subjective narratives.

The study was based on the following general objective: to analyze how entrepreneurial capabilities, sustainable innovation, and regional development are interlinked in Cajamarca's MYPES, taking into account managerial competencies, financial resources, collaborative networks, and technological, environmental, and social innovation practices, within the framework of the region's economic, social, and sustainable development. In line with this purpose, the following specific objectives were formulated: to verify how managerial competencies, reflected in the educational level of

entrepreneurs, influence the competitiveness of micro and small enterprises (MYPES) in Cajamarca; to analyze how access to credit impacts the sustainability and growth of MYPES in Cajamarca; to identify the role that participation in associations and collaborative networks plays in generating economic and social value in MSMEs; to evaluate how spending on Research and Development (R&D) affects the capacity for technological innovation in Cajamarca's MSMEs; to verify the role that environmental certifications play in consolidating sustainable innovation practices in MSMEs; Examine how partnerships with institutions contribute to the generation of social innovation in Cajamarca's MSMEs; to identify how entrepreneurial capabilities and sustainable innovation affect the regional employment rate; to analyze how the performance of MSMEs relates to regional GDP growth in Cajamarca; and to evaluate the impact of regional innovation programs on the sustainability of MSMEs and their contribution to territorial development.

In terms of international background, the study cited in [13] was conducted with the aim of mapping global trends in sustainable entrepreneurship and digital innovation; it was a bibliometric study with a quantitative approach and a descriptive design, based on a sample of 381 Web of Science (WoS) articles; The results identified emerging intellectual and thematic networks such as the circular economy and microfinance, concluding that sustainable innovation is multidimensional and depends on institutional and technological factors.

The study cited in [14] evaluated the conceptual framework of green innovation (GI) in SMEs through a bibliometric analysis of 496 articles indexed in Scopus and Web of Science; the analysis mapped performance and co-citation patterns; The results identified 1,373 authors, 218 journals, and 63 countries; the main topics were sustainable business development, green transformation, and innovation in SMEs, addressing sustainable production, barriers and facilitators, eco-innovation, and knowledge management. The analysis concluded that green innovation is a field of study that offers comprehensive information to guide business strategies and public policies, highlighting gaps that open up new lines of research.

Reference [15] conducted a systematic review on sustainable entrepreneurship, identifying trends and perspectives in the business field. The study was a literature review with a mixed-methods approach based on 654 articles obtained from Scopus and WoS, of which 234 were selected using the PRISMA protocol. The results revealed conceptual gaps and the need to establish a stable framework for sustainable entrepreneurship, linking it to the social, economic, and technological spheres, as well as to studies on artificial intelligence. The study concluded that sustainable entrepreneurship is a growing field that requires the consolidation of theoretical and methodological frameworks to guide future research and public policy.

Reference [16] examined the relationship between green entrepreneurship and environmental sustainability based on 1,392 publications indexed in Scopus, using the R software package Biblioshiny. The study highlighted the importance of creative business models, eco-efficient processes, and global partnerships for advancing the SDGs, identifying consumer behavior, regulatory frameworks, and financial mechanisms as enablers. The study concluded that there is a need for interdisciplinary cooperation and reliable metrics to assess environmental impacts, and it provided additional data and comprehensive frameworks that strengthen public policies and sustainable business strategies.

At the national level, Reference [17] analyzed scientific literature on sustainable entrepreneurship in Peru through a systematic review of nine databases indexed in Scopus, using a qualitative approach aimed at identifying thematic trends and research gaps in the field. The results show a predominance of studies on resilience and creativity in micro and small enterprises (MYPES), but limitations in the areas of the circular economy and green innovation, leading to the conclusion that in Peru, the field of sustainable entrepreneurship is in a stage of consolidation, albeit with significant challenges regarding thematic diversification.

Reference [18] analyzed innovation and entrepreneurship ecosystems in Peru through a literature review of national success stories, examined relevant experiences, and compared the conditions that limit or promote the consolidation of these ecosystems. Among the main findings, it highlighted persistent obstacles in accessing financing and institutional support, citing structural barriers to business growth; however, it also emphasized the high potential for development based on the innovative capacity and resilience of entrepreneurs. The analysis concluded that an inclusive and sustainable approach that brings together public and private actors is essential, promoting green innovation policies and the circular economy.

Reference [19] examined Peruvian entrepreneurship within the framework of sustainable development through semistructured interviews with social entrepreneurs from different sectors; this approach yielded qualitative information on the practices, motivations, and challenges of the entrepreneurial ecosystem. The results highlight prosocial values such as solidarity and community engagement, identifying resilience as a key competency for the continuity of projects. The study concluded that sustainable entrepreneurship in Peru requires cross-sectoral policies that integrate the government, civil society, and the private sector, as well as strategies that promote social and environmental innovation as pillars of development.

Reference [20] analyzed the sustainable digital transformation capabilities of Peruvian SMEs using a quantitative approach and experimental design, applying structural equation modeling (SEM) to a sample of 200 SME managers in Lima. The results found that digitization had a positive impact on business sustainability and competitiveness by improving resource efficiency and strengthening environmental responsibility. The study concluded that digital transformation is a strategic factor in ensuring the sustainability

of SMEs in the Peruvian context, recommending the promotion of technological support policies and training programs that strengthen managers' digital skills.

The category of entrepreneurial skills is defined as the set of technical and soft skills that enable the transformation of ideas into viable projects, integrating creativity, innovation, and strategic planning [21]. Among its subcategories are managerial competencies, related to financial management and planning, as well as leadership, whose indicator is the educational and technical level that enhances strategic decision-making [22]. Financial resources which encompass access to credit, liquidity, and investment are key to the survival of micro and small enterprises (MSEs) in contexts of poverty; the indicator for this is the number and amount of loans obtained. Collaborative networks related to participation in associations, cooperatives, or trade associations strengthen formal ties with business organizations, with participation in associations serving as the indicator [23].

The category of sustainable innovation, defined as the introduction of products, processes, or services according to reference [22], encompasses the subcategories of technological, environmental, and social innovation. Technological innovation involves the adoption of new technologies to improve processes and products; the indicator is R&D spending aimed at strengthening the company's market position. Environmental innovation aims to reduce ecological impact through circular production practices and sustainable business models; its indicator is the number of environmental certifications obtained by the company. Social innovation, which seeks to generate community value and social cohesion, underscores the importance of integrating social and economic objectives into business strategies; it is measured by the number of partnerships with NGOs, universities, or public entities.

The category of regional development refers to a process of economic and social growth that strengthens local capacities and reduces territorial inequalities, comprising three subcategories [12]. Economic development, linked to productive diversification and an increase in regional GDP, is measured by the gross value added for each productive sector; social development, which includes education, employment, and poverty reduction, with the employment rate serving as an indicator; and sustainable development, which incorporates environmental and social policies into regional growth and is measured by evaluating the number of public and private projects focused on sustainability.

These definitions are a key resource for entrepreneurs in Cajamarca, as they enable them to identify strengths and weaknesses in their management, direct investment toward technological and environmental innovation, and align their practices with regional development policies. The indicators for each subcategory provide a systematic evaluation framework that facilitates strategic decision-making, access to financing, and integration into collaborative networks. In this way, micro and small enterprises ensure their survival in a competitive environment and establish themselves as drivers of the new regional and global economy, actively contributing to Cajamarca's development.

The study is based on the theory of entrepreneurial competencies, which states that cognitive, technical, and social skills transform ideas into viable projects. According to reference [24], entrepreneurial capacity is linked to financial literacy and the adoption of technologies—factors that improve the strategic quality of decisions in micro and small enterprises (MYPES). This theory enables entrepreneurs to understand the importance of developing managerial and financial competencies, as well as incorporating technological tools that optimize business management. Consequently, entrepreneurs in Cajamarca can identify strengths and weaknesses, direct investments toward critical areas of innovation, and consolidate management practices that increase competitiveness and resilience in dynamic markets.

The Theory of Planned Behavior [25] confirms that entrepreneurial intention depends on three key factors: attitudes toward entrepreneurship, social norms, and perceived control. This approach reinforces the importance of managerial competencies and collaborative networks as factors that directly influence the decision to become an entrepreneur. This theory's contribution to micro and small enterprises (MYPES) lies in the fact that it enables entrepreneurs to understand how their perceptions, beliefs, and social environment shape the viability of their projects, guiding them to strengthen their management skills, expand their professional networks, and build confidence in their ability to take action. In this way, entrepreneurs in Cajamarca can transform their intentions into concrete actions, increasing the resilience and sustainability of their businesses in a competitive regional context.

According to reference [26], stakeholder theory emphasizes the need to integrate social and environmental interests into business strategy, directly linking technological, environmental, and social innovation. Its main contribution to micro and small enterprises lies in directing investment toward R&D, promoting the adoption of green technologies, and fostering the creation of institutional partnerships. In this way, entrepreneurs not only strengthen the competitiveness of their businesses but also ensure their social legitimacy by responding to demands for sustainability and shared responsibility with the community and the environment.

The theory of endogenous development [27] holds that regional growth depends on internal factors such as human capital, innovation, and institutional quality. From this perspective, institutional strengthening and coordination with public policies are essential for revitalizing local economies. Its main contribution to micro and small enterprises (MSEs) is to highlight the importance of aligning their business practices with the institutional environment and regional development policies, thereby generating synergies that enhance their competitiveness in local markets and enable them to become drivers of economic and social development. Its contribution lies in reducing territorial inequalities and strengthening local capacities.

II. Methodology

This study was characterized as basic research; it sought to expand knowledge about the relationship between entrepreneurial capabilities, sustainable innovation, and regional development in Cajamarca's micro and small enterprises (MYPES), without pursuing an immediate practical application, in accordance with the guidelines set forth in reference [28] regarding research aimed at generating conceptual frameworks and scientific evidence to understand economic and social phenomena. A qualitative approach was employed, as priority was given to exploring the perceptions, narratives, and experiences of the stakeholders involved, which made it possible to capture the complexity of the phenomenon within its context. The study design was a case study, as it analyzed in depth the reality of Cajamarca's micro and small enterprises as a representative unit; following the guidance in reference [29], it is argued that this design is appropriate for understanding contemporary phenomena in specific settings.

The scope of the research was limited to an analysis of micro and small enterprises (MYPES) in Cajamarca within the context of the new regional and global economy, focusing specifically on the dimensions of entrepreneurial capabilities, sustainable innovation, and regional development. The aim was to gain a comprehensive understanding of how these variables interrelated and influenced business competitiveness and sustainability, without extending the study to other productive sectors or different regions, thereby ensuring relevance and analytical focus.

The research included an examination of three categories of interest: entrepreneurial capabilities, which included the subcategories of managerial competencies, financial resources, and collaborative networks; sustainable innovation, which encompassed technological, environmental, and social innovation; and regional development, which comprised economic, social, and environmental development. Each subcategory was operationalized using indicators such as educational attainment, access to credit, participation in associations, R&D spending, certifications, partnerships with institutions, employment rate, regional GDP, and regional innovation programs, following the approach proposed in [30].

The unit of analysis consisted of micro and small enterprises (MSEs) formally registered in Cajamarca. The inclusion criteria considered businesses that had been in operation for at least three years and were actively participating in the regional market, while those operating informally or with less than one year of operation were excluded. The population consisted of all MSMEs in the region; the sample was selected through purposive sampling, giving priority to those with relevant experience in innovation and sustainability, in accordance with the recommendation in reference [31]. The sample comprised 23 MSMEs.

The data collection method consisted of in-depth interviews conducted using a semistructured guide designed specifically for the study. Prior to its implementation, the instrument underwent a content validation process by expert raters, who approved its use with the study group. The validation process allowed for adjustments to the items to ensure clarity and relevance in the collection of information.

Data analysis was conducted using thematic and categorical coding techniques, which made it possible to organize and systematize the collected narratives. To strengthen the validity of the findings, procedures for source triangulation and cross-checking with the scientific literature were applied. In cases where it was necessary to supplement the data with quantitative information, descriptive statistics were used to characterize variables such as educational level, access to credit, or the number of certifications, following the approach outlined in reference [32].

Ethical considerations were addressed in accordance with the principles of scientific integrity, transparency, and respect for participants. Informed consent was obtained from entrepreneurs and local stakeholders, and confidentiality and anonymity were ensured in the handling of data. Furthermore, the provisions of the Code of Ethics for Research of the National Council for Science, Technology, and Technological Innovation [33] were observed, which entailed protecting the rights of informants and exercising responsibility in the dissemination of results, ensuring that the study was conducted with rigor and respect for the ethical values of scientific research.

III. Results

The data analysis was organized through thematic and categorical coding, supplemented by triangulation of sources and the use of descriptive statistics for key indicators such as educational level, access to credit, and environmental certifications. This procedure made it possible to identify patterns of interrelationships among the categories studied, providing a comprehensive view of the findings.

TABLE 1
EDUCATIONAL LEVEL OF ENTREPRENEURS AS REFLECTED IN THE MANAGEMENT SKILLS OF MICRO AND SMALL ENTERPRISES

Subcategory	Indicator: educational level			Management Skills
	Level	fi	%	
Management Skills	High school diploma	6	26.09	He strengthened discipline in management and responsibility, linking them to order and consistency
	High school (incomplete)	2	8.70	It limited competitiveness by restricting management capacity.
	Administrative technician	3	13.04	It improved competitiveness by providing practical management knowledge.
	Agroindustrial technician	3	13.04	It improved processes and optimized production and organization within the micro and small enterprise (MYPE).
	Accounting technician	2	8.70	It improved financial management by strengthening financial control.
	College graduate	7	30.43	It applied management knowledge, strengthened strategic management, implemented innovation, and provided a comprehensive vision.
	Total	23	100.00	

An analysis of Table 1 shows that entrepreneurs' educational level is directly related to the competitiveness of micro and small enterprises (MYPES) in Cajamarca. The data indicate that the largest proportion consists of entrepreneurs with a college education (30.43%), who make significant contributions to strategic management, innovation, and a comprehensive vision, thereby generating a positive impact on sustainability and growth. Those with technical training account for 34.78% of the total; they contribute to competitiveness, production processes, and financial management, while entrepreneurs who have completed high school (26.09%) bring discipline and perseverance, albeit with less innovative capacity. In contrast, those who have not completed high school (8.70%) are associated with management limitations and low competitiveness. In terms of contribution, the findings suggest that entrepreneurs should view education as a strategic factor for enhancing their managerial skills; therefore, investing in college education, technical training, and continuing education is key to improving the competitiveness and sustainability of micro and small enterprises (MYPES) in Cajamarca.

TABLE 2
ACCESS TO CREDIT AND ITS IMPACT ON THE SUSTAINABILITY AND GROWTH OF MICRO AND SMALL ENTERPRISES

Subcateg	Indicator: Access to Credit			Impact on Sustainability	Impact on Growth
	Condition	fi	%		
Financial Resources	Received credit	16	69.57	It made it possible to increase inventory, purchase machinery, sustain the business, diversify, expand, innovate, and generate stability and growth	It facilitated expansion, diversification, innovation, and an increase in inventory.
	Did not receive credit	7	30.43	It limited business and hindered sustainability.	It faced obstacles to its business growth
	Total	23	100.00		

An analysis of Table 2 shows that access to credit is a decisive factor for the sustainability and growth of micro and small enterprises (MYPES) in Cajamarca. 69.57% of entrepreneurs who accessed financing reported positive impacts, such as increased inventory, the purchase of machinery, product diversification, market expansion, innovation, and financial stability, which translate into enhanced competitiveness and the ability to adapt to changing circumstances. In contrast, the 30.43% who did not access credit faced limitations in sustainability and constraints on their development, confirming that the lack of financing constitutes a structural barrier to business growth. The key takeaway for entrepreneurs is to recognize that credit is not only an economic resource but also a strategic tool that drives innovation, diversification, and the consolidation of micro and small enterprises (MSEs); therefore, it is essential to foster financial literacy, improve access to formal credit, and promote partnerships with institutions that facilitate inclusive and sustainable financing conditions.

TABLE 3
PARTICIPATION IN ASSOCIATIONS AND COLLABORATIVE NETWORKS IN THE CREATION OF ECONOMIC AND SOCIAL VALUE

Subcateg	Indicator: Membership in associations			Reported profits	Identified Limitations
	Condition	fi	%		
Collaborative Networks	Associations	5	21.739	Training, networking, and strengthening business ties.	Limited geographic coverage, explicit restrictions
	Trade associations	7	30.435	Training, marketing, lobbying, and business advocacy.	Limited scope of benefits and reliance on union leadership
	Agribusiness networks	3	13.043	Marketing, market access, and productive innovation.	There is a need for greater coordination and funding.
	Do not participate	8	34.783	They do not report profits.	Business isolation, access to training and markets
	Total	23	100.00		

The analysis in Table 3 shows that participation in associations and collaborative networks is essential for generating economic and social value in MSMEs. Associations and trade groups account for 51.17% of participation, providing training, marketing, and representation, although they are limited by their coverage and dependence on leadership. Agro-industrial networks, while less common (13.04%), stand out for their impact on innovation and market access, but require greater institutional coordination and funding. In contrast, the 34.78% that do not participate reflect isolation and lower competitiveness. Taken together, the results suggest that integration strengthens entrepreneurial capabilities and economic dynamism, while a lack of participation perpetuates development gaps; therefore, it is recommended to promote strategic alliances and financing programs that consolidate a collaborative and competitive.

TABLE 4
INVESTMENT IN RESEARCH AND DEVELOPMENT AND TECHNOLOGICAL INNOVATION CAPACITY IN MICRO AND SMALL ENTERPRISES IN CAJAMARCA

Subc	Indicador: Gasto en I + D			Changes Made	Identified Limitations
	Condition	fi	%		
Technological Innovation	They did not invest	11	47.826	It does not improve production processes.	Stagnation in technological innovation.
	Investment in processes	3	13.043	Better quality and efficiency	Limited scope of impact.
	Investment in seeds	3	13.043	Productivity improved.	Continuity and technical support.
	Investment in software	2	8.696	The company's efficiency improved.	Training and Continuing Education
	Investment in machinery	2	8.696	Increase in production	Procurement and Maintenance.
	Investment in digital marketing	2	8.696	Improve positioning and marketing	Impact Dependent on Market Access.
	Total	23	100.00		

An analysis of Table 4 shows that nearly half of Cajamarca's micro and small enterprises (47.83%) did not invest in R&D, which limited their technological innovation

and led to stagnant production. In contrast, 52.17% did allocate resources to seeds, software, machinery, and digital marketing, achieving improvements in quality, productivity, efficiency, and market positioning. However, these initiatives faced constraints such as the need for training, high costs, and dependence on market access. Taken together, the results demonstrate that even modest investments in R&D strengthen business competitiveness and sustainability, provided they are accompanied by continuity strategies, technical support, and institutional coordination that enable businesses to overcome limitations and consolidate a culture of innovation.

TABLE 5
ENVIRONMENTAL CERTIFICATIONS AND THEIR IMPORTANCE IN ESTABLISHING SUSTAINABLE PRACTICES IN MICRO AND SMALL ENTERPRISES IN CAJAMARCA

Subcateg	Indicator: Number of certifications			Reported importance for business sustainability	Identified Limitations
	Condition	fi	%		
Environmental Innovation	It does not have any certifications	15	65.22	No direct benefits for the company's sustainability.	Limited market access and environmental impact
	Organic certification	3	13.04	Strengthens sustainable agricultural practices and productivity	It requires compliance with standards and entails audit costs.
	Environmental certification	5	21.74	It improves positioning, market access, and business legitimacy.	The need for greater outreach and institutional support.
	Total	23	100.00		

An analysis of Table 5 reveals that the majority of micro and small enterprises (MYPES) in Cajamarca (65.22%) lack environmental certifications, which limits their access to differentiated markets and their visibility in terms of sustainability. In contrast, 34.78% hold organic or environmental certifications, which strengthen agricultural practices and improve their market positioning, although they face challenges such as audit costs and limited institutional outreach. Overall, certifications promote sustainability and competitiveness; therefore, it is necessary to promote training programs, financing, and institutional support to facilitate their acquisition and maintenance.

TABLE 6
INSTITUTIONAL PARTNERSHIPS AND THEIR CONTRIBUTION TO SOCIAL INNOVATION IN MICRO AND SMALL ENTERPRISES IN CAJAMARCA

Subcateg	Indicator: Partnerships with Institutions			Contribution to Social Innovation	Identified Limitations
	Condition	fi	%		
Social Innovation	They have not formed any alliances	7	30.43	They do not report any benefits in social innovation.	Corporate isolation, less community engagement.
	Partnerships with NGOs	3	13.04	Support for environmental fairs and projects.	Dependence on external funding.
	Agreements with the municipality	3	13.04	Business promotion and support for local activities.	Scope limited to municipal programs.
	Partnerships with local churches	1	4.35	Community support and social cohesion.	Limited to specific community activities
	Partnerships with universities	5	21.74	Crop innovation and knowledge transfer.	It requires continuity in projects and resources
	Partnerships with the Chamber of Commerce	2	8.70	Business representation and strengthening of ties.	Institutional Leadership Unit
	Partnerships with banks	2	8.70	Financial support and access to credit.	Restrictive financing terms.
	Total	23	100.00		

An analysis of Table 6 shows that 30.43% of Cajamarca's micro and small enterprises (MYPES) have not established institutional partnerships, which limits their social innovation due to business isolation. In contrast, 69.57% do maintain ties with NGOs, municipalities, local churches, universities, chambers of commerce, and banks, reaping benefits in the form of trade shows, promotion, social cohesion, knowledge transfer, trade association representation, and access to credit. However, these partnerships face constraints such as dependence on external funding, the limited scope of municipal programs, the need for continuity in university projects, and restrictive credit terms. Overall, the results show that institutional partnerships are a key mechanism for strengthening social innovation and business sustainability, provided they are managed with a strategic vision, a diversity of stakeholders, and alignment with regional policies.

TABLE 7
CONTRIBUTION OF MICRO AND SMALL ENTERPRISES TO REGIONAL JOB CREATION AND FACTORS THAT PROMOTE OR LIMIT THIS CONTRIBUTION

Subcateg	Indicator: Employment Rate			Reported contribution to the employment rate	Factors that contribute to	Limiting factors
	Condition	fi	%			
Economic Development	Creation of 1 to 3 jobs	10	43.48	Minimum increase in jobs.	Dependence on external funding.	Small scale, limited exposure capacity.
	Creation of 4 to 7 jobs	6	26.09	A moderate increase in local employment.	Dependence on external funding.	Lack of sustained funding
	Creation of 8 to 10 jobs	3	13.04	Significant contribution to employability	Scope limited to municipal programs	Maintenance costs and market dependence
	Creation of 11 to 15 jobs	4	17.39	Impact on the regional employment rate.	Limited to specific community activities	Greater coordination and continuity..
	Total	23	100.0			

An analysis of Table 7 shows that micro and small enterprises (MYPES) in Cajamarca generate employment in different ways: 43.48% create between 1 and 3 jobs, with minimal impact; 26.09% contribute a moderate number of

jobs—between 4 and 7—though this remains limited; 13.04% generate between 8 and 10 jobs; and 17.39% generate between 11 and 15 jobs, demonstrating a significant impact despite cost constraints, market dependence, and the need for greater institutional coordination. Overall, the results indicate that the ability to generate employment depends on access to financing and operational sustainability; therefore, strengthening networks, diversifying support, and consolidating growth strategies are key to expanding employability and contributing to regional economic development.

TABLE 8
PERCEPTIONS OF THE RELATIONSHIP BETWEEN THE PERFORMANCE OF MICRO AND SMALL ENTERPRISES AND REGIONAL ECONOMIC GROWTH (GDP) IN CAJAMARCA

Subcateg	Indicator: Regional GDP			Contribution to Social Innovation	Identified Limitations
	Condition	fi	%		
Social Development	Minimum ratio	7	30.43	They do not report any benefits in social innovation.	Corporate isolation, less community engagement..
	Moderate relationship	3	13.04	Support for environmental fairs and projects.	Dependence on external funding.
	Strong relationship	3	13.04	Business promotion and support for local activities.	Scope limited to municipal programs
	Clear relationship (agriculture/sales/GDP)	1	4.35	Community support and social cohesion.	Restrictions on specific community activities.
	Partnerships with Universities	5	21.74	Crop innovation, knowledge transfer.	continuity in projects and resources
	Indirect / Limited Relationship	2	8.70	Business representation and strengthening of ties.	Institutional Leadership Unit
	Total	23	100.00		

An analysis of Table 8 shows that 30.43% of MSMEs perceive only a minimal connection to regional GDP growth, reflecting isolation and limited community engagement. In contrast, 26.09% identify links to trade fairs, environmental projects, and local activities, although these are limited by funding and institutional reach. Likewise, 21.74% recognize a clear connection through partnerships with universities, which promote the transfer of knowledge and innovation in crop production. Overall, the results show that the performance of micro and small enterprises can directly influence regional GDP growth if cooperation networks are strengthened, sources of support are diversified, and coordination with academic, political, and public institutions is enhanced.

TABLE 9
PARTICIPATION IN REGIONAL INNOVATION PROGRAMS AND THEIR IMPACT ON THE SUSTAINABILITY OF MICRO AND SMALL ENTERPRISES AND TERRITORIAL DEVELOPMENT IN CAJAMARCA

Subcat	Indicator: Regional Innovation Programs			Contribución a la innovación social	Limitaciones identificadas
	Condition	fi	%		
Sustain	Not participating	9	39.130	They do not yield any benefits in terms of sustainability or development.	Business isolation, reduced access to innovation.
	Training programs	1	4.348	Improvement of technical and business management skills.	Limited impact due to a lack of continuity.
	Agricultural programs	3	13.043	Crop Innovation and Sustainable Productivity.	It requires funding and technical assistance.
	Digital programs	4	17.391	Process modernization and access to digital markets.	Ongoing training needs.
	Financial programs	2	8.696	Access to credit and strengthening sustainability.	Restrictive financing terms.
	Sustainability programs	2	8.696	Consolidation of sustainable practices and social legitimacy	Lack of institutional coordination.
	Comprehensive regional programs	2	8.696	Business development and contribution to regional development.	Limited coverage and lack of follow-up.
	Total	23	100.00		

An analysis of Table 9 shows that 39.13% of Cajamarca's micro and small enterprises (MYPES) do not participate in regional innovation programs, which limits their sustainability and capacity for development. In contrast, 60.87% did participate in training, agricultural, digital, financial, sustainability, and comprehensive programs, leading to improvements in productivity, modernization, access to credit, and business strengthening. Participation in regional innovation programs is key to enhancing the sustainability and territorial impact of micro and small enterprises; therefore, it is necessary to ensure the continuity of these programs, expand their coverage, and strengthen institutional ties.

TABLE 10
THE RELATIONSHIP BETWEEN ENTREPRENEURIAL CAPABILITIES, SUSTAINABLE INNOVATION, AND REGIONAL DEVELOPMENT IN MICRO AND SMALL ENTERPRISES IN CAJAMARCA

Categ	Articulation
Entrepreneurial Skills	- Technical training strengthens specific areas of management, and secondary education fosters organizational discipline. - Credit is a strategic financial resource that drives competitiveness and sustainability; its absence constitutes a structural barrier. - Collaborative networks, integrated with associations and trade groups, enhance the development of entrepreneurial capabilities and access to markets; a lack of participation perpetuates development gaps.
Sustainable Innovation	- Investment in R&D has a positive impact on productivity and competitiveness when accompanied by continuity and technical support. - Environmental certifications reinforce sustainable practices and open up niche markets, although they require institutional support and funding. - Institutional partnerships are key to social innovation and sustainability; they must be managed with a strategic vision and a diverse range of stakeholders.

Regional Development	- Job creation depends on financing, business coordination, and operational sustainability. - The performance of micro and small enterprises (MYPES) impacts regional GDP when they collaborate with academic and political institutions. - Participation in regional programs is strategic for sustainability and territorial development; it requires continuity and broad coverage.

Table 10 indicates that the link between entrepreneurial capabilities, sustainable innovation, and regional development is a key driver of competitiveness and sustainability for micro and small enterprises (MYPES) in Cajamarca. Education and access to credit strengthen management and growth; networks drive integration and market openness; investment in R&D, certifications, and institutional partnerships consolidate productivity, differentiation, and social innovation; and regional development is reflected in job creation, contributions to GDP, and territorial innovation programs. The findings indicate that training, financing, networks, and strategic partnerships are key to improving business performance and contributing to the region's sustainable development.

IV. Discussion

The results for the first specific objective show that, in terms of the educational level reflected in the competitiveness of micro and small enterprises (MYPES), a college education stands out as a driver of innovation and strategic management. These findings are similar to those in studies [13] and [17], which highlight the importance of institutional and technological factors, resilience, and creativity as key competencies; this similarity stems from the fact that both studies recognize education and competencies as determinants of competitiveness, although they differ in emphasis: the former on intellectual networks and the latter on creativity. This contribution aligns with the theory of entrepreneurial competencies, which emphasizes financial and technological literacy as the foundation for strategic decisions. The results confirm that low educational attainment limits competitiveness, which calls for policies promoting continuous training to strengthen business management.

Regarding the second specific objective, the findings show that the majority of micro and small enterprises (MYPES) accessed credit, reporting positive impacts on sustainability and growth, while a minority faced constraints. The results align with Reference [16], which highlights financial mechanisms as enablers of sustainability, but differ from Reference [18], which identifies persistent obstacles to accessing financing in Peru. The alignment lies in recognizing credit as a strategic factor, although the difference is explained by national structural barriers. This study aligns with the theory of planned behavior by identifying entrepreneurial intention as a key determinant. The evidence shows that the lack of financing perpetuates inequalities, underscoring the urgent need to promote financial literacy and inclusive partnerships.

The third specific objective states that participation in associations and trade groups yields benefits in terms of training and marketing, while the absence of such participation reflects business isolation. The results are consistent with Reference [15], which highlights stable frameworks for sustainable entrepreneurship, but differ from Reference [19], which emphasizes prosocial values. The similarity lies in collaboration; the difference lies in the social approach versus formal networks. This contribution is linked to the theory of planned behavior, which recognizes social norms as determining factors. The data show that a lack of integration limits competitiveness and calls for policies that strengthen trade associations and agro-industrial networks.

The results corresponding to Specific Objective 4 indicate that the lack of investment in R&D prevents micro and small enterprises (MYPEs) that invest in processes, seeds, software, and digital marketing from achieving specific improvements. This information aligns with reference [14], which identifies green innovation as a growing field, and differs from reference [20], which highlights digitalization as a driver of sustainability; the similarity lies in technological relevance, while the difference lies in the emphasis on digitalization versus R&D. This contribution aligns with stakeholder theory, which promotes investment in green technology and institutional partnerships. The results show that even modest investments require continuity and technical support to consolidate innovation.

The information supporting Specific Objective 5 indicates that most micro and small enterprises (MYPES) lack environmental certifications, limiting their access to differentiated markets, while for the minority that do have certifications, these legitimize their market position. This finding is related to reference [16], which highlights the importance of regulatory markets and reliable metrics; it differs from reference [17], which points out limitations in green innovation in Peru. The similarity lies in recognizing certification as an enabler of sustainability, while the difference lies in its limited national dissemination. This contribution aligns with stakeholder theory, which emphasizes social legitimacy through environmental practices. The results show that the lack of certifications weakens competitiveness, which calls for institutional support policies.

The results from Specific Objective 6 show that institutional partnerships strengthen social cohesion and community values, although they face limitations in terms of funding and coordination. The findings are similar to those in Reference [19], which highlights the need for intersectoral policies to promote social innovation, but differ from those in Reference [5], which identified conceptual gaps in sustainable entrepreneurship. The similarity lies in recognizing the importance of partnerships; the difference stems from the contrast between theoretical approaches and local practices. This contribution is linked to stakeholder theory, which promotes partnerships as a strategy for social legitimacy. The data indicate that partnerships are key to sustainability but require greater public-private integration.

The information from Specific Objective 7 shows that entrepreneurial capabilities and sustainable innovation have a positive impact on regional employment and strengthen competitiveness and resilience. The findings align with Reference [16], which highlights eco-efficient business models for advancing the SDGs, but differ from Reference [18], which identifies structural barriers to financing; the similarity emphasizes the positive impact on sustainability and employment, while the difference stems from national constraints. This contribution aligns with endogenous development theory, which views human capital and innovation as drivers of growth. The results indicate that sustainable innovation is key to reducing unemployment but requires inclusive policies.

The elaboration of Specific Objective 8 emphasizes that the performance of micro and small enterprises is linked to regional GDP growth through diversification and value added. The results are consistent with Reference [13], which identifies the circular economy as an emerging phenomenon, but differ from Reference [17], which finds limitations in thematic diversification; the similarity lies in recognizing the link between innovation and economic growth, while the difference lies in the lack of consolidation. This contribution aligns with endogenous development theory, which emphasizes institutional coordination as a driver of growth. The data suggest that MSMEs are drivers of GDP but require policies that reduce territorial inequalities.

The information highlights Specific Objective 9, indicating that regional innovation programs strengthen the sustainability of MSMEs, although they require greater coverage and private sector participation. The results align with reference [14], which identifies green innovation as a growing field, but differ from reference [20], which considers digitalization a strategic factor; the common ground lies in recognizing innovation as a cornerstone of sustainability. This contribution aligns with endogenous development theory, which emphasizes public policies to revitalize local economies. The results show that regional programs are indispensable but require broader coverage.

The link between entrepreneurial capabilities, sustainable innovation, and regional development in Cajamarca's micro and small enterprises (MYPES) reveals a synergistic relationship that enhances business competitiveness and resilience; the factors that directly influence their growth are education, access to credit, participation in networks, and investment in R&D. The findings are similar to those in references [13] and [16], which emphasize the multidimensional nature of innovation and the role of financial mechanisms, although they differ regarding structural barriers to financing. This study ties into endogenous development theory by highlighting that institutional strengthening and innovation are drivers of regional growth. The data confirm that MSMEs are strategic actors in boosting GDP and employment, but they require inclusive policies that integrate education, financing, and environmental sustainability to consolidate their role in the new regional economy.

V. Conclusions

The interplay between entrepreneurial capabilities, sustainable innovation, and regional development in Cajamarca's micro and small enterprises (MYPES) is evident in the fact that education, financing, collaborative networks, and innovation are factors that strengthen competitiveness and sustainability. The findings demonstrate that these subcategories have an impact on employment, GDP, and territorial development, confirming that MYPES are strategic actors in the new global economy.

Managerial competencies reflected in educational attainment influence competitiveness, as university and technical training provide strategic vision and innovation—facts that confirm that education is a key factor in strengthening business management in Cajamarca.

Access to credit is directly related to the sustainability and growth of MSMEs, as it enables expansion, innovation, and stability; the lack of financing constitutes a structural barrier that limits their development.

Participation in associations and collaborative networks generates economic and social value through training, marketing, and representation; the absence of integration reflects business isolation and reduced competitiveness.

Investment in R&D strengthens technological innovation, improving processes, productivity, and market positioning; a lack of investment keeps micro and small enterprises (MSEs) stagnant, highlighting the need for technical and institutional support.

Environmental certifications reinforce sustainable practices and legitimize MSEs in niche markets; the absence of certifications limits their visibility and access to growth opportunities.

Partnerships with institutions foster social innovation by generating community cohesion and shared value; however, they require greater coordination and funding to become established as a sustainable strategy.

Entrepreneurial capabilities and sustainable innovation have the potential to impact the regional employment rate by strengthening the resilience and competitiveness of MSMEs; this contributes to labor inclusion and social development.

The performance of MSMEs is linked to regional GDP growth by diversifying production and generating added value; their consolidation is key to revitalizing Cajamarca's economy.

Regional innovation programs strengthen the sustainability of MSMEs and contribute to territorial development. Public-private coordination is essential for expanding coverage and consolidating impacts.

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