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Scientific articles

**Estrategias gerenciales: hacia la consolidación de la calidad
investigativa universitaria***

***Management strategies: towards the consolidation of the university research
quality***

***Estratégias de gestão: rumo à consolidação da qualidade da pesquisa
universitária***

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Resumen

Las estrategias gerenciales son herramientas valiosas en el contexto corporativo, y su aplicación en instituciones de educación superior juega un papel crucial en la gestión de actividades administrativas, formativas, de enseñanza-aprendizaje e investigativas a través de funciones de planificación, organización, control y dirección, de ahí que requieran altos estándares de calidad para garantizar su efectividad. Por eso, el objetivo de esta investigación fue analizar las estrategias gerenciales aplicadas para fortalecer la calidad investigativa en los centros de investigación universitarios (CIU) en Venezuela. Para ello, metodológicamente se adoptó un enfoque positivista con un diseño descriptivo no experimental, de tipo transeccional y de campo. La recolección de datos se efectuó mediante observación directa y el uso de un cuestionario mixto, administrado a 48 investigadores pertenecientes a los seis CIU seleccionados como muestra representativa. Los resultados revelaron que las estrategias gerenciales implementadas en los CIU venezolanos contribuyen, en cierta medida, al desarrollo de proyectos de investigación que abordan las necesidades y demandas del entorno social. De hecho, más de la mitad de los encuestados evaluaron positivamente los indicadores relacionados con estas estrategias en sus respectivos centros, mientras que una minoría consideró que dichos procesos eran deficientes. En conclusión, se destaca la necesidad de fortalecer la gestión investigativa y mejorar la eficiencia de las estrategias gerenciales para alcanzar los objetivos institucionales y promover un mayor número de proyectos de investigación y planes de acción que mejoren la calidad investigativa en estos centros.

Palabras clave: estrategias gerenciales, centros de investigación universitarios (CIU) venezolanos, calidad, gestión de la calidad en centros de investigación universitarios.

Abstract

Management strategies are important tools for corporations, which, when applied in the field of education, in Higher Education Institutions (HEIs), allow the management of administrative, training, teaching-learning and research activities through the functions of planning, organization, control and direction; This requires high standards of excellence and quality. For this reason, this research had the following objective: To analyze the management strategies applied for the

consolidation of research quality in Venezuelan University Research Centers (CIU). Methodologically, a positivist paradigm was followed, with a descriptive type of research, and a non-experimental, cross-sectional and field design. The technique used was direct observation, and the application of a mixed questionnaire for the collection of information, to a total of 48 researchers belonging to the six (6) Venezuelan University Research Centers (CIU) of the population under study. The results of the survey showed that the management strategies applied in the Venezuelan CIUs contribute to a certain extent in promoting the development of research projects that meet the needs and demands of the social environment; This was evidenced by the percentage that groups together more than half of the researchers surveyed, who evaluated between acceptable, good and very good indicators that describe the management strategies applied in the CIUs where they work; a smaller percentage considered these processes to be deficient and very deficient. The main conclusion reached is that it is necessary to strengthen research management and the application of more efficient and effective management strategies, in order to achieve the institutional objectives and promote a greater number of research projects, and organizational action plans that raise the quality of research in these research centers.

Keywords: Management strategies, Venezuelan University Research Centers (CIU), quality, quality management in university research centers.

Resumo

As estratégias de gestão são ferramentas importantes para as corporações, que, aplicadas no campo educacional, nas Instituições de Ensino Superior (IES), permitem gerir atividades administrativas, de formação, de ensino-aprendizagem e de pesquisa por meio de planejamento, organização, controle e direção; exigindo altos padrões de excelência e qualidade. Por esse motivo, com esta pesquisa foi traçado o seguinte objetivo: Analisar as estratégias de gestão aplicadas para consolidar a qualidade da pesquisa nos Centros Universitários de Pesquisa (CIU) venezuelanos. Metodologicamente seguiu-se um paradigma positivista, com um tipo de pesquisa descritiva, e um desenho não experimental, transecional e de campo. A técnica utilizada foi a observação direta e a aplicação de um questionário misto para coleta de informações, a um total de 48 pesquisadores pertencentes aos seis (6) Centros Universitários de Pesquisa da Venezuela (CIU) da população estudada. Os resultados da pesquisa realizada mostraram que as estratégias de gestão aplicadas nos UIC venezuelanos contribuem, em certa medida, para promover o desenvolvimento de projetos de pesquisa que atendam às necessidades e demandas do meio social; Isso ficou evidente no percentual que agrupa mais da metade dos pesquisadores



pesquisados, que avaliaram os pesquisadores entre aceitável, bom e muito bom, aos indicadores que descrevem as estratégias de gestão aplicadas nas UIC onde atuam; Uma percentagem menor considerou estes processos como deficientes ou muito deficientes. A principal conclusão a que se chega é que é necessário o fortalecimento da gestão investigativa e a aplicação de estratégias de gestão mais eficientes e eficazes, para o maior alcance dos objetivos institucionais e a promoção de um maior número de projetos, de pesquisas e planos de ação organizacionais que elevem a qualidade da pesquisa nesses centros de pesquisa.

Palavras chave: Estratégias de gestão, Centros Universitários de Pesquisa (CIU) Venezuelanos, qualidade, gestão da qualidade em centros universitários de pesquisa.

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Introduction

University research centers (CIU) are institutes affiliated with Venezuelan public universities that have long been an essential pillar for the generation of knowledge within these institutions, and their contribution to the academic and training function has been crucial to consolidate the prestige that these universities have achieved. However, it is important to highlight that this generation of knowledge in the Venezuelan CIUs has taken place in a context marked by crises and political turbulence, especially during the last two decades.

These circumstances have affected the research management processes, as well as the general development of these institutions, which has limited the ability to meet the professional growth needs of researchers, teachers and students, as well as the progress of society as a whole. together, since their work contributes significantly to the deepening and updating of scientific knowledge in various areas of knowledge (Cardozo-Rincón, 2014). Therefore, it is imperative that these two activities remain active and complement each other. Furthermore, the participation of students in research activities during their professional training is equally decisive in contributing to the development of actions and solutions for local and social problems.

The emergence of the knowledge society in recent decades has posed significant challenges for organizations, which are forced to adapt their management structures and processes to improve the quality of knowledge and apply it to resolve various needs and demands of communities. (Díaz, 2016; Rojas and Rojas, 2019). This idea is in accordance with what was proposed by Escorcía and Barros (2020), who highlight the role of universities and research centers in the adoption of changes to guarantee their competitiveness , which includes the incorporation of indicators that improve the processes of management, such as effectiveness,

efficiency, social relevance and quality management in order to enhance the production of knowledge.

At the end of the 20th century, the important work carried out by university research centers in various countries began to be recognized (Arechavala, 2011) due to its positive and beneficial influence in various areas, such as social, economic and political, among others. . Furthermore, this production of knowledge facilitates exchange and interaction between countries. Therefore, it is crucial to highlight the close relationship between the development of research and its relevance, especially in the context of the budget deficit and the lack of management processes that guarantee proven quality.

Although the CIUs in Venezuela are registered in the Venezuelan System for Quality - as established in the legal instrument promulgated in 2002 by the National Assembly of the Bolivarian Republic of Venezuela, which imposes the obligation to offer quality services -, These services are not developed optimally due to the previously mentioned limitations and the limited existence of agreements with state organizations or private companies that finance and promote research activities.

Although the achievement of quality status in Venezuelan CIUs can be approached from various perspectives, it is the management area that determines the performance of the teams and groups of researchers. This is essential because it is considered key to guaranteeing excellence both in research and in the academic field in general. This perspective affects the ability to identify social demands, establish links and alliances with other organizations and companies to consolidate and promote research effectively.

In the Venezuelan university context, there is little effort on the part of the competent authorities to address the stagnation in the production of knowledge and to highlight the importance of existing research centers. Despite this, it is undeniable that the knowledge generated in the university environment constitutes a valuable resource for the formulation of public policies that address various social, cultural, economic and political contexts (Kababe , 2014). In fact, research processes continue to develop in the academic and research units of the public university educational sector, despite the pressures and imbalances caused by political governance. However, it is worth mentioning that these circumstances generate uncertainty among researchers and make it difficult to achieve goals and objectives through projects that, in many cases, are managed autonomously and that fail to consolidate in the long term.

In higher education institutions (HEIs), management strategies play a crucial role in managing administrative, training, teaching-learning and research activities through functions

such as planning, organization, control and direction, which require high standards of excellence and quality to ensure effective operation. These strategies could favor and increase scientific production with high quality standards and allow these institutions to overcome the limitations derived from the scarce allocation of economic resources allocated to research in public universities (Meleán and Contreras, 2020).

Taking into account the approach of Schmelkes (2010), from the managerial perspective, the following is established:

The approaches of the new forms of management of productive systems have important implications in the way of thinking and carrying out public services (...). However, it is also possible to notice that in certain sectors of the public service there is a significant gap in reflection on the implications of the new management models and, in particular, the concepts associated with so-called quality (p. 7).

Therefore, this research focuses on analyzing the management strategies used to strengthen the quality of investigative processes in Venezuelan CIUs. The indicators considered include communication systems, technical assistance for research, articulation of research promotion networks, institutional participation in research projects and agreements to strengthen the quality of research. The main objective is to verify to what extent the implementation of these management strategies contributes to the success in the development of investigative processes in the Venezuelan CIU or if, on the contrary, they are not favoring the achievement of institutional goals in this area.

Management strategies

According to Cedeño *et al.* (2019), management strategies are mechanisms that largely depend on the understanding and knowledge that the organization has about this aspect, as well as its culture and values. These constitute a “system of principles” or daily practices that establish a point of balance to guide the creation of actions and decision-making that allow meeting expectations and addressing external demands, which in turn determines the level of quality.

For Macel (2000), management strategies are defined as a “set of actions of an organization, aimed at achieving its objectives and the factors of its environment, including the mission, objectives, strategies themselves and action plans. what the organization intends to do” (p. 50). This definition clearly refers to the pattern of application of organizational resources in order to guarantee effective and efficient institutional management. Consequently, management strategies represent an excellent tool for the organization, in any circumstance, to enhance its

strengths, minimize its weaknesses, take advantage of opportunities and successfully confront threats.

To the above, González *et al.* (2019), adds the following:

Strategic management is a tool to manage and order changes, where the organization's objectives are defined and strategies are established; Likewise, participation based on leadership and decision-making that correspond to the demands of the immediate and future environment is recognized (p. 243).

Furthermore, González *et al.* (2019) highlight that management strategies must be designed after an exhaustive analysis, both internal and external, of the organization, so that they can offer quality services that allow establishing and maintaining a solid positioning in the market. However, it is important to adapt each strategy according to the direction that the organization should take, based on its mission, vision and values.

In relation to the management strategies applied in research centers, Alvarado-Peña and Moreno (2017) maintain that it is a priority for higher education institutions to change rigid management paradigms, especially in research centers, and implement new models that lead to significant changes to improve the quality of research.

According to the above, it follows that the implementation of effective and efficient management strategies is closely linked to the availability of organizational resources necessary to ensure quality in institutional management. In this way, these strategies become a valuable resource, since they allow an organization, regardless of the circumstances, to act as a transformative agent by enhancing its strengths, mitigating its weaknesses, taking advantage of opportunities and successfully facing threats.

This system of management strategies constitutes a management process that guarantees the production of knowledge, as indicated by Alvarado-Peña and Moreno (2017):

Management in public universities, as well as in research centers, is made up of a set of core academic and administrative processes, directed by human capital that must be capable at the operational, tactical and managerial level of complying with policies and strategies. of the institution in order to achieve the objectives of higher education (p. 473).

University research centers

Research centers stand out for their focus on quality management as a fundamental pillar for decision-making and the development of strategies that promote the generation of knowledge, which implies maintaining a clear perspective on the advancement of scientific knowledge in line with changes in the global environment. To achieve this, it is crucial to keep quality management and process improvement indicators updated to satisfy the demands and demands of the various sectors of the knowledge society, including economic, cultural, social and even political aspects (Alvarado-Peña *et al.* , 2021).

Having explained the above, it can be indicated that the Venezuelan university research centers (CIU) - according to the definition adopted for this research - are institutions directly responsible for carrying out the investigative work, under the supervision and guidelines of government entities in charge of managing the research. science and technology at a central level, such as the Council for Humanistic, Scientific and Technological Development (CDCHT), the Technical Research Councils (CTI) and other administrative bodies. This means that university research centers are structurally, organizationally, administratively, economically and financially linked to the national public university institutions that host them (Alvarado-Peña and Moreno, 2017).

In these centers, the personnel in charge of management or directors are usually research teachers, responsible for establishing interactions between these organizations, the State and the immediate environment, who are in charge of controlling, evaluating and monitoring all processes related to the execution of research projects, in addition to reporting on the results generated by the research activity carried out.

Quality

Hincapié *et al.* (2023) emphasize that the definition of quality may vary depending on the country, context or field of application, as well as the authors or organizations that address it. These authors warn that trying to establish a single definition of quality would be limited, since various implications must be taken into account, such as legal, social, economic, environmental, cultural, educational aspects, among other factors.

For its part, for Becerra *et al.* (2019) the concept of *quality* has evolved over the decades, especially in the business field, where it has had greater relevance. Many authors and scholars on

the subject have highlighted aspects related to quality, recognized both in the business and academic fields:

Quality as value, Feigenbaum (1951; Abbot (1955), quality as conformity to specifications, Levitt (1972); Gilmore (1974), quality as compliance with requirements, Crosby (1979), quality as adaptation to use, Juran and Gryna (1988); uniformity and reliability, Deming (1989); and meeting and/or exceeding customer expectations, Grönroos (1983) ; It is a service, Levit (1972); Grönroos (1983; Parasuraman *et al .* (1985), customer satisfaction” Gutiérrez (1997) (Becerra *et al .*, 2019, p. 4).

These definitions have generated debates because many experts argue that they are more linked to the quality of a product than to the quality of a service (Becerra *et al .*, 2019). In addition to this, various international organizations dedicated to quality evaluation have contributed by establishing definitions from different approaches and areas of action. For example, the International Standard Organization (ISO), in its ISO 9001:2015 standard, states that quality in organizations drives a results-oriented culture that involves changes in attitudes and behaviors to satisfy the demands and needs of customers. Therefore, they define quality as follows:

The quality of an organization's products and services is determined by the ability to satisfy customers, and by the intended and unintended impact on relevant stakeholders. The quality of products and services includes not only their intended function and performance, but also their perceived value and benefit to the customer (ISO, 2015, p. 7-8, cited by Becerra *et al .*, 2019, p. 5).

Emphasis *et al .* (2023) also highlight that UNESCO (United Nations Educational, Scientific and Cultural Organization) has established that quality in education “ must be capable of making students learn to solve specific problems and meet the needs of society, making use of its scientific and technological skills and knowledge” (p. 183). These authors, when analyzing various research, describe quality in relation to the management or administration of quality in research, which is why they cite Xiaobo *et al .* (2011), who define it as “the management of all scientific research activities and procedures” (p. 189). They also mention Fàbregas *et al .* (2012), who consider it this way:

[Quality] is considered as the administration of all activities and procedures that are involved in research, that is, the organization, the system, the personnel, the product and its integration process; In addition, it has resource management that allows operational

management of the funds and resources necessary to carry out a scientific activity (p. 189).

Finally, they cite Xiao and Wang (2013), who highlight the importance of strengthening quality self-management in scientific research, using quality as a central element to drive innovation in management and establish a new concept.

Quality management

The management carried out in research centers must have the capacity to address the needs, demands and requirements of society in terms of solving existing problems. To achieve this, it is necessary to have qualified personnel who have specific skills and qualities to promote actions aimed at guaranteeing the quality of the processes. This last aspect is crucial for the survival and competitiveness of organizations, which is why it is essential to develop and implement quality management systems (QMS) that promote good performance and sustainable development (Amaya Pingo *et al .*, 2020), especially in institutions or organizations whose purpose is oriented to service to society.

A QMS, based on the ISO 9001 (2015) standard, is made up of a hard dimension and a soft dimension. The first covers the formal aspects of the organization, such as standardization and control. These processes aim to use the available resources to meet the requirements that guarantee the efficiency and effectiveness of the products or services offered (Reyes *et al .*, 2022). On the other hand, the soft dimension refers to the available human resources, social elements, leadership, the philosophical values of the organization, knowledge management (training, formation) and the interactions and interrelationships between internal members and with the around. In a knowledge management system, not only the technical aspects are important, but the human and social elements that allow its development and the proper functioning of organizations are also equally important (Reyes *et al .*, 2022).

Method

The present study is framed within the positivist paradigm, since the reality of the existing problems was directly addressed by observing the relationships and interactions between the actors in their own contexts. This approach was based on the theoretical foundations that guided the data collection process, following the approaches of Sabino (2014), which sought to obtain a proportionate understanding of reality, focusing mainly on the numerical dimension of social phenomena. object of interest of this research.



Regarding the level of research, it is a descriptive study, whose objective was to describe the indicators and factors that characterize the “management strategies” applied by the directors of university research centers in Venezuela, with a view to consolidating the quality of the university research. The design used was non-experimental, transectional, which means that the study variable was not manipulated, but rather the data were collected as they were presented in their natural context. This research approach, according to Hernández *et al.* (2014), involves the collection of information at a single moment and in a single time with the purpose of describing variables and analyzing their incidence and interrelation with other phenomena at a specific moment.

Likewise, a field design was used, since all the necessary information was obtained directly from the subjects linked to the relevant research centers and university institutions (Sabino, 2014), without intermediaries of any kind, and the methods considered were used. most suitable for the researcher and his work team.

The study population consisted of Venezuelan university research centers (CIU) associated with the faculties, academic programs and other research units of national public universities of Venezuela. Those centers that showed interest in participating in the research were selected after their coordinators and directors were contacted by email. These centers belong to the following university institutions: Universidad del Zulia (LUZ), Universidad Nacional Experimental Rafael María Baralt (UNERMB), Universidad Central de Venezuela (UCV), Universidad Simón Bolívar (USB), Universidad de Los Andes (ULA) and Universidad Guyana Experimental (UNEG).

The chosen CIUs share similar characteristics, since they are research entities responsible for generating, organizing and disseminating knowledge produced in studies and research in various fields such as social, economic, administrative and managerial sciences.

To select the sample, the web portal of each research center was accessed to obtain the number of researchers registered in each one and prepare a list with the number of researchers. With this information, a simple random sampling was carried out, following the methodology proposed by Sabino (2014), where each element of the population universe had the same probability of being selected.

The final sample consisted of 48 researchers who agreed to participate and complete the survey designed for the research. Due to the restrictions on in-person activities caused by the Covid-19 contingency, the questionnaires were sent to the researchers by email, at the request of

the participants themselves. To facilitate this process, ICT was used to digitize the questionnaire in Google Forms format .

Once the questionnaires were completed, the responses were organized and classified in an Excel format for more efficient analysis of the collected data. The information was then processed using descriptive statistical techniques to obtain a detailed understanding of the results.

Table 1 presents the detailed population, including the number of research centers for each selected university and by geographic region. The number of researchers who agreed to participate is also indicated. It should be noted that a confidentiality agreement was established to preserve the identity of the researchers associated with each research center.

Table 1. Study population

Region	Number of study and/or research centers	Research staff
West	2	30 researchers
Capital	2	10 researchers
Andean	1	5 researchers
Guiana	1	3 researchers
Total	6 research centers	48 subjects

Source: self made

The instrument used to collect data was a mixed structured questionnaire, which included closed and open questions. This was designed considering various criteria, such as the inclusion of instructions for respondents and sections intended to collect relevant personal information, such as academic training, work status, professional experience, age, gender, among other aspects relevant to the research. During this stage, existing theories related to management strategies were reviewed and experts were consulted for the construction of each question to avoid repetition of items, so that precise information about the study variable could be obtained.

Likewise, a measurement scale was implemented to evaluate attitudes and perceptions, assigning codes to assess each response to the items or questions with multiple alternatives. This allowed us to measure the variable “management strategies” and its indicators. The evaluation of the results was carried out in accordance with the criteria established in the scale in Table 2, where the response range from 1 to 5 is presented, with 1 being the least important and 5 being the most important.

Table 2. Scale for measuring the variable

Criterion in order of importance	Interpretation
5	Very good
4	Well
3	Acceptable
2	Deficient
1	Very poor

Source: self made

The validation of the instrument was carried out through the judgment of 9 experts; Their recommendations were incorporated to improve the wording and coherence of the items, so that reliable responses from the research subjects were guaranteed. In addition, a content validation or theoretical review was carried out to determine the degree of measurement of the variable, using variables, dimensions, indicators and reagents relevant to the field of knowledge and object of study.

In addition to this, a reliability analysis was carried out to statistically support the measurements obtained with the instrument. Likewise, the internal consistency technique was applied to evaluate a 10-item questionnaire for the 48 subjects in the study sample. Cronbach's alpha index was used, with a result of 0.919, which indicates very good reliability of the instrument. The instrument used in this research is presented below (Table 3).

Table 3. Information collection instrument (structured mixed questionnaire) for measuring the variable “management strategies”

Variable	Management strategies applied in Venezuelan university research centers (CIU)	Measurement criteria				
		M.D	d	T	b	M.
Dimensions	Items	.		O		B.
Communication system	What specific results do the communication systems established in the study and/or research center show on research quality?					
	How much have the communication systems used at the center helped to disseminate or strengthen research quality?					
Technical assistance for research	How is technical assistance for research deployed at the center to ensure research quality?					
	Towards which particular area is technical assistance for research at the center oriented so that research quality is guaranteed?					
Articulation of research promotion networks	In what state of progress is the articulation of research promotion networks in the study and/or research center for quality?					
	How convenient has the articulation of research promotion networks in the study and/or research center for quality turned out to be?					
Institutional participation in research projects	What is institutional participation usually like in the center's research projects to promote research quality?					
	What role does institutional participation in the center's research projects play in ensuring research quality?					
Agreements to strengthen research quality	What has been the progress of the agreements signed by the center to strengthen the quality of research?					
	How important have the agreements signed by the center proven to be to strengthen the quality of research?					

Fountain: Own elaboration

The information processing was carried out using the statistical program SPSS, v22. In this sense, data extraction was carried out following the criteria and characteristics of the instrument used in the research. The results were presented using descriptive statistics, through double-entry tables that showed the indicators of the variable and the absolute and relative frequencies. These frequencies were determined according to the measurement criteria specified in the scale used.

Results

Below, the results derived from the application of the instrument designed to evaluate the management strategies implemented in the university research centers (CIU) of Venezuela are presented. These data represent a significant contribution to the process of improving management by the authorities and the personnel responsible for these centers. Its correct interpretation can provide valuable data to raise the quality of research in public universities, which in turn would contribute to improving the academic level and obtaining greater recognition at the national and international level.

Table 4. Measurement of the *management strategies variable*

Dimension	Very poor	Deficient	Acceptable	Well	Very good	total F	total fr
Management strategies	-	3 (6.3%)	21 (43.8%)	22 (45.8%)	2 (4.2%)	48	100%

Source: self made

The previous table shows the results obtained when evaluating the effects of the implementation of management strategies in the institutions that are the subject of this research. It is observed that the highest percentages correspond to the criteria of good with 45.8% (22 subjects), and acceptable with 43.8% (21 subjects). On the other hand, 6.3% of those surveyed (3 subjects) consider that the application of these strategies is poor, while 2 subjects (4.2%) think that they are very good.

Next, in Table 5, the measurement of the indicators that constitute the variable *management strategies* applied in the Venezuelan CIU is presented.

Table 5. Measurement and analysis of the indicators of the management strategies variable

Indicators	Management strategies - measurement criteria						
	Very poor	Deficient	Acceptable	Well	Very good	total F	total fr
Communication system	-	9 (18.8%)	6 (12.5%)	20 (41.7%)	13 (27.0%)	48	100%
Technical assistance for research	-	5 (10.4%)	10 (20.8%)	20 (41.7%)	13 (27.1%)	48	100%
Articulation of research promotion networks	2 (4.2%)	3 (6.2%)	26 (54.2%)	12 (25.0%)	5 (10.4%)	48	100%
Institutional participation in research projects	3 (6.3%)	14 (29.2%)	8 (16.6%)	18 (37.5%)	5 (10.4%)	48	100%
Agreements to strengthen research quality	3 (6.3%)	5 (10.4%)	22 (45.8%)	11 (22.9%)	7 (14.6%)	48	100%

Source: self made

The “Communication Systems” indicator recorded a percentage of responses in the *Good criterion* of 41.7% (20 subjects), while 27.1% (13 subjects) opted for the *Very Good rating* . On the other hand, the *poor criterion* was selected by 18.8% of the respondents (9 subjects) of the sample of this research.

In relation to “Technical assistance for research”, 41.7% (20 subjects) rated it as *Good* , followed by the *Very Good criterion* , which also obtained a high percentage (27.1% = 13 subjects). These were the two highest ratings with a positive trend for this indicator. In the *Acceptable criterion* , 20.8% (10 subjects) were obtained, while 5 subjects (10.4%) rated it as *Deficient* .

Regarding the “Articulation of research promotion networks”, the highest percentage corresponded to the *Acceptable criterion* (26 people = 54.2%), which exceeds the average. On the other hand, 12 subjects (25.0%) thought that this process is good (second highest score). The

Very Good criterion was selected by 10.4% of the subjects (5 participants). Regarding the negative responses, 6.3% (3 people) rated it as poor, while 4.2% (2 people) considered this process to be very poor.

The indicator “Institutional participation in research projects”, as part of the management strategies applied in the Venezuelan CIUs, was rated as good by 37.5% of those surveyed (18 people), which shows a positive appreciation. Continuing with this trend, 10.4% (5 individuals) thought that this process is very good. On the other hand, the *Acceptable criterion*, considered neutral, obtained 16.6% of the responses (8 subjects). However, a significant percentage of respondents—29.2% (14 researchers)—answered the *Poor criterion* regarding institutional participation. Finally, 6.3% of the sample (3 subjects) placed their selection in the *Very poor criterion*.

The last indicator for measuring the *managerial strategies variable* (i.e., “Agreements to strengthen the quality of research”) revealed that the majority of responses, 45.8% of the subjects (22 people), thought that this aspect applies in an acceptable manner. On the other hand, 11 subjects (22.9%) rated this indicator as good, while 14.6% (7 subjects) considered it very good.

Discussion

Universities are fundamental pillars worldwide for the creation and dissemination of knowledge (Escobar *et al.*, 2016; Suárez-Amaya *et al.*, 2022), hence it is crucial to review and analyze the management strategies implemented for the management of research activity, especially in university research centers, in order to guarantee that this work increases its quality and can address existing problems in various areas and sectors of the communities. In this sense, González Roys (2022) indicates that knowledge management depends on effective managerial and organizational tools, capacities and skills, which ensure success in institutions in the educational sector. Therefore, in the case of higher education, management strategies must guide the processes for the development of projects taking into account all the elements involved, whether social, economic or human.

Now, regarding the indicators that constitute the *managerial strategies variable* of the present research, the results indicate that the respondents consider that the communication systems established in the Venezuelan university research centers (CIU) are good. This means that they allow the transmission of information about the institutional reality both internally and to the external public, overcoming distances and differences, and promoting the institutional

image and values. Likewise, these systems meet the demands and demands of the environment, which has a positive impact on strengthening investigative quality.

The results also demonstrate that one of the processes that influence the generation of knowledge and that increases the quality of the research work are the communication systems used. In the case study of the Venezuelan CIUs, these systems have been positively evaluated, which is significant. According to Antón-Chávez and García-Yovera (2019), the existence of fluid, well-planned and quality communication and information systems within an organization mainly leads to identification with the objectives by the members of the institution, which in turn facilitates participation in decision-making and the acquisition of good practices that benefit its operation. In other words, effective communication and the way in which messages are transmitted promote integration and motivation, as well as internal cohesion based on the organization's values.

However, it should be noted that although research centers have good communication systems, some opinions suggest that they have not been used to the maximum. Therefore, it is necessary to strengthen and update them for greater dissemination of scientific production.

Regarding technical assistance for research, the data indicate that a high percentage of researchers agree that it is widely deployed through exchange and cooperation, as part of the management strategies applied in the Venezuelan CIUs of the study. Therefore, it is important to highlight the relevance of having a broad framework of action to establish alliances and associations that strengthen inter-institutional exchange and cooperation.

To this end, it is vital to have spaces where virtual work is carried out that provides newspaper services and interaction through an open access Internet portal, which must have a design and user-friendly mode of use for users in general with the objective to bring all interested parties closer to the full texts of scientific documents and articles published in the best journals and databases with a high impact factor.

In this sense, and in relation to the specific aspect that guides technical assistance in the Venezuelan CIU, according to the information provided by the members of these agencies, both internal and external collaboration between departments of the same center and with others from different centers stands out. universities, which encourages the exchange of knowledge and methods, as well as the application of policies to promote impact in research work.

In accordance with the above, Cordero *et al.* (2015) highlight that in the educational field, the research assistant or technical advisor becomes a facilitator of the educational improvement process, which must be a point of reference and reason for pedagogical support or advice.

Likewise, in a review article published by Castro *et al.* (2023), it was found, according to several authors, that technical assistance involves actions such as helping to solve problems related to the provision of a service, the development of products, processes and management.

In extension activities, this technical assistance is manifested through the strengthening and formulation of knowledge, which stimulates innovation through good management practices, as well as the consolidation of technical skills. These actions become improvement strategies that help solve the different problems that arise during the implementation, monitoring and evaluation of public policies, laws, guidelines and operating models, aimed at achieving their objectives (Castro *et al.*, 2023).

On the other hand, the opinions collected through the questionnaire indicate that the promotion of research through the articulation of networks is considered “acceptable.” However, in the current situation, a high degree of stagnation is evident due to inattention on the part of the State, the lack of institutional momentum and the organizational deterioration in which Venezuelan public universities find themselves. Even so, the work carried out by researchers is notable, either individually or in collaboration with research groups and nodes, to keep the investigative work active.

In this context, the articulation of networks for the promotion of research in Venezuelan university research centers constitutes a strategy that amalgamates the efforts of researchers from these centers to continue interaction with the external context, which includes the business field, industrial, social, economic, multilateral organizations and, possibly, with their peers abroad.

On this topic, Aguilar-Gallego *et al.* (2016) point out that the articulation of research promotion networks establishes links between actors, groups, centers, institutes and research nodes with common interests. For his part, Velásquez (2014) highlights the importance of the dissemination mechanisms implemented by research communities, through which inputs can be obtained for the development of knowledge. For example, the formation of networks of researchers makes it possible to promote, review, discuss and disseminate the product of research. Furthermore, it highlights a crucial aspect for the articulation of networks: voluntary participation, a highly convenient action and initiative for research centers, both at the individual and group level.

On the other hand, Esteves and Rada (2012), cited by Velásquez *et al.* (2014) explain that, by linking researchers with common interests in their research work, networks can be established even when physically separated, an aspect that was strengthened during and after the covid-19 pandemic, which made the collaborative work and networks in research.

Therefore, the results presented reflect that the majority of respondents agree that the promotion of research quality through institutional participation in research projects is effective, although there is a minority group that believes otherwise. In this sense, the leading role of institutions in research projects is positioned as an effective mechanism that demonstrates good political practices in research centers to promote research quality.

For Comba *et al.* (2020) the perfection of research assets and academic skills is achieved through active interaction and intervention in the development of institutional research projects, while Sillero (2018) considers that the participation of students, co-researchers or research assistants in different projects It must be aimed at improving the conditions of well-being and growth of communities and society in general.

To exemplify this idea, Rojas and Rojas (2019) describe the case of Venezuelan university research centers that have operated for more than 30 years at the headquarters of one of the most important autonomous universities in Venezuela: the University of Los Andes (ULA) in the state of Mérida. These research centers, which comprise 18 in total, have as their main function and fundamental role the execution of projects, in addition to the dissemination of scientific production, the evaluation of strategies and the generation of indicators, among other mechanisms that contribute to raising the research quality. This example illustrates how an autonomous and national university like the ULA demonstrates a form of self-management that can be replicated.

The last element analyzed as a management strategy in this research on the Venezuelan CIU is the signing of agreements to strengthen the quality of research. According to the percentage of researchers who expressed positive opinions in this regard, it is inferred that the progress of the agreements signed by the centers to strengthen the quality of research is in a state of development or medium momentum. In this regard, it is worth highlighting that these agreements can have a positive impact on strengthening investigative quality.

However, management to increase this progress requires more efficient mechanisms that address this need, while encouraging the participation of researchers in the generation of knowledge from their respective areas of interest. To this end, it is essential that these options do not compromise personal well-being or affect the professional interests of researchers, especially in the complex context of higher education in Venezuela, marked by the political, social and economic situation.

Likewise, the work of the directors of the university research centers in the country's public universities must be recognized, since they contribute in various ways to promoting the quality of the research projects carried out.

At a global level, the signing of new agreements, as expressed by López *et al.* (2014), requires the implementation of other management mechanisms that promote inter-institutional and transnational relationships. These actions imply numerous benefits, since they represent a process of enrichment and growth through the experiences developed with other institutions. Fostering relationships with different types of institutions—both national and international, as well as with companies from various economic, social, cultural and political sectors—enriches and promotes the generation of new scientific knowledge.

Similarly, Peralta Mocha (2022) believes that the subscription to inter-institutional agreements, both nationally and internationally, constitutes a strategic and management mechanism that promotes internationalization. These agreements facilitate the obtaining or creation of corporate identities and promote the differentiation of some institutions from others. This variable is fundamental for the recognition of Venezuelan CIUs, as it can project them as leading centers in the generation of new knowledge, scientific and technological innovation for the benefit of national development, as occurs in developed countries.

In conclusion, the results obtained indicate that the management strategies applied have been considered “acceptable” and “very good” by the majority of the researchers surveyed. Furthermore, given that these strategies are implemented by the same teaching and research staff, this constitutes a strength when evaluating and analyzing the context of this research.

On the other hand, although teachers and researchers have the responsibility of highlighting the importance and value of organizational culture in CIUs, institutions dedicated to the generation of knowledge must work on the development of high-quality research that responds to the requirements and demands of the environment. In fact, to ensure optimal levels of efficiency and effectiveness in future research work, it is necessary to base policies according to the needs of university CIUs and institutional regulations, along with the application of corrective actions.

In line with this idea, Alvarado-Peña and Moreno (2017) maintain that academic staff, including teachers and researchers, are those who have the responsibility and capacity to promote visible changes and guarantee the effective development of processes in Venezuelan CIUs, since their experiences and knowledge make them the ideal actors to manage research in these centers.

In short, this study has shown that the personnel of the Venezuelan CIUs largely fulfill the purpose of guaranteeing quality and efficiency in the processes of knowledge generation in the field of national public university education. However, limitations have also been identified during the conduct of this study due to the context of the covid-19 pandemic and its consequences.

The main limitation, therefore, was the mobility restriction, which prevented contact with the researchers in their specific work and geographic environments at each research center. This situation hindered direct observations, a technique that would have provided precise and objective information on the administrative and managerial functioning of the CIUs. Additionally, the lack of direct personal contact influenced sample selection, which likely would have been higher if the researchers had been accessible at their physical locations.

These limitations underscore the need to adapt to changing circumstances and use alternative approaches, such as online data collection via the Internet, as was done in this study. However, it is important to recognize that this approach may have affected the representativeness of the sample and, therefore, the generalizability of the results.

Conclusions

The results obtained highlight the need to update and strengthen the management process in terms of the strategies applied in the administrative and research field of Venezuelan university research centers (CIU). This includes the monitoring and evaluation of all management processes, using quality indicators and applying dissemination and visibility measures that generate credibility both in the internal and external environment of these centers.

The implementation of efficient management strategies not only increases the research quality in the CIU, but also promotes and consolidates relationships with other entities, both public and private. In addition, it facilitates interdisciplinarity, community intervention and collaboration between researchers from different research centers of Venezuelan public universities.

In addition to this, management strategies encourage student participation in research projects, which allows them to contribute novel ideas and contribute to the consolidation of future projects. This integration not only enriches their academic training, but also strengthens the research capacity of the CIU in general.

However, achieving quality in research will only be possible through an inter-institutional and multidisciplinary approach, supported by the collaboration of private companies and the use

of innovative management strategies that conform to international standards in scientific research. Furthermore, these strategies must be appropriate to the internal context of the country and the specific nature of the Venezuelan CIU.

On the other hand, it is worth mentioning that the research activities carried out in the Venezuelan CIUs are governed by the policies and management guidelines of each university, which affects their operation. Therefore, it is crucial that public policies issued by the State are updated and adjusted to the demands of innovation in research management mechanisms.

The request for fair budgetary and financial allocations, as well as the generation of own income, are priority aspects to satisfy the expectations of research quality in all Venezuelan CIUs, and not only in those addressed in this research. This approach will ensure that CIUs have the necessary resources to carry out high-quality research and thus contribute to scientific advancement and national development. Keep in mind that a set of well-structured, efficient and effective management strategies is essential to satisfy the demands of society and guarantee the quality and functionality of CIUs, whose evaluation ultimately falls on society in general.

The correct implementation of the theoretical principles related to management strategies will allow achieving both institutional and research quality objectives. For example, communication systems guarantee the exchange and dissemination of information and knowledge generated, while technical assistance for research strengthens investigative work by facilitating the effective transfer of knowledge and technologies, as well as by consolidating institutional capacities. . Likewise, the articulation of research promotion networks consolidates the efforts of research work, while institutional participation in research projects allows the acquisition of resources, experience and prestige that support research quality. In addition, the agreements signed as a modality promote, develop and strengthen quality in research by receiving support from internationally renowned institutions, which increases the value, credibility and positioning of the Venezuelan CIU.

Future lines of research

This research leaves various fields open to continue exploring the topic of Venezuelan university research centers (CIU), especially in the post-pandemic context and considering the particular situation of the country. Therefore, the different dimensions of investigative activity and its development in Venezuela must be addressed, taking into account the attention required in the current situation. In summary, some possible lines of research could include the following:

1. Comparative analysis of administrative management in research centers in Latin America and the Caribbean.
2. Study on academic and research technical assistance and cooperation with national and international institutions in the Venezuelan CIU.
3. Research on international multilateral collaboration and assistance in research centers in Venezuela.
4. Comparative analysis of the media and dissemination as part of the management strategies implemented in Venezuelan CIUs, in comparison with research centers in Latin America and the Caribbean.
5. Study on the mechanisms that strengthen the research and institutional quality of research centers in Venezuela.
6. Exploration of opportunities for growth, expansion and collaboration of national university research centers with international research organizations and institutions.
7. Research on the influence of knowledge, understanding, experience and theoretical and philosophical foundation of researchers on management strategies.
8. Study on changes or adjustments of management strategies based on new trends and demands of the environment.
9. Development of an effective management model for Venezuelan CIUs.

These lines of research can contribute to better understanding the challenges and opportunities faced by Venezuelan CIUs and to develop effective strategies to strengthen their research work and their impact on society.

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