

Original article

Local innovation system from a multi-stakeholder and participatory governance approach



Sistema de innovación local desde una concepción multiactoral y de gestión de gobierno participativa

Sistema de inovação local a partir de uma concepção de governação participativa e multiparticipativa

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ABSTRACT

The municipality of Consolación del Sur, like most of the Cuban municipalities, has the urgent need to solve the problems affecting its sustainable local development, based on the application of knowledge and innovation, from multi-stakeholder participation, the formation and establishment of networks of internal and external actors, inclusive, transparent, participatory and with the protagonism of the local government; therefore, the objective of this research was to configure a multi-stakeholder platform for participatory management led by the local government, which promotes the connection of actors and makes viable the solution of local problems oriented from a systemic perspective of innovation, with a value chain approach, enhancing sustainable local development. To carry out the same, scientific research methods were used, both theoretical and empirical (historical-logical, systemic, etc.), as well as qualitative research methods and techniques, which allowed the participation of key innovation actors in the configuration of the Local Innovation

System, aligned to the Municipal Development Strategy and its respective programs and projects, especially those linked to the Food Sovereignty and Nutritional Security Plan, promoting a real and sustainable endogenous local development. The Local Innovation System built and approved by the Municipal Administration Council, from participation, with the techniques and methods used, as well as the documentary and practical basis that supports it, is applicable to the specific conditions and particularities of the municipality of Consolación del Sur.

Keywords: innovation; system; local development; participation; multi-stakeholder; strategy; projects; programs; food sovereignty.

RESUMEN

El municipio de Consolación del Sur, igual que la mayoría de los municipios cubanos, tiene la inaplazable necesidad de solucionar los problemas que afectan su desarrollo local sostenible, a partir de la aplicación del conocimiento y la innovación, desde la participación multiactoral, la formación y establecimiento de redes de actores internos y externos, inclusivas, transparentes, participativas y con el protagonismo del gobierno local, por lo que esta investigación tuvo como objetivo, configurar una plataforma multiactoral de gestión participativa liderada por el gobierno local, que fomente la conexión de actores y que viabilice la solución de problemas locales orientados desde una perspectiva sistémica de la innovación, con enfoque de cadena de valor, potenciando el desarrollo local sostenible. Para llevar a cabo la misma, se utilizaron métodos de investigación científica, tanto teóricos como empíricos (histórico-lógico, sistémico, etc.), así como métodos y técnicas de investigación cualitativa, que permitieron la participación de actores claves de la innovación, en la configuración del Sistema de Innovación Local, alineado a la Estrategia de Desarrollo Municipal y a sus respectivos programas y proyectos, especialmente los vinculados al Plan de Soberanía Alimentaria y Seguridad Nutricional, potenciando un real y sostenible desarrollo local endógeno. El Sistema de Innovación Local construido y aprobado por el Consejo de la Administración Municipal, desde la participación, con las técnicas y métodos utilizados, así como la base documental y práctica que lo sustenta, es aplicable a las condiciones y particularidades concretas del municipio de Consolación del Sur.

Palabras clave: innovación; sistema; desarrollo local; participación; multiactoral; estrategia; proyectos; programas; soberanía alimentaria.

RESUMO

O município de Consolación del Sur, tal como a maioria dos municípios cubanos, tem a necessidade urgente de resolver os problemas que afectam o seu desenvolvimento local sustentável, com base na aplicação do conhecimento e da inovação, a partir da participação de múltiplas partes interessadas, da formação e do estabelecimento de redes de atores internos e externos, inclusivas, transparentes, participativas e com o protagonismo da comunidade, Assim, o objetivo desta investigação foi o de configurar uma plataforma multi-atores para a gestão participativa liderada pelo governo local, que promove a ligação dos atores e torna viável a solução dos problemas locais orientada de uma perspectiva sistémica de inovação, com enfoque na cadeia de valor, promovendo o desenvolvimento local sustentável. Para a realização do projeto, foram utilizados métodos de investigação científica, tanto teóricos como empíricos (histórico-lógicos, sistémicos, etc.), bem como métodos e técnicas de investigação qualitativa, o que permitiu a participação de atores-chave da inovação na configuração do Sistema de Inovação Local, alinhados com a Estratégia de Desenvolvimento Municipal e os seus respectivos programas e projetos, especialmente os ligados ao Plano de Soberania Alimentar e Segurança Nutricional, promovendo um desenvolvimento local endógeno real e sustentável. O Sistema Local de Inovação construído e aprovado pelo Conselho Municipal de Administração, baseado na participação, com as técnicas e métodos utilizados, bem como a base documental e prática que o apoia, é aplicável às condições e particularidades específicas do município de Consolación del Sur.

Palavras-chave: inovação; sistema; desenvolvimento local; participação multiparticipativa; estratégia; projetos; programas; soberania alimentar.

INTRODUCTION

Technological innovation has been a recurring theme since the 19th century, from the construction of development theories based on innovation and knowledge. Some authors such as Joseph Schumpeter (1963) conceive innovation as a key aspect in the economic development of any nation; however, this author does not delve into the importance of these processes in the economic fabric at the local level.

In contrast to the Schumpeterian theories of technological change and in line with the development of local development theories and the role they play in it, science, technology and innovation processes attach great importance to the local dimension with its geographical, historical and cultural peculiarities, with its traditions, its institutional and educational identities, given the proven contextual nature of the same and the relativity of the degree of novelty that each one can contribute (González Pérez, 2020).

The interactive, participatory, multi-stakeholder and integral nature of innovative processes condition the emergence of the concepts of National, Regional and Local Innovation Systems. At the global level, several models of innovation systems have been conceived, such as that of Bengt-Åke Lundvall (1985), who conceived a highly interactive model with the participation of various actors that went beyond Innovation + Development.

In recent years, Local Innovation Systems (LIS) have acquired cardinal importance in the objectives of sustainable development at the local level, since it is in these environments, especially at the municipal level, where this development must be managed, because at the same time it is at the local level where it is generated. If development is not achieved at these levels, it is very difficult to achieve development objectives at the national level. Therefore, this process of management and generation of development must be based on a participatory local government management approach, seen as the strategic capacity to lead development processes by local governments, from an integrating vision of all actors, both internal and external, resources of all kinds and potentialities of the locality, in order to achieve, in terms of quality and efficiency, the continuous improvement of the quality of life of the population, based on the consensus of local proposals and initiatives that allow the organization and strengthening of local agro-industrial systems that guarantee the balance between economic growth, environmental care and social welfare, supported by Local Innovation Networks.

The Local Innovation Systems approach aims to favor policies that promote the articulated work of local actors: governments, cooperatives, farmers, enterprises, media, educational sector, health institutions, credit institutions, among others, strongly connected with national and foreign actors capable of providing knowledge, technologies, financing and other inputs for local development (Núñez Jover & García Vacacela, 2017).

From this perspective, the LIS should be seen from a cultural conception, which offers a more integrative vision of its dimensions and subsystems, because it places the human being at the center of any action, as a subject who demands to form certain capacities to transform his or her reality and to participate actively and responsibly in the design and implementation of local strategies for such changes (Juliá Méndez, 2016). The effectiveness of a LIS depends on an adequate identification of local needs and demands, of endogenous resources and the possibility of interacting with exogenous resources and actors, of the decisions of the multiplicity of local agents integrated into a sociocultural fabric, which must be articulated with the various forms of production and services, harmonized with their forms of organization and with the governmental and political organizations that decisively influence their performance.

For this network of links, interactions, technology transfers and continuous learning, i.e., the LIS, to work, it is important to foster a culture of innovation that modifies the traditional and spontaneous behavior of local governments in dealing with and managing innovative processes. This presupposes a new way of managing science, technology and technological innovation, making them the main protagonists in their operation.

Local government management, based on multi-stakeholder participation and guided by innovation, makes it possible to strengthen social capital, innovative processes and knowledge at the municipal and community levels, ensuring that the actors involved have mutually collaborative relationships and that there is coherence between economic, sectoral and development policies. Achieving self-managed and participatory local development presupposes reconciling the aspirations, interests, needs and criteria of citizens, taking into account local identity and idiosyncrasies. In a consolidated Local Innovation System, informal linkage paths are extremely important and, through them, real bases for consensus can be built (Hernández Medina et al., 2017).

A key aspect in the functioning of the LIS is the work in networks, clusters and productive chains that, together with values, norms, institutional, enterprise and community relations, allow the collective construction of knowledge, decision making and consensus among the multiplicity of actors, achieving the social transformation of the municipalities, based on the social responsibility of all those involved in local development.

The identification of key actors is an activity derived from network mapping and is prior to the operational definition of the innovation management strategy (Rendón Medel et al., 2007).

In Cuba, several LIS proposals have been made since the end of the first decade of this century; these proposals have common features on which almost all authors agree, such as multi-stakeholder participation, the role of government as LIS manager, the sociocultural approach of LIS, the need to create Local Innovation Networks, among others; however, much remains to be done in their implementation, especially to adapt them to the needs and demands of municipalities, from a participatory government management that strengthens local development.

Today, the economic battle is a priority that must materialize at the local level. What is wanted is a harmony and a development born from below, from the municipality, with an intelligent and adequate management, with a proactive work, based on its needs and also its aspirations, its experience, its culture, its productive potential and the talent of its skilled workforce (Díaz-Canel Bermúdez & Delgado Fernández, 2021).

In the context of the 2030 Agenda (United Nations, 2015), one of the challenges of the Cuban economic and social model that privileges local development is to change course towards a participatory management of innovation that drives sustainable local development, increasingly demanding an increase in the innovative capacity of municipalities, led by local governments and advised and accompanied by universities, especially the Municipal University Centers (Cum in Spanish)), on the basis of greater social inclusion and participation and from an environmentally, socially and economically sustainable perspective.

When reference is made to the ability to innovate, it means that the worker, the collective, the organization knows how to do a certain thing according to the acquired learning processes such as identifying, assimilating, applying and retaining knowledge. It means not only learning concepts, but also assimilating the way in which they can apply them (Lazcano Herrera & Ruiz González, 2019).

The capacity to manage innovation as a system is a critical success factor (ISO, 2019).

Thus, from the process of configuring the LIS to its implementation and monitoring, the use of experiential and participatory techniques are important, which enhance the ongoing search for previous experiences and knowledge to confront them with new knowledge, enabling a transforming and recreating dynamic of learning and the creation of skills to innovate and enhance competitiveness in the territory, led by a competent local government with a vocation for innovation.

There is a close link between the development model we promote, capacity building and the knowledge available at the local level. The development to which we aspire - human, prosperous, sustainable, supportive, equitable, inclusive and fair - requires that we pay the utmost attention to the creation of human and institutional capacities that allow us to promote local development (Fernández González & Núñez Jover, 2020).

This process should be conceived on the basis of citizen participation, with a systemic approach to innovation that fosters innovative and innovation management capabilities, in which the local government should be the main protagonist.

The interrelationship established between: the social organization of innovation, the knowledge management cycle and the development, culture and knowledge for participatory innovation, lays the foundations for a management system focused on the participatory and horizontal development of municipalities (Fis de la Rosa et al., 2019).

In the theoretical and methodological study carried out, especially of the Cuban experiences of the municipalities of Yaguajay and Camajuaní, in the province of Villa Clara and Abreus and Cumanayagua, in Cienfuegos, the Local Innovation Systems are conceived as mechanisms for local articulation of innovation and development, However, they do not offer a proposal for their structure, but make it clear that this will depend on the characteristics of the territory, the municipal demands and the decisions taken by the multi-stakeholder coordination, led by the local government.

In the case of the design of the LIS for the municipality of Camajuaní, in Santi Spíritus, the innovation process is conceived as a system, as long as it penetrates all social activities. An innovation system is only a system to the extent that there are strong interactions among the various actors. It is the links that determine the systemic conception.

On the other hand, the systemic approach is associated with the existence of multiple policy areas or dimensions: public, institutional, business and sectoral that need to be harmonized to have a positive impact on the innovative capabilities of a locality, in which local governments must be the protagonists in the management of the processes of training, development, stimulation and channeling of these innovative capabilities.

In essence, these LIS proposals have the same precepts and contain the aspects that should not be missing in the design of LIS, in terms of the articulation of actors, resources and means, the leading

role of the government and the promotion of local innovative capacities that will have a real impact on endogenous and sustainable local development.

The municipality of Consolación del Sur, one of the most important, above all, from the economic point of view for the province of Pinar del Río and which assumes great commitments also at the national level in certain productions, however, these potentialities do not find support in the productive, economic and financial results of the territory, nor in a greater dynamism of the local economy and consequently in the increase of welfare at the local level. This situation is generated by evident management problems and insufficient strategic capacities to manage innovation, based on the rational use of local resources, from a systemic perspective, popular participation, conciliation of interests and productive chain approach, networking and use of knowledge and innovative initiatives and traditional and scientific knowledge throughout the local community.

On the other hand, it is necessary to explain that, despite the experiences at the local level, first with the Local Agricultural Innovation Program and currently with the Local Agricultural Innovation System, the local government does not conceive of a multi-stakeholder platform that articulates actors, resources, knowledge and processes in terms of participatory innovation management with a systemic approach that responds to local development demands in the agricultural and industrial sectors and impacts on real social transformations. On the other hand, in the 24 programs that make up the Municipal Development Strategy and the Food Sovereignty and Nutritional Security Plan, the innovative solutions that are projected are still insufficient.

This situation causes the municipality of Consolación del Sur to face great challenges to solve the problems that affect its sustainable local development, based on the application of knowledge and innovation from multi-stakeholder participation, the formation and establishment of local, transparent and participatory innovation networks and the systemic approach. Based on these assumptions and taking into account good practices and national and international experiences on the subject, this research was carried out with the following objective: To configure a multi-stakeholder platform for participatory management led by the local government, which promotes the connection of actors in the solution of local problems oriented from a systemic perspective of innovation, with a value chain approach, enhancing sustainable local development.

MATERIALS AND METHODS

To carry out this proposal, several scientific research methods were used, both theoretical and empirical, from the perspective of the combination and correlation that should exist between them. Some of these methods were the historical-logical one, which facilitated the study of the different stages through which the LIS have gone through since their emergence and especially their evolution, especially the experiences in Latin America and Cuba. Very valuable materials and works were considered in the last years, so that it allowed not only to determine its tendencies, but also to discover the social relations that characterize it and that are part of its structure and functioning.

Documentary analysis was one of the techniques widely used as part of the historical research, which made it possible to determine relevant information regarding good practices and experiences in the design and implementation of LIS, especially in Latin America and Cuba, and to approach them from the social, political, economic and cultural context of the municipality of Consolación del Sur and the demands of the current Cuban economic model.

One of the essential methods in this research was the systemic method, which made it possible to determine the structure of LIS, based on multi-actor participation, as well as the subsystems that make it up, their interaction and interdependence.

The main method of qualitative research was the Action-Participatory Research, taking into account that the LIS is designed and implemented from a multi-stakeholder, participatory, collaborative and consensus conception, and that it has been very important in the effectiveness of participatory governments, in the identification and proposal of solutions to the problems affecting the management of sustainable local development of the municipality, focused on innovation.

Qualitative research strategies and techniques were used; in this case the focus group strategy and individual and open group interview techniques, widely used, especially in proposals of this type, where the participatory and multi-stakeholder approach are key.

An open group interview was conducted with the members of the local development group of the municipality. During the interview, 25 people participated, with two interviewers, in an atmosphere of collaborative dialogue, with the objective of evaluating the potential of the LIS, approved in the municipality as a multi-stakeholder and participatory platform based on its experiences and good

practices and the foreseeable impacts on the local development objectives established in the Municipal Development Strategy.

This same objective was taken into account in the individual surveys applied. For the application of these individual surveys and in order to make an adequate selection of the sample, the statistical technique of simple random sampling was applied to a population size of 3254 key actors that make up the platform, being the maximum sample size of 0.5, with a reliability level of 95%, with an absolute error (d) of 0.05. All these data were applied to a program for sample calculation, which resulted in a sample of 99 actors to be surveyed, chosen based on the innovative vocation, experiences and good practices in the municipality.

RESULTS AND DISCUSSION

The municipality of Consolación del Sur is located on the southern plain in the central eastern part of the province of Pinar del Río, with a territorial extension of 1111.90 km², occupying the second largest area in the province, it is a strong sub-center of regional social services. It is a fundamentally agricultural municipality, where its fundamental productions are based on the cultivation of rice, tobacco, citrus, various crops and livestock, it also has 3 swine centers and a wide network of units belonging to the Pinar del Río Poultry Enterprise, important forest resources and high potential for the development of aquaculture.

Most of the land is made up of soils of medium agrological category, with a predominance of type II Gley Ferrallitic (XIX) soils. Of its total territorial extension, 82669 ha correspond to agricultural land, 28521 ha to non-agricultural land and 12873 ha to forest areas. It has an extensive surface drainage network made up of four fundamental basins, in addition to four dams and 9 micro-dams.

The municipality has a population of 88 368 inhabitants for a population density of 79.2 inhabitants/km² which makes it the second largest municipality in the province, where 49% of the total is represented by women, making it a potentially important force for local development. The economically active population is 26007 inhabitants, 40.04% women and 59.96% men.

The business sector is quite significant as it has a large number of local, provincial and national subordinate entities, as well as other local actors, which are conceived as part of the LIS (in total 3254 key actors). The LIS and the Action Plan for its implementation were approved by the Municipal Administration Council since 2021, which are shown in the following figure:

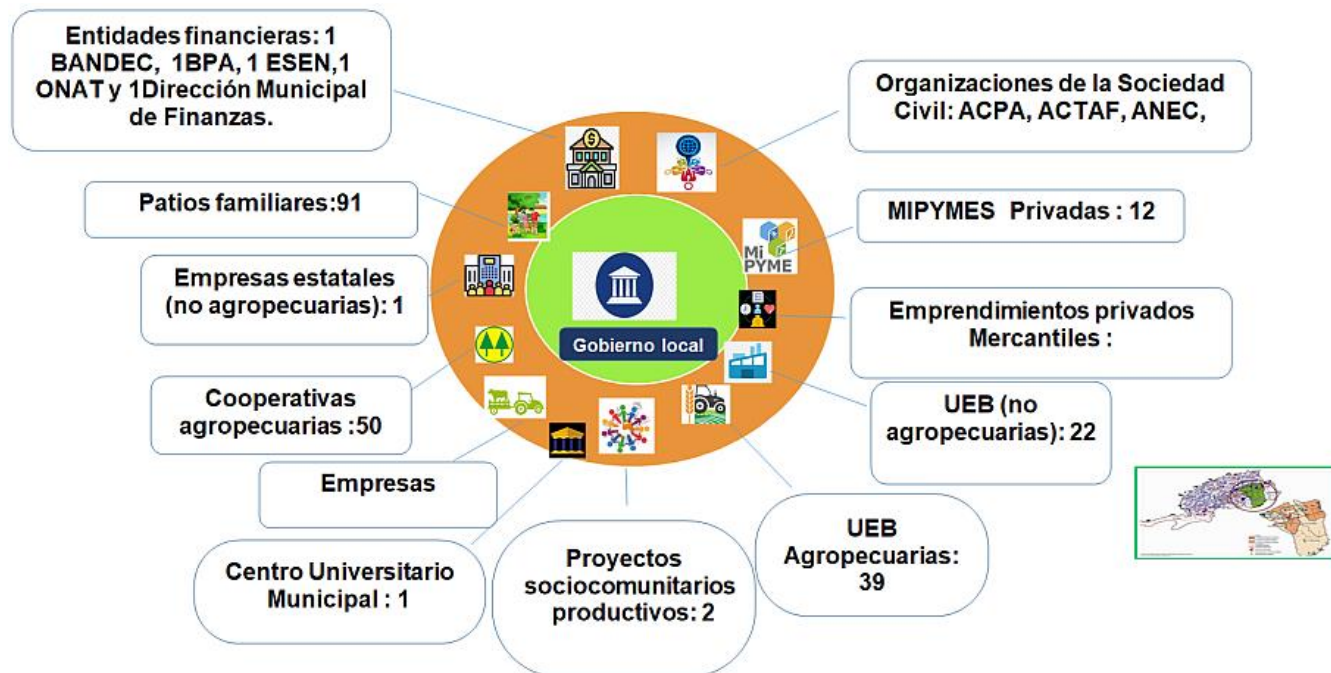


Figure 1. Map of key innovation actors in the municipality of Consolación del Sur

Source: Prepared by the authors based on data from the Municipal Directorate of Economics and Planning

Consolación del Sur is the most important municipality in the province of Pinar del Río, after the head municipality, for its contribution to the socioeconomic development of the province and the nation; it is a municipality of national reference in the agricultural sector, which is a major source of employment for residents. Two large enterprises of great national importance are located in the territory: the Empresa Integral y de Tabaco and the Empresa Pecuaria Genética "Camilo Cienfuegos".

It has been one of the municipalities chosen at the country level to carry out its Municipal Development Strategy until 2030, which is currently immersed in the gradual implementation of the 24 development programs that comprise it, especially those linked to the Food Security and Sovereignty and Nutritional Education Plan, challenges that require an innovation-oriented municipal management model, in which the Local Innovation System must be built from a multi-stakeholder and participatory government conception, constituting the ideal platform to achieve the much-needed endogenous and sustainable local development.

In spite of this, a group of weaknesses that negatively affect the development of the municipality and the management of local development are evident. In this sense, the following are identified:

1. Insufficient training and capacity building for the management of a multi-stakeholder platform for participatory management led by the local government, which promotes the connection of actors in the solution of local problems oriented from a systemic perspective of innovation.
2. The strategic spaces that exist in the municipality for the process of training and development of innovation management capabilities are not used as spaces for socialization of experiences, results and endogenous and exogenous learning for an effective management of the Local Innovation System.
3. The level of complementarity to be achieved at the local level between non-state forms of production, agricultural cooperatives and the state sector is insufficient to make sustainable progress in endogenous local development, taking advantage of installed capacities.
4. The LIS is conceived as a platform to identify, generate and energize demands for development, which can encourage the formation of a culture of innovation at the local level.
5. The functioning of the LIS is inconceivable without the development of productive linkages between agriculture, industry and commerce at the municipal level, as well as the communities.
6. The municipality is identified as having potential for the implementation of the approved LIS, based on its advantages in terms of human capital, natural resources, water resources, agricultural land, etc.
7. The LIS is seen as the ideal platform for achieving a sustained and sustainable increase in food production, the development of agroindustry on agroecological bases and the promotion of the effective implementation of the Food and Nutritional Sovereignty and Security Plan.
8. The integrating nature of the LIS is positively valued, with a multi-sectoral, multi-actor approach, from which an effective organization of the participatory management of innovation can be achieved.
9. Great importance is attached to the creation of the Local Innovation Management Center as the entity where the participatory management of local innovation is controlled and organized.
10. The LIS is presented as a mechanism for the articulation of actors, which in a contextualized manner, allows for increased autonomy and greater governance of the municipality and the ability to become a territory with the capacity to innovate.
11. LIS's conception is fully in line with the requirements of the innovation-oriented government management model, which requires foreseeing and coherently integrating plans, development

programs and policies from a participatory approach, based on science and innovation to achieve the necessary sustainable development.

However, the good practices and experiences of the Local Agricultural Innovation System, which has a coordinating team in the municipality Consolación del Sur, have enhanced the participatory approach in development practices, privileging local development and enhancing innovation as a driving element of agri-food development that responds to challenges such as: the development of initiatives and popular participation, decentralized development planning and management, capacity building from a common agenda that includes the state, private and cooperative sectors, the empowerment of women and youth, and the agrifood chain approach to achieve food security and sovereignty.

In this sense, the proposal considered the lessons learned and good practices of University Knowledge and Innovation Management at the local level as a key element in the construction of Local Innovation Systems and in the improvement of interconnection channels and university-municipality knowledge and innovation networks. Among these good practices are the experiences of LIS in the municipalities of Yaguajay (Bofill Vega et al., 2015) and Camajuaní (Hernández Medina et al., 2019), in Villa Clara province and Abreus and Cumanayagua, in Cienfuegos (Castro Perdomo & Rajadel Acosta, 2015).

The above analysis, together with the application of the Action-Participatory Research methodology, made it possible to identify the following results:

1. Establishment of the current local context of the territory, which had as fundamental inputs the Municipal Development Strategy and the 24 programs that comprise it, the actions carried out in the gradual implementation of the Food and Nutritional Sovereignty and Security Law, as well as Decree-Law 33/2021 for the Strategic Management of Local Development and the Social Economic Development Plan until 2030, among other key documents in the management of local development.
2. The foundations were laid for the configuration of a Local Innovation Network, which includes the municipalities of La Palma, Pinar del Río and Los Palacios. This network is practically viable in the municipality, once the existing centers for knowledge, innovation and information management are integrated: Cum, Information Centers and Libraries, Delegations of the Ministry of Science, Technology and Environment, the National Association of Innovators and

Rationalizers, the Youth Technical Brigades, the Forum of Science and Technology, the Provincial Experimental Station of Pastures and Forages, civil society organizations, as well as the technical and development departments of the most important enterprises in the municipality: Empresa Pecuaria Genética "Camilo Cienfuegos", Empresa Integral y de Tabaco of Consolación del Sur, Municipal Directorate of Culture and its institutions, the community projects, etc. The operation of the network will make it possible to promote a culture of exchange, management and production of knowledge, generalization of good practices, etc., as well as the necessary change in the way innovation is managed from the business and institutional point of view, which is currently carried out by the municipal government and other innovation actors.

3. The approval by the Municipal Administration Council of a Project Not Associated to a Program, which will allow training and capacity building for the management of a participatory multi-stakeholder platform led by the local government, which promotes the connection of actors in the solution of local problems oriented from a systemic perspective of innovation.
4. The configuration of the LIS of the municipality, composed of 5 interconnected subsystems, each one integrated by several Local Innovation Groups, which would be the fundamental nuclei where innovation is managed. Both results were approved by the Municipal Administration Council. The subsystems, as well as their composition, are as follows:

I. Local Agricultural Innovation Management Subsystem: Made up of members of the 50 agricultural cooperatives in the municipality, members of the Local Agricultural Innovation System project, rural women entrepreneurs, rural youth, science and technology departments of the Empresa Pecuaria Genética "Camilo Cienfuegos" and the Empresa Integral y de Tabaco of Consolación del Sur, the Cuban Association of Animal Production, the Cuban Association of Agricultural and Forestry Technicians, the National Association of Small Farmers, the Municipal Directorate of the Ministry of Agriculture, etc.

II. Management of Sociocultural and Community Innovation Subsystem: Made up of diverse actors of the territory, prioritizing those of the system of cultural institutions, communities and community leaders with an innovative attitude, sociocultural projects of the municipality, etc.

III. Innovation Management Science, technology and innovation for local development Subsystem: Cum, Center for Management Studies, Local Development, Tourism and Cooperativism, Provincial Experimental Station of Pastures

and Forages, Delegations of the Ministry of Science, Technology and Environment, Science and Technology Forum, National Association of Innovators and Rationalizers, Youth Technical Brigades, etc.

IV. Innovation management for industry and commerce subsystem: composed of the Municipal Company of Commerce and Gastronomy, Basic Food Unit, private entrepreneurs in commerce, gastronomy, services, Basic Unit of Services and Household and other services, construction materials industry, etc.

V. Innovation Communication Management for local development Subsystem: Integrated by the managers of the municipal government's Communication Strategy, the municipal Radio base, the municipal television channel Consurvisión, the Young Computer Clubs, etc.

LIS is configured as an open system, therefore, other actors with a vocation for innovation can join in time and the principles it assumes are the following:

1. Open and participatory access for innovative stakeholders
2. Promotion of local innovative capacity
3. Cooperation and mutual assistance between the agents of each subsystem and between subsystems, with the local community in general
4. Commitment and social responsibility to sustainable local development
5. Collective and developmental learning
6. Vulnerability, gender and generational focus
7. Promotion of productive linkages and local and regional clusters
8. Contextualization and respect for traditions and idiosyncrasies

The following figure shows the configuration of the proposed and approved Local Innovation System.

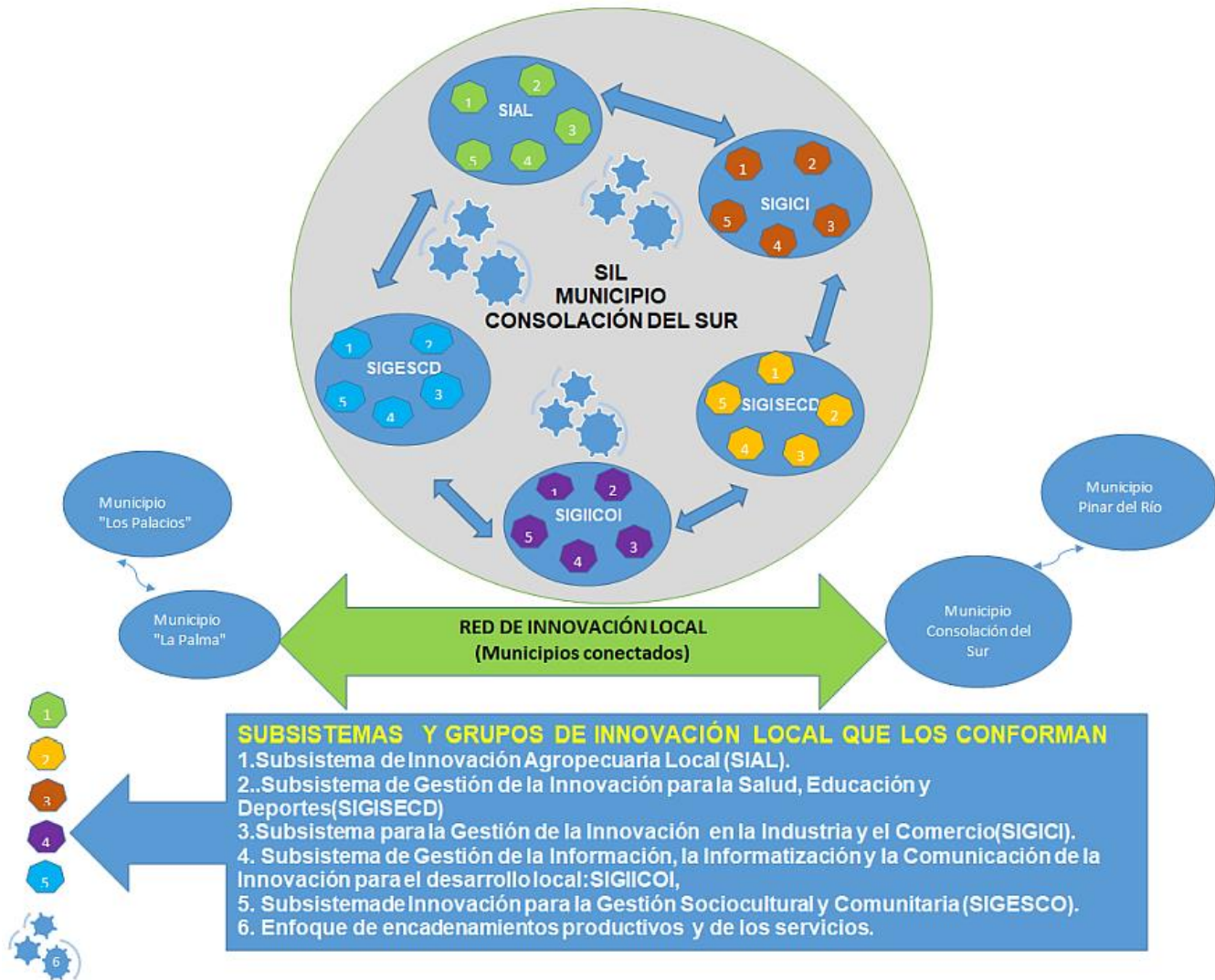


Figure 2. LIS approved for the Municipality of Consolación del Sur

Source: Prepared by the authors

The approved LIS has an internal organization that is hierarchical, that it is the Municipal Administration Body that must ensure that the LIS functions effectively, starting with the creation of a Center for the Management of Local Innovation, made up of competent professionals, with a proven innovative attitude, where the following figures should not be missing: lawyers, specialists in economics and accounting, representatives of the network of banking services of the municipality, among other professionals. In addition, it should subsequently be decided who will be in charge of the operation of the system and the links between the subsystems and where the most important

decisions of the LIS will be taken and reconciled. This center is subordinated to the Municipal Administration Council and its main functions are:

- a. Clarify the roles and responsibilities of the working groups of each subsystem and their main interrelationships.
- b. Survey of professionals in the territory who can contribute to the multidisciplinary approach to the solution of any problem at the local level.
- c. Establish the legal framework within which the LIS will operate, based on the prerogatives of the municipal governments.
- d. Periodically evaluate the operation of each subsystem and the interactions that should exist between them, in accordance with the strategic objectives and the regulatory framework to be established.
- e. Evaluate the operation of the Municipal Network for Science, Technology and Innovation.
- f. Determine whether the actions carried out in each subsystem correspond to the innovation requirements of the Municipal Development Strategy and the Food and Nutritional Security and Sovereignty Plan, with more science.
- g. Participate in Local Development Group meetings.
- h. To protect the stability and consolidation of the LIS.
- i. Identify, manage and socialize financing alternatives for local innovation.
- j. Eliminate the artificial distances created between the actors and between the processes of learning, improvement, training, research and innovation.
- k. Build infrastructure for computerization, connectivity and networks, mainly, build and evaluate LIS's performance indicators, and ensure that its systemic nature and multi-stakeholder participation are strengthened from its operation, contributing to sustainable local socioeconomic development.

The LIS of the municipality of Consolación del Sur is visualized as a multi-actor and multi-serial platform that requires multi-actor coordination, from a Local Innovation Management Center, subordinated to the Administration Council, which allows the management of innovation from a participatory government perspective that identifies local demands, channels them through the effective implementation of the Municipal Development Strategy and the Food and Nutritional Sovereignty and Security Plan with a focus on agri-food chains, enhancing the much needed sustainable local development.

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Conflict of interest

Authors declare that they have no conflicts of interest.

Authors' contribution

Marta María Cruz Bravo and Noraida Garbizo Flores were in charge of the initial diagnosis and the application of the instruments for its implementation, as well as the configuration of the multi-actor platform for participatory management led by the local government, i.e. the Local Innovation System (LIS), from a systemic perspective of innovation, with a value chain approach and multi-actor participation, defining the component subsystems of the LIS, until the conception of its final version.

Alba Marina Lezcano Gil was in charge of the collection, analysis and interpretation of the information, as well as the documentary, legal and practical basis that supports the proposed LIS and the theoretical-methodological study carried out, especially of the Cuban experiences of the municipalities of Yaguajay and Camajuaní, in Villa Clara province, and Abreus and Cumanayagua, in Cienfuegos, to determine the articulation mechanisms used and the knowledge and experiences shared and implemented.

The writing, coherence and unity between the objectives, development and conclusions were reviewed by all the authors, as well as the degree of contribution to the state of the art of the research carried out.

A thorough review was carried out by all the authors to approve the final version of the document sent to the journal.



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