

RELATIONSHIP BETWEEN THE INDICATORS OF THE HIGHER EDUCATION QUALITY ASSURANCE SYSTEM AND THE ISO 9001:2015 QUALITY MANAGEMENT SYSTEM: A LITERATURE REVIEW

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Abstract

The main objective of this work is to contribute to the literature that analyzes the adoption of a quality management system (QMS) ISO 9001:2015 and the implementation of the indicators established in the quality assurance system (QAS) in Higher Education Institutions (HEIs). To do this, a systematic review of the literature on the subject is carried out using the following databases: Educational Source, Elsevier (Science Direct), Springer and Taylor & Francis. The following research questions were formulated: 1) Is there a relationship between the indicators of the QAS of HEIs and the indicators of the ISO 9001:2015 QMS?; 2) Does the implementation of the QAS indicators of HEIs and the ISO 9001:2015 QMS promote innovation in institutional processes?; 3) Does the implementation of the HEIs QAS indicators and the ISO 9001:2015 QMS promote the generation of institutional competitive advantages? The main findings suggest that the relationship may become possible considering that processes and services are significantly improved when quality management is implemented in institutions, because it has a positive effect on the development of the innovation and in the generation of competitive advantages. The possible relationships are determined and the conclusions of the analysis are presented.

Keywords: Education, quality assurance, innovation, competitive advantage, institutional performance.

1 INTRODUCTION

In the 1990s, discussions began regarding the relevance of using the notion of quality in the field of higher education. Education for all, throughout life, is the educational paradigm that UNESCO established in order to identify the goal to which modern society should aspire. This desire is difficult to achieve if strategic educational management does not actively foster the integration of knowledge management, science, technology and innovation [1]. To follow the advances in this desire, the World Economic Forum prepares annually the World Competitiveness Report with data that aim to establish the degree of general competitiveness and higher education development of the countries. These data are based on the Global Competitiveness Index, introduced in 2005 and based on 12 pillars, among which the importance of having appropriate institutions, showing good levels of higher education and training, and exhibiting a convenient capacity for innovation are mentioned. These reports let to assess the need to generate public policies to promote education as a factor of competitiveness [2], the value of quality assurance as a way to continuously improve [3], and the concept of innovative university to explain the changes in the mechanisms of production and application of knowledge [4]; [5].

Under this conception of international measurement of higher education, the countries of Latin America became actors in processes where an international, intercultural and/or global dimension is integrated into the objectives, functions (teaching/learning, research, services) and provision of higher education. The existence of these rankings has a significant impact on the institutional planning of public and private universities, which are moving towards educational excellence within and outside their territory simultaneously [6]. Hence, the data obtained from the study carried out by Lemaitre and Zenteño [7] for the Interuniversity Development Center - CINDA, show how the results of the evaluations planned and executed by the Institutions of Higher Education (IES) promote managerial decision-making to achieve better institutional performance [8]. On the other hand, the Ecuadorian state, through the Organic Law Reformatory to the Organic Law of Higher Education [9], recognizes as a public guarantee the certification of the degrees to which the higher education system satisfies quality standards [10]. In this case, the fundamental objective of quality assurance is to ensure that HEIs assume the responsibility of their processes and offer quality [11] [3].

In this sense, a limited group of studies were found that suggest the possibility of a positive relationship between the indicators established in the Quality Assurance System (QAS) of HEIs and those proposed by the Quality Management System (QMS) [12] [13] [14] [15] [16] [17]. In these investigations the idea is raised that HEIs can adopt the practices of a QMS as a fundamental and integral framework to direct and operate the institution and continuously improve the management of its processes, while focusing on the satisfaction of its clients [18]. All this, based on the application of quality management principles: customer focus, leadership, people commitment, process focus, improvement, evidence-based decision making and relationship management. The QMS must be applied to, among others, the resource management; development of products or services; measurement, analysis and improvement [19]. However, there is still a gap when it comes to determining the possible relationships and how they intervene and guide the processes of universities towards innovation and generation of competitive advantage [20].

Similarly, quality management practices and their relationship with fundamental innovation to achieve a higher level of research productivity in HEIs [21] has been little studied [22]. Therefore, the purpose of this paper is to contribute to the literature that analyzes whether, based on the implementation of the indicators established in the QAS of Ecuadorian HEIs, it is possible to have a solid basis for the adoption of an ISO 9001 QMS: 2015, which promotes innovation and generation of competitive advantages to improve institutional performance. The following research questions are formulated:

- Is there a relationship between the QAS indicators of HEIs and the QMS ISO 9001: 2015 indicators?
- Does the implementation of the indicators of the QAS in HEIs and of the QMS ISO 9001:2015 promote innovation in institutional processes?
- Does the implementation of the indicators of the QAS in HEIs and of the QMS ISO 9001:2015, promote the generation of institutional competitive advantages?

To answer the questions a documentary review is carried out, which systematically consults studies [23] that maintain that the QMS criteria applied in HEIs has recently emerged as a new concept [24], where the scales of quality management developed for HEIs are adopted from the constructs that were initially developed to study these issues in the manufacturing and other services sector [25]. In addition, the bibliographic review allowed to obtain information on how the application of quality management promotes the administrative innovation of HEIs, related to the generation of new ideas, methods or systems to improve their social structure [26], and conditions that can improve institutional competitive advantages. With this information, a theoretical reference framework is elaborated that helps to determine the possible relationships and conclusions of the study.

2 METHODOLOGY

The methodology applied in this study is based on the guidelines established by Petticrew and Roberts [23] for systematic reviews in the social sciences. At first, a preliminary bibliographic review was carried out to define the scope and evaluate the relevance and size of the literature on the subject. This protocol includes information on the objective of the study, the research questions, the search strategies and the design of the data extraction form. To find the articles related to the research topic the Educational Source, Elsevier (Science Direct), Springer and Taylor & Francis databases were used. We included the advanced option keywords and considered the combination of the established terms "education + quality", "education + innovation", "education + competitiveness", "education + ISO9001". Based on the result of the bibliographic review, an attempt was made to categorize the various definitions and their relationships. With the information collected, it was analyzed whether, from the implementation of the indicators established in the QAS of the Ecuadorian HEIs, it is possible to have a solid base for the adoption of an ISO 9001: 2015 QMS, which promotes innovation and generation of competitive advantages to improve institutional performance.

3 RESULTS

3.1 Relationship between the indicators of the Quality Assurance System and the Quality Management System ISO 9001:2015

The educational quality proposed by UNESCO for Latin America and the Caribbean - UNESCO / IE-SALC [27] is known as the adequacy, coherence, consistency and relevance between the intentionality or superstructure, the organization or structure and the working conditions or infrastructure of the HEIs.

The superstructure refers to the governing core of an institution (mission, vision, objectives, goals, graduate profile and educational model). The structure corresponds to the academic organization of the institution and the actors of the educational process (study plans, research lines and projects, extension and transfer actions and dissemination of knowledge). The infrastructure encompasses material and financial resources and services (bibliographical heritage, computing, others). This definition also contains the assessment of four categorical criteria. First, adequacy, which allows detecting development trends and the capacity for change that the institution has in its academic career to adapt to its current social context. Second, coherence is the relationship that exists between the constituent elements of each institutional dimension (superstructure, structure and infrastructure) and between dimensions. Third, consistency that is linked to the stability, duration and soundness of institutional processes and actions. Fourth, relevance, understood as the relationship between the results achieved and the institutional project [28].

Within the framework of the Interinstitutional Quality Assurance System (SIAC) conceived in the LOR LOES [9] published in the Official Register No. 297, of August 2, 2018, a new policy approach to the institutional evaluation of Universities appears and Polytechnic Schools of Ecuador is set, being the Higher Education Quality Assurance Council (CACES) the council in charge of the regulation, planning and coordination of the QAS of higher education; with regulatory and management power. The structuring of the QAS, represented in Fig.1, determines that accreditation contributes from external to internal evaluation processes promoted by the institutions themselves on a permanent basis and with the aim of continuous improvement. The principle of quality, defined in Art. 93 of the same law, as the continuous, self-reflective search for improvement, assurance and collective construction of the culture of quality”.

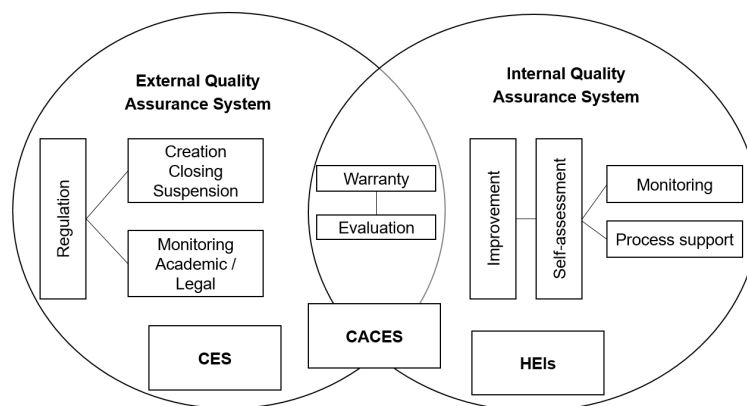


Figure 1: Quality Assurance System for Higher Education in Ecuador
 Source: Department of Studies and Research– CEAACES (2018).

Under these guidelines some authors argue that the practices applied to guide quality education can be associated with quality management practices used in the business sector, considering that this type of management includes a set of administrative components [29]. These components are planning, customer and stakeholder focus, employee management, supplier relations, process management, and information and analysis [30] [31], which are subject to performance evaluation standards, criteria and methodological approaches [32]. In turn, its implementation makes it possible to achieve long-term objectives and improve the ability to respond to changes in terms of innovation and competitiveness [24]. The fundamental idea is that any process can significantly be improved and moved towards sustainability when this is the result of the implementation of an ISO 9001 QMS [33]. Its regulations help establish and strengthen the culture of institutional quality, which will be the responsible for guiding the creative process of the participants for the development of a new quality institutional structure [34]. Recent research found that the implementation of the ISO QMS can improve the transfer of knowledge within the organization, with positive effects on research, development and innovation [35] [36].

In the same way, some recent studies [37] [38] [26] have adopted a multidimensional approach to quality management to indicate that its successful implementation is based on a balanced combination of hard and soft quality factors [38]. The "hard" (or technical) side refers to management tools, techniques, and practices, and the "soft" (or philosophical) side includes elements such as leadership, strategic quality planning, customer focus, management of processes, continuous improvement, information and analysis, knowledge and education, and supplier management. Both sides lead to the improvement of organizational performance, arguing that performance is a multidimensional concept that refers not only

to the achievement of planned results but also to execution, that is, the transfer of knowledge to establish evaluation criteria [39]. This is where another possible relationship appears with the external evaluation process for accreditation purposes carried out by HEIs, because it provides hard and soft elements [40] to continuously improve through knowledge management [41].

Table 1. Relationship between the indicators of the QAS and those of the QMS.

<i>Structure of the external evaluation model of Universities and Polytechnic Schools Ecuador, 2019 Standards for evaluation and accreditation</i>	<i>ISO 9001:2015 Quality management system Requirements</i>
<p>1. Teaching Function</p> <p>Faculty component</p> <ul style="list-style-type: none"> - Planning Dimension Standard 1: Planning of teaching processes. - Execution Dimension Standard 2: Execution of teacher processes. - Results Dimension Standard 3A: Tenure of the teaching staff (HEI undergraduate and undergraduate-postgraduate). - Standard 3B: Tenure of teaching staff (HEI postgraduate). - Standard 4A: Teacher training (HEI undergraduate and undergraduate-postgraduate). - Standard 4B: Teacher training rate (HEI postgraduate). <p>Student component</p> <ul style="list-style-type: none"> - Planning Dimension Standard 5: Planning of student processes. - Execution Dimension Standard 6: Execution of student processes. - Dimension Results Standard 7: Graduation of the student body. 	<p>4.1 Knowledge of the organization and its context.</p> <p>5.1.2 Customer focus.</p> <p>5.2.1 Establishment of the quality policy.</p> <p>5.3 Roles, responsibilities and authorities in the organization.</p> <p>6.1 Actions to address risks and opportunities.</p> <p>6.2 Quality objectives and planning to achieve them.</p> <p>7.1.2 People.</p> <p>7.1.4 Environment for process operation.</p> <p>7.1.5 Monitoring and measurement resources.</p> <p>7.1.5.2 Traceability of measurements.</p> <p>7.1.6 Knowledge of the organization.</p> <p>7.2 Competition.</p> <p>7.3 Awareness.</p> <p>7.5 Documented information.</p> <p>8.1 Planning and operational control.</p> <p>8.2.2 Determination of requirements for products and services.</p> <p>8.3 Design and development of products and services.</p> <p>9 Performance evaluation.</p> <p>10 Improvement.</p>
<p>2. Research Function</p> <ul style="list-style-type: none"> - Planning Dimension Standard 8: Planning of investigation processes. - Execution Dimension Standard 9: Execution of research processes. - Dimension Results Standard 10: Academic and scientific production. - Standard 11: Publication of articles in indexed journals. 	<p>6.1 Actions to address risks and opportunities.</p> <p>6.2 Quality objectives and planning to achieve them.</p> <p>7.1.5 Monitoring and measurement resources.</p> <p>7.1.5.2 Traceability of measurements.</p> <p>7.1.6 Knowledge of the organization.</p> <p>7.4 Communication.</p> <p>8.1 Planning and operational control.</p> <p>9 Performance evaluation.</p> <p>10 Improvement.</p>
<p>3. Substantive Function Link with Society</p> <ul style="list-style-type: none"> - Planning Dimension Standard 12: Planning of the processes of linkage with society. - Execution Dimension Standard 13: Execution of the processes of linkage with society. - Dimension Results Standard 14: Results of the processes of linkage with society. 	<p>4.2 Understanding the needs and expectations of stakeholders.</p> <p>5.1.2 Customer focus.</p> <p>6.1 Actions to address risks and opportunities.</p> <p>6.2 Quality objectives and planning to achieve them.</p> <p>7.1.5 Resources monitoring and measurement.</p> <p>7.1.5.2 Traceability of measurements.</p> <p>7.1.6 Knowledge of the organization.</p> <p>7.4 Communication.</p> <p>7.5 Documented information.</p> <p>8.1 Planning and operational control.</p> <p>8.2.1 Communication with the client.</p> <p>8.2.2 Determination of requirements for products and services.</p> <p>8.3 Design and development of products and services.</p> <p>8.5.6 Control of changes.</p> <p>9 Performance evaluation.</p> <p>10 Improvement.</p>

<p>4. Institutional Conditions</p> <ul style="list-style-type: none"> - Standard 15: Strategic and operational planning. - Standard 16: IT infrastructure and equipment. - Standard 17: Libraries. - Standard 18: Internal quality management. - Standard 19: Student Welfare. - Standard 20: Equal opportunities. 	<ul style="list-style-type: none"> 5.1.2 Customer focus. 5.2.1 Establishment of the quality policy. 6.1 Actions to address risks and opportunities. 6.2 Quality objectives and planning to achieve them. 6.3 Change planning. 7.1.3 Infrastructure. 7.1.4 Environment for process operation. 7.1.5 Monitoring and measurement resources. 7.1.5.2 Traceability of measurements. 7.1.6 Knowledge of the organization. 7.5 Documented information. 8.1 Planning and operational control. 8.5.6 Control of changes. 9 Performance evaluation. 10 Improvement.
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3.2 Education, quality management and innovation relationship

According to Antunes [24], innovation in HEIs can be understood as those procedures or methods of teaching activity that differ from those established and that can increase the level of university efficiency in the competitive environment. Analyzing the capacity of the institution to introduce new academic programs, curricula, teaching methods and the like [21], innovation in the QAS and QMS can be understood by adopting the definition of administrative innovation proposed by Jaskyte, K. [42] when referring to the introduction and application of management practices related to the structure, procedure, system or process. Organizations open to this learning are capable of systematically facing and solving situations in a changing environment and learning from their own experience and that of others to continuously improve through innovation[32].

The generation of incremental innovations supposes minor changes in existing activities, processes and practices [43]. In the case of universities, this type of innovation in its knowledge stock is linked to small updates and specific improvements in existing knowledge, which, although they can be published and disseminated in top-level scientific journals, their impact is less than that of a radical innovation. These incremental innovations have institutional benefits [44] by becoming engines that allow obtaining competitive advantages [45] and satisfying specific needs in a short period of time [46]. Therefore, they are key to ensuring the long-term survival of institutions, to the extent that they adapt to use their various organizational capacities in order to identify and capitalize on emerging opportunities [47] typical of the environment of which they are a part and in where they exert influence [48]. In this same perspective, a group of authors [49] conclude that innovation is facilitated by internal factors such as strategy, structure, management and leadership to drive quality planning in organizations.

Regarding the link between quality management and innovation, some previous studies found that the former has a positive influence on innovation [50] [37] [51] [52]. Analyzing the relationship between quality practices and innovation capabilities based on the Strategic Resource-Based View strongly justifies this type of relationship [53]. The adoption of quality management practices in innovation activities allows minimizing activities without value and reducing the time of process development [37]. In addition, the idea that innovation is fundamental and necessary for organizations that want to increase productivity and quality is raised, This perspective allows putting the central elements of innovation in line with the objectives of the QMS [54].

In the search for TQM, HEIs must have a referential comparison as well as the systematic implementation of their quality systems [55]. This implies evaluating its processes through the impact of innovation in planning, operation, the services offered by the university to students, teachers and other people and instances [56]. In this way, the activities that improve the capacity for innovation can be seen reflected in research and development programs [57] related to the transfer and dissemination of knowledge and intellectual management for the improvement institutional performance [58]. When the association between quality, innovation and performance is analyzed, some authors include a measure of operational performance as a variable of interest in the association [59], while others consider that innovation is a mediating variable between QM and performance [60].

3.3 Education, quality management and competitive advantage relationship

Currently, higher education has become an element to achieve development, being considered as a component to increase the competitiveness of the economies of the countries [61]. HEIs have used various strategies to continuously improve [62], integrating in its structures the international, intercultural and global dimension in universities [63] to prioritize, among others, the quality of higher education services through the implementation of quality assurance measures. Quality management directs HEIs policies towards the strengthening of internal relations and well-being for the academic and administrative community at the organizational level [64] [65] [66].

Recently, UNESCO incorporated the quality discussion agenda as part of the conception of education as a public social good, a universal human right and a duty of the State [67]. Under this concept, the reforms of the Latin American educational systems have been organized around the need to articulate quality and competitiveness standards under a quality management model, which seeks to generate competitive advantages. This will improve the perception of the client with respect to what he receives through its measurable [68]. From the point of view of the quality of the service offered by HEIs, market orientation can become part of their management philosophy focused on meeting demands [69], which allows them to perform better [70]. In addition, quality management helps to make correlations between the different indicators of institutional performance [71]. In this way, the competitive advantage can be evaluated by comparing the perceptions of what is received and the expectations of what should be received [72], to give meaning to the fulfillment of the objectives of the QAS of the HEIs. Quality evaluation policies allows to show improvements in their structure [73] and the efficiency and effectiveness of the variety of services they offer in different areas compared to their competitors [74].

The efforts invested in quality practices can improve the activities and products and services of HEIs through incremental or radical changes [37] [75]. Some authors suggest that, with the emergence of new forms of education supported by information and communication technologies, concern has been raised in universities to identify the factors that can affect the perception of service quality in higher education [76] [77]. The soft quality practices (customer orientation) affect profitability, sales and market share [78]. For implementing measurement instruments to evaluate the quality of the service from the perspective of all internal and external clients, actions that can be framed within the hard practices of quality (quality standards), based on three variables of organizational design: formalization, standardization and centralization [79]. Institutional policy must go beyond the constitutional obligation that assists higher education institutions to offer quality services [80] by means of adopting a total quality strategy because two main phenomena: the strengthening of the knowledge economy, and the amazing growth in the world of coverage in higher education [81].

4 CONCLUSIONS

In the proposals promoted by UNESCO in the years 2005, 2008, 2010, the importance of implementing and strengthening quality education is emphasized, promoting the need for national systems for evaluating the quality of higher education with the purpose of structuring the training of professionals under the parameters of accreditation and certification of the programs [82]. Therefore, in some contexts, the quality of education can be mechanically related to evaluation, understanding this not as part of the teaching-learning process, but as the measurement of results through standardized instruments within a system of quality assurance - QAS HEI [83].

Organizational performance can be measured from different perspectives [84]. Quality management practices lead to an improvement in institutional performance as the result of the organization's operations or the achievement of its planned goals [85]. In this sense, organizational changes come to be considered linearly as a kind of cause-effect correspondence of institutional evaluation processes [86], which drive continuous improvement of the processes carried out by HEIs.

The literature shows a lack of agreement on the dimensions that make up quality management. These dimensions or elements vary according to the researcher [87]. Some authors show the relationship between quality management and innovation using a multidimensional view, in which the soft dimension of quality refers to philosophical elements, while the hard dimension refers to technical elements of quality [88]. As a result of the bibliographical review, it is found that in the relations raised between the indicators of the QAS and QMS, the two dimensions can be understood as part of the processes associated with the generation of knowledge, research and its dissemination, management of relations with internal and external customers and quality of the services offered.

In the case of the QAS and QMS, for innovation purposes, institutional planning aimed at quality evaluations must consider the integration or consistency between the different institutional components. That is, in order to innovate, it is necessary to achieve an adequate relationship between the strategy, the structure, the systems, the direction, the people and the environment [89]. This implies the assumption that organizational innovation is linked to a new or improved organizational method that, when implemented, can affect the entire institution. However, the results of the bibliographic review do not show standard measures to determine exactly how this integration should take place. Thus, when analyzing whether, based on the implementation of the indicators established in the quality assurance system of the Ecuadorian Higher Education Institutions, it is possible to have a solid basis for the adoption of a quality management system (QMS) ISO 9001: 2015, only a proposal is presented. Some authors affirm that the type of activities that are carried out in the business field are somewhat similar to those that are carried out in the field of education, which makes quality management also applicable to HEIs [90].

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