

Integrated Management Systems as a Tool for Strengthening and Competitiveness in Higher Education Institutions in Colombia

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Abstract

Higher education institutions (HEIs) are recognized at the national level as increasingly structured organizations that provide educational services in accordance with the requirements of both students and the current environment, where the different stakeholders expect quality levels and guarantees of the education product or service provided. With the aim of reflecting on how Integrated Management Systems (IMS) can facilitate the scope for further strengthening and

competitiveness, a structured review of the current literature is proposed below, in order to highlight the most important aspects of GIS and the benefits for HEIs in Colombia. The results obtained confirm that the advantages are enormous in terms of organization and quality, and although they demand an effort in resources such as time, money and training of personnel, in the long term they are seen as a valuable tool for these organizations.

Keywords: Higher Education Institutions, Quality, Competitiveness

1 Introduction

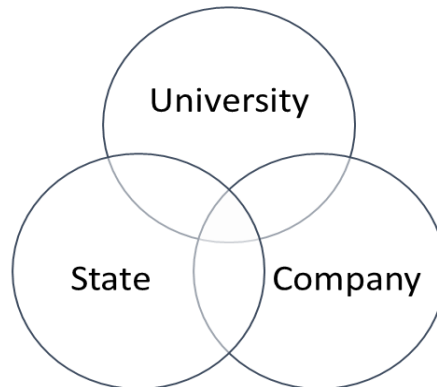
Every person who decides to study a technological or professional career, does so with the intention of improving his or her skills to successfully participate in the real world of business, hence the responsibility of higher education institutions to not only design competitive curricula, but also to dictate them efficiently and effectively, as well as to build an enriched knowledge base and create study environments that favor the assimilation of the teachings taught.

For this reason, this type of organization should not be far from its strategic allies such as the government and the company, and the development of training and administrative programs to keep the needs and expectations of future professionals up to date can be very useful. It is not advantageous for society to transmit unimportant knowledge that does not contribute to the development of students' skills, or that is out of context with respect to the competitive business environment; for this reason, the joint work between University - Company - State is fundamental.

2 Integrated Management Systems: development and advantages

When dealing with the issue of quality, we can observe the appearance of the Triple Helix model, which is based on the interaction of the three actors mentioned, seeking the development of innovation; its creators Leydesdorff and Etzkowitz talk about innovation systems considering them as dynamics of change in production and distribution systems, which arise in knowledge-based economies[1][2]; This is why the authors place the university at the same level of importance as business and government, while the former is responsible for generating knowledge, the latter for developing it, and the latter dictates the policies and guidelines that the country's actions are expected to be directed towards. Figure 1 shows the Leydesdorff and Etzkowitz Triple Helix model.

Fig. 1: Triple Helix Model



Source: Morales, Sanabria & Caballero, 2015

The triple helix model differs from the others in that it includes hybrid organizations called Cooperative Research Centres, whose main purpose is to promote and manage university, state and business cooperation through collaborative research activities and multidisciplinary training [1].

In relation to the role that education is playing in today's society, the Ministry of National Education in Colombia has established minimum quality criteria for the provision of education services, thus creating the National Council for Higher Education (CESU), the National Accreditation Council (CNA) and the National Accreditation System (SNA) since the issuance of Law 30 of December 1992 [3].

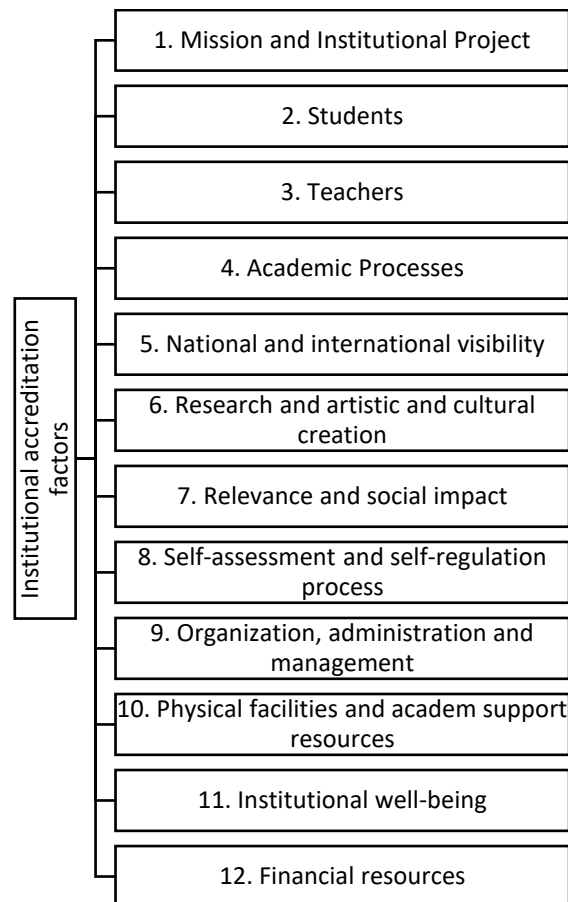
The National Council for Higher Education (CESU) is the government entity in charge of giving the concept favorable to the higher education entities that satisfy the requirements contemplated in articles 19 and 20 of Law 30 of 1992[3]; while the National Accreditation System (SNA) emanates the set of policies, strategies, processes that seek to guarantee society that these institutions that make up the system comply with the highest quality requirements and institutional objectives; which are elaborated by the National Accreditation Council (CNA)[4].

Similarly, Law 30 of 1992[3] also defined higher education institutions, which may be publicly or privately funded, and can be distinguished between professional technical institutions, technological institutions, university institutions or technological schools and universities.

Quality in higher education is then understood as the characteristics that make it possible to recognize an academic program or an educational institution, and to judge the relative gap between the way in which that institution or program provides the educational service and the characteristic that corresponds to its nature. Likewise, educational quality contemplates the development of an organizational culture with principles of evaluation and continuous improvement, which includes

the deployment of policies, strategic programs, projects, actions and resources that, immersed in development plans, lead to the fulfillment of mission objectives [5]. The National Accreditation Council (NAC) has established 12 factors that it has identified as pillars for its evaluation, as shown in Figure 2.

Fig. 2: Institutional Accreditation Factors



The factors represented can be described as [6]:

- o Mission and institutional project: the institution of having defined a mission and an educational project recognized by the community that serves as a guide for the development of mission and support functions.
- o Students: the institution must recognize the duties and rights of the students, must offer transparent application of the norms, promotion of inclusion in decision-making bodies, guarantee of equity and inclusion, as well as a graduation under conditions of quality.

- o Teachers: stimulates the level and commitment of their teachers, guaranteeing the conditions for the proper performance of their duties.
- o Academic processes: the institution must place the student at the center of its work, in search of enhancing their knowledge, capacity and skills resulting from a training process developed in a comprehensive, flexible, updated and interdisciplinary.
- o National and international visibility: it must develop mission processes and capacities to access international resources and knowledge, intercultural communication and comparative analysis of academic processes and their context.
- o Research and artistic creation: promotes effective training processes for research, critical thinking and creation, so that it can contribute to scientific knowledge and cultural development.
- o Relevance and social impact: the institution must demonstrate its commitment to its environments through the development of substantive functions, policies and programmes for outreach and interaction with the external sector.
- o Self-assessment and self-regulation processes: it must develop its capacity to plan its development and to evaluate itself systematically and permanently, through the execution of continuous improvement plans, making possible its self-regulation in the use of its institutional autonomy.
- o Institutional well-being: it must have mechanisms and instruments for the generation of an institutional climate conducive to the integral human development of the entire community, and must also include internal and environmental intervention programmes that reduce situations of psychosocial risk.
- o Organization, management and administration: the institution must have an administrative structure and management processes for the development of its substantive functions.
- o Academic support resources and physical infrastructure: you must guarantee the necessary resources to give optimal fulfillment to your educational project and the optimal maintenance of your physical resources.
- o Financial resources: the institution must guarantee the resources for the fulfillment of its educational project and show an efficient and transparent execution of its financial resources.

The above analysis of the criteria and characteristics of quality in higher education in Colombia is consistent with the general concepts of quality and their standards for management systems, which is why the idea of integrating educational quality criteria into a total quality methodology developed through the implementation of Integrated Management Systems (IMS) is not outlandish.

Total quality is a business philosophy in which the main objective is the permanent and full satisfaction of our clients, in front of their needs and expectations, through the continuous improvement of the organization, with the active participation of all the human resources that are part of it [7]. This systems approach considers each interaction between the various elements of the organization, so that, in general, the effectiveness of the system is greater than the sum of the individual results of the

subsystems, and the subsystems also include all the organizational functions in the life cycle of a product, such as: design, planning, production, distribution and field service. Management subsystems also require integration, including: customer-focused strategy, quality tools, and employee engagement [8].

When establishing a partnership with the educational environment, the institution is considered as a company, students and their families as clients, rectors as managers; in this way, total quality is developed to satisfy clients in their need for quality education, for which the company or institution establishes processes, controls and objectives of continuous improvement to ensure its competitiveness.

ISO 9000 standards are known as a set of internationally accepted standards and guidelines that establish minimum requirements for the development of an effective quality system, in particular ISO 9001 is commonly used when the organization needs to demonstrate and/or increase its ability to provide products that meet customer requirements and applicable regulations [7].

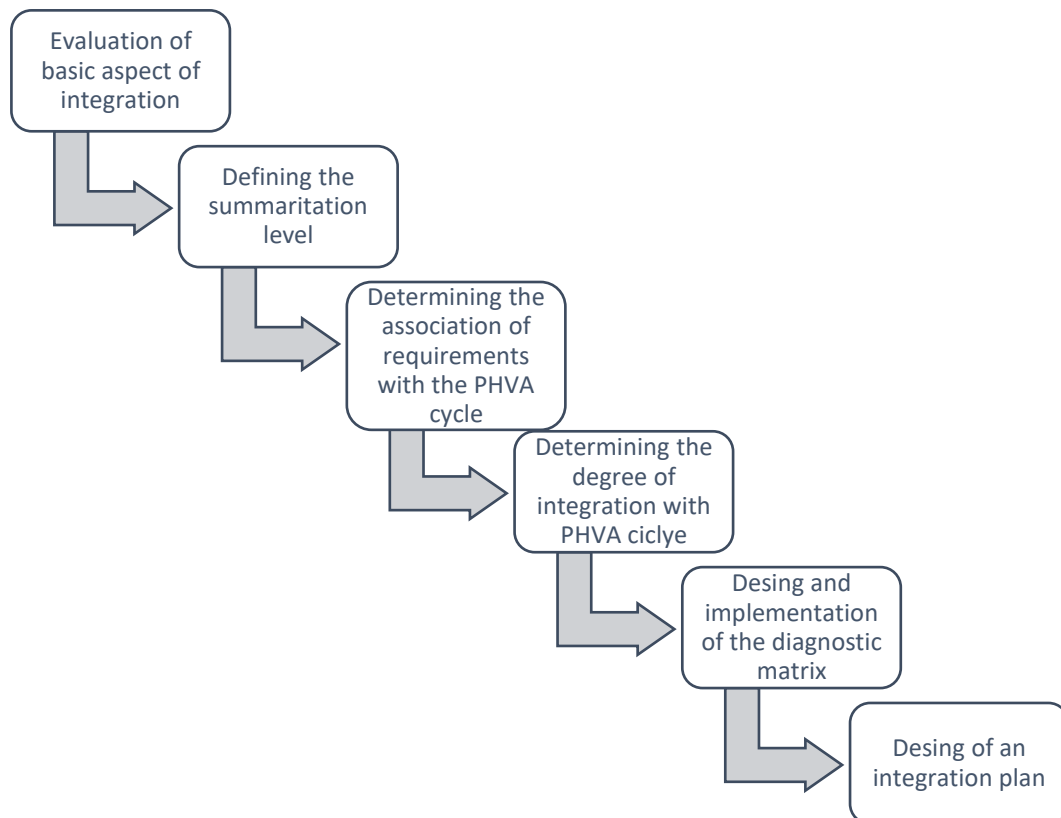
On the other hand, the integrated management systems involve a standard of the ISO 9000 family and others of the OHSAS 18000 and/or ISO 14000 family, i.e. quality management, added to the management of occupational safety and health and environmental management; the benefits and limitations of the implementation of integrated management systems are presented in Table 1.

Table 1. Advantages and limitations of the implementation of an Integrated Management System

Advantages	Limitations
Meeting the needs and expectations of all stakeholders	Difficulties in harmonizing goals and the organization's overall strategy
Increased efficiency and effectiveness of processes	Weaknesses in the capacity of senior management to manage organizational change generated by GIS implementation
Integration of strategic planning management processes	Due to the cultural change required, more effort is required in terms of training and organisation.
Improves consistency and facilitates documentation management	
Increased performance, competencies and staff training	
Improves organizational culture	
Saving of resources required for the implementation of management systems	
Unification of GIS implementation, follow-up and review audits, which generates a reduction in costs.	
The unification of systems facilitates their management, development and maintenance, which allows the organization to add value to its products or services.	

In order to integrate the management systems, it is advisable to use the Spanish standard UNE 66177: 2005 as a guide for systems integration, and the basic principle of structuring the management systems based on the Deming Continuous Improvement Cycle or PHVA. Based on these two methods, the integration method represented in Figure 3 is proposed.

Fig. 3: Method for the integration of management systems



Step 1 consists of "Evaluating the Basic Aspects of Integration", for which the organization is evaluated based on four criteria [12]:

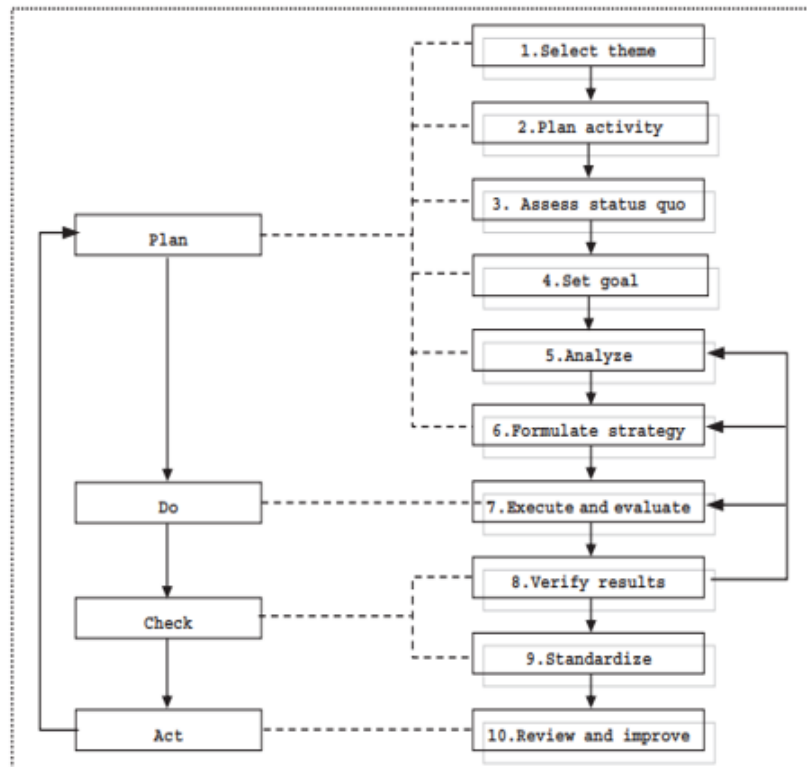
- **Maturity:** evaluates the organization to manage its processes according to the experience and effectiveness in its use, the organizational and functional structure and the level of competencies of the staff.
- **Complexity:** Assesses the degree of complexity of stakeholders, the requirements of the sector and the strategies employed by the organisation
- **Scope:** determines the management of the integration, from the standards, products or services and processes involved.
- **Risk:** assesses the consequences of non-compliance with legal and regulatory requirements.

Step 2 seeks to "Define the level of integration" in such a way that it can be determined whether or not the organization meets the requirements, or whether it does so in whole or in part, accordingly the level is set according to the following grades [12]:

- Basic: At this level the integration activity is fully performed and documented with minimum monitoring and review requirements.
- Advanced: at this stage, procedures for the early improvement of processes are contemplated.
- Expert: It is a developed system, designed for continuous improvement, in search of an effective and efficient process.

Step 3 contemplates the "Determination of the association of requirements with the PHVA cycle", this is based on what Edward Deming has defined in his continuous improvement cycle, in which he defines actions of Planning, Doing, Verifying and Acting in such a way as to allow the continuous improvement of the processes; the Deming concept is integrated in all standards for the development of management systems establishing common elements that can be integrated. Figure 4 shows the relationship of the Deming cycle to the composition stages of a quality-based management system.

Fig. 4: Description of the Deming PHVA cycle



Source: Wang, Lou, Li & Zhang, 2013

Step 4 consists of "Determining the degree of integration with the PHVA cycle", analysing each of the requirements in order to establish which should be treated similarly and which should receive a differentiated solution [14]:

- Common requirements: they are characterized by having identical characteristics in all the standards used, in such a way that they can be unified under a single solution.
- Homogeneous requirements: these are defined as those requirements that are not identical, but can be integrated, and therefore it is up to the person responsible for integration to decide to what extent he or she will carry out the integration.
- Specific requirements: are those requirements that cannot be integrated and must be dealt with individually.

Step 5 develops the "Design and application of the diagnostic matrix" based on the previous results. A matrix is then designed that contains all the requirements of the systems included, determining according to the level of integration of its components. This matrix is then applied in the evaluation of the institution's processes.

Finally, step 6 seeks to "Design an integration plan" based on the results obtained according to the maturity level of the institution as described in table 2.

Table 2. Considerations for GIS design based on maturity level

Maturity level	Actions
Basic	Policy integration Preparation of a single Quality Manual for the documentation of the management systems involved Definition of staff responsibilities and functions related to critical processes in management systems. Integration of common organizational processes according to the classification of the summarization level
Advanced	Developed a process map that integrates the different management systems. Definition and management of strategic processes. Systematic review and improvement of processes.
Expert	Establishment of integrated objectives, targets and indicators. Establishment of processes for the inclusion of interests of supplier customers and other interested parties in the development of the processes. Extension of process management to administrative and economic activities.

The methodology proposed allows the integration of the concepts of integrated management systems with the quality of education, as it was observed that this is a simple approach in which they simplify the requirements and the way in which they must be fulfilled [15]; considering that an educational institution can be considered as a productive organization, these criteria are perfectly applicable to the quality of education [16].

The tools of quality management systems are widely known as promoters of growth and innovation [17]; the environments of organizations are dynamic, changing over time by the different influences of market factors [18], which is why methodologies are required that allow organizations to keep pace with these changes and generate scenarios where competitiveness can gain prominence [19], to meet the needs of the public or market of interest [20].

3 Conclusion

Higher education institutions are not different in their basic structure from other types of organizations, although their corporate purpose has particular characteristics, including customers, needs and expectations, organizational management, control processes and continuous improvement, with the same considerations as other productive entities.

All these components are permanently interrelated parts of interest as described in the Triple Helix model, in relation to the State and industry. For all the above reasons, it is considered that the implementation of Integrated Management Systems provides a holistic view of the management of the environment and the various ways to make the most of resources in accordance with the conditions of the environment of both internal and external institutions.

Nowadays, aspects such as quality and competitiveness are closely linked, since the markets or potential clients, when choosing one or another institution, can choose to analyze certain aspects in search of guarantees for their higher education process. In this way, a great challenge is generated for today's university, because as long as it manages to respond to this specific need of the parties of interest, it will be able to grow in aspects such as competitiveness.

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