SARAVI PONTES
Band 12

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Handbook of Higher Education in Latin America: Deans' Views and Overviews

Burgos, Hugo
Fellner, Astrid M.
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Herausgegeben von Astrid M. Fellner, Roland Marti,
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German Academic Exchange Service

HRK German Rectors' Conference
The Voice of the Universities

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To Professor Christian Scholz, *in memoriam*.

Contents

Welcome Address DAAD and HRK

Supported with funds provided by the Federal Ministry for Economic Cooperation and Development (BMZ) the Program 'Dialogue on Innovative Higher Education Strategies' (DIES) aims to strengthen Higher Education management capacities in developing countries. DIES which is jointly coordinated by the German Academic Exchange Service (DAAD) and the German Rectors' Conference (HRK) comprises a variety of modular, practice-oriented training opportunities for management-level professionals from universities in different regions of the world. One of the very successful DIES courses is the International Deans' Course Latin America (IDC LA) targeting newly elected deans and vice-deans from universities in Spanish-speaking Latin America.

Since its launch in 2012, the IDC LA—implemented in a partnership between Saarland University (Germany) and the University of Alicante (Spain)—has enhanced the management skills of about 175 participants from 17 different Latin American countries. It deals with the various dimensions of faculty management, such as strategic planning, human resources management, financial management, and internationalization to equip the participants with the necessary managerial skills for their jobs. Undiminished demand of the course as well as the annual feedback of organizers, trainers, and participants reveal that the selected topics are still relevant and address current Higher Education management needs in Latin America. The future generation of deans needs to acquire the necessary competences to deal with scarce financial resources, manage human resources effectively, or position the faculty in an increasingly competitive Higher Education market both at national and institutional level.

The IDC LA is an intense training offer which stretches over a period of about eight months and consists of three presence phases in Germany, Spain, and Latin America. In between the presence-phases, all participants are required to develop individual change projects at their home universities by formulating the so-called Strategic Action Plans (SAP). This didactical design requires a lot of time and efforts from the participants, commitment, and passion to get into the various aspects of faculty management but also the openness to share experiences and perspectives with peers and trainers.

We are convinced that this format is not only effective in terms of acquiring knowledge, the hands-on approach also allows immediate transfer and application of the course learning outcomes, linking theoretical concepts to the participants' working environments, and turning them into practice.

Furthermore, blended-learning elements such as distance coaching and online webinars ensure that the participants stay in touch with each other, the trainers and experts, and that dialogues continues.

Frequently, the professional contacts established during the course persist even after the course has long been completed and turn into friendships thus initiating the creation of informal networks, important for the dissemination of knowledge and the organization of multiplication events. With the first IDC LA Alumni Meeting in Guayaquil, Ecuador, in April 2018 an important step has been made to ensure the sustainability of the training course through the creation of stable networks. The present publication presenting a unique overview of the Latin American Higher Education landscape from a deans' perspective is another valuable outcome of the course that will be of great help for Higher Education institutions intending to initiate university cooperation with Latin America.

We look forward to continuing our successful cooperation with Saarland University and the University of Alicante and to contributing to strengthen Higher Education management capacities in Latin America.

On behalf of the DAAD and the HRK

Marc Wilde & Tobias Wolf

Development Cooperation:
Partnership Programmes,
Alumni Projects and Higher
Education Management (P32)
German Academic Exchange
Service (DAAD)

Iris Danowski

International Department
Section Latin America
German Rectors' Conference
(HRK)

HUGO BURGOS, ASTRID M. FELLNER AND LUDGER SANTEN

Introduction: Higher Education, Academic Management, and the DIES IDC Latin America Course

Why a Handbook? The Idea of this Volume

Deans are not born; they are rather made: some academics become deans. They are shaped by the circumstances of a higher calling in academic institutions; they are molded by their previous supervisors. Or, simply stated, a dean who has been elected by a faculty or who has been designated as dean probably has had minimal experience in such position: being a dean is not a profession that you can study for; there is no formal training, but it is a role that you learn empirically and acquire auto-didactically (Scholz and Stein, 2014, p. 15). These statements reflect a recurring situation in Higher Education, at least in Latin America. In this sense, deans as middle managers in Higher Education institutions (HEIs) are confronted with several challenges: they must align their colleges and faculty to upper management guidelines, while tending to the minuscule everyday situations that the academic world built by student and faculty generate. But the strongest challenge lies in the lack of specific training for a dean's role. Taking into account that academia might be one of the most standardized, hierarchical, and structured institutions, there is no real study plan for becoming a dean. The appointment just happens.

The present *Handbook of Higher Education in Latin America* builds on seven years of collaboration between Saarland University and the University of Alicante in the "DIES IDC Latin America" program (IDC LA), which is funded by the DAAD (German Academic Exchange Service) and the HRK (German Rectors' Conference) in cooperation with the Alexander from Humboldt Foundation. The key objective of this program is to bring together groups of deans and vice-deans from different Latin American universities so as to engage in serious discussions concerning the challenges of holding a dean's position. During this course, participating deans develop a Strategic Action Plan (SAP) for their own faculty and concentrate on concrete measures, which they want to implement in their own faculty. Apart from Strategic Faculty Planning, the three modules deal with such Higher Education management issues as Financial Management, Quality Management, Human Resources Management, and Internationalization.

Throughout its seven editions, the IDC LA has been a guiding light in addressing the shortcomings that deans and HEIs face in addressing the role and goals that such relevant position should have. The deans' course with its four-part setup accomplishes more than what its syllabus states. Certainly, having a first-hand experience of how the German and Spanish Higher Education governance, research, publishing, quality accreditation, internationalization, human resources, and financial management operate is extremely valuable. But education is a human enterprise, and to paraphrase John Dewey: "[E]ducation […] is a process of living and not a preparation for future living" (Dewey, 1987, pp. 77-80). And the unexpected added value that the deans' course offers is putting together extremely talented people to discuss on a structured common ground issues that are relevant to all of them disregarding their academic backgrounds, personal achievements, type of Higher Education institution.

The deans' course is a gathering of peers in a life experience, who all form part of a "high performance team" (Scholz and Schmitt, 2011, p. 15). Without a doubt, an intended consequence of the IDC LA is the creation of networks among participants, and possibly with our international hosts. However, one of the strongest outcomes of the course is the ability to contrast, compare, and understand how the Higher Education system of our neighbor Latin American countries work and the challenges they face related to their own national institutions and to their context. It is very common among Latin American scholars to look abroad (the United States and Europe) while having a poor idea of their neighbors' developments and achievements. The deans' course offers a unique opportunity to create a new venue for dialogue among academics of Latin American and Caribbean countries, who have chosen to participate in management duties within Higher Education.

This handbook seeks to capture as text the shared knowledge that the interaction among deans produces: a bird's eye view of key issues that Latin American countries face in Higher Education, expressed by the view of the deans who have participated in the IDC LA, and structured through the discussion points of the course. The deans who participate in the IDC LA bring a wealth of information to the meetings regarding their personal experience at their universities as well as the context in which Higher Education operates in their countries. During the three modules, one of the most powerful moments is when different deans interact and compare issues and ideas that shape academia in their countries, whether it is the fact that there is a national accreditation process, or what kind of publications are valued, or if their internationalization efforts have been successful. A common language in the articles of this volume allows readers to compare institutions and countries. The editors acknowledge that what we present here is an incomplete and biased view, and

yet, the alumni of the IDC LA course continue to structure and propel the advancement of their institutions towards higher goals; their experience and knowledge can guide future deans.

University and Society

All histories need a starting point. In the case of the context under which Latin American Higher Education institutions have developed it is feasible to look back at the last 15 years to gauge the heterogeneity and change that countries have shared. By no means will this section try to give a thorough history of education in Latin America; it will rather inform how heterogeneity has become the norm.

All over the world, universities continuously undergo transformation processes; many of them have to be implemented by the faculties under guidance of the deans. This is why deans play a key role in designing the future of our Higher Education system. Having this in mind, it is a relevant question for deans what a future university should look like. Answers to this question are obviously difficult to find. We undergo rapid technological changes which have strong impact to our society and our environment. According to our self-conception, there should be a strong contribution of the global(ized) Higher Education system to a responsible development of our societies as well as to sustainable technological progress.

From our perspective, an approach which has been proven to be successful goes back to the foundations of modern universities implemented by Wilhelm von Humboldt and others. Following the pioneers of the present university system there are a few principles that should apply to an ideal university. The first principle should be more than ever the guiding light of curricular design. According to Humboldt, students should not be educated by professors but should educate themselves. In this model, teachers support students in order to explore their personal fields of interest and develop their individual skills.

This approach obviously stands in sharp contrast to a policy of common teaching standards which represent more the standards of our Higher Education systems. But ironically, this historic ideal seems to be better suited for a professional career since it provides an excellent and individual basis for lifelong learning.

Humboldt's vision of an independent university is following the ideal of a purely knowledge-oriented institution: Research and teaching should neither be influenced by the state authorities nor by the private donors. Members of the university should be carefully selected and contribute exclusively to the gain of knowledge. This model of a university differs considerably from a university

which is regulated by external institutions or an institution which performs mostly contract research.

From our point of view, it is necessary that universities readjust their roles again. The step from an institution which is at least partly detached from the most important problems of the society toward an institution which is accessible for the majority of the people was necessary. In some cases, however, this process has gone too far. Education and scientific training should provide sustainable knowledge, which is not possible if the teaching programs change every year and follow the present demand of the local economy. This strong market orientation of HEIs contradicts the necessary demand of universities' intellectual leadership.

Identifying a Common Language: The IDC LA as Nucleus of this Handbook

Talking about the challenges in Higher Education leadership, James Soto Antony, Ana Mari Cauce, and Donna E. Shalala remark that "all colleges and universities face somewhat similar issues, with differences being largely defined by scale and funding source" (2017, p. xxiii). It is clear that Higher Education institutions across Latin America can differ in several ways. These differences are not only a matter of finding common distinctions as private versus public universities, or research-based institutions versus teaching institutions. The complexity and difference among institutions can happen within a same city, or district. One of the added values that the IDC LA training gives its participants is an organized structure of the elements that conform HEIs. These elements encapsulate issues that are many times addressed in different forms by deans, but sometimes fail to pinpoint or find a common ground while discussing them. In this sense, the IDC LA's structure becomes a shared code, a common language that fosters the discussion of topics, while keeping the individual context of each participant. For example, a relevant topic among institutions might be internationalization. However, its execution and goals can vary across institutions, but the concept of internationalization, and how it is defined by possible partners (like our European hosts) has common traits that allow deans to make plans, define strategies, and form networks.

It is also quite interesting to notice that topics covered by IDC LA happen to appear in Higher Education rankings. There is a vigorous discussion among colleagues, both European, and Latin American, about the institutional value of such rankings. There is no straight answer about their worth, but for those deans and their institutions who choose to participate in rankings, they will

notice that the course has addressed many of the main indicators of such rankings. Finally, the IDC LA course culminates with a Strategic Action Plan (SAP), another powerful element, where the process of creating such SAP is useful, as it is a tool for management. The idea of deans stepping outside from daily activities to gather their thoughts and set achievable goals through a plan, with steps, and indicators, is the most basic tool of management that can relate to managers in other fields. It also sets the tone and acknowledges that fact that being a dean is having a management job, albeit one that may not always be fully understood. But if it is expressed in terms that academia and professional worlds can understand the set goals, then there is room for partnership and improvements.

In order to support the exchange of knowledge among Latin American universities the alumni and organizers of the IDC LA decided to edit a handbook which provides an overview about the present situation of the Higher Education system in the participating countries. The articles in this handbook are organized according to national contexts and are arranged in alphabetical order, starting with Argentina, and ending with Peru. The compilation of these articles into a handbook has various objectives: first, and most importantly, it aims at compiling relevant data about the components of Higher Education of each country that has participated in the Deans' Course. The individual articles are supposed to provide a snapshot that illustrates how Higher Education works in each country. Secondly, the articles provide detailed and specific information on the situation of Higher Education of each participating country, paying attention to the following areas:

- National context for Higher Education
- Industry-University Relations
- Human Resources Management
- Quality Management and Accreditation
- Funding and Financial Management
- Research and Publishing
- Internationalization

The authors of the individual articles were asked to address these seven topics in their overviews. All articles follow a similar scheme and can therefore be easily compared. Authors were also asked to identify challenges their respective region faced and provide their particular views and strategies of how to cope with these challenges. The most important objective of this book is that it should serve as a reference book for DAAD projects which are based in Latin

America, constituting both a guide for DIES alumni as well as for incoming participants in the DIES Latin America course.

We hope that the reader of this handbook will find useful information and inspiration for the challenges they are facing in their own departments. At the same time, we know that the information is rather incomplete and based on the personal experience of the authors. Therefore, we encourage all readers of this handbook to give us feedback, and to help us eliminate some of the blind spots in future editions.

Acknowledgements

This collection of articles owes much to the generosity of many people. The editors of this handbook would like to thank all participating authors for their contributions and their devotion to our project, which made our endeavor a rewarding intellectual experience. Our acknowledgements also go to the contributors for their willingness to make revisions, which allowed us to structure the articles according to the agenda for this volume.

The intellectual exchange between the editors and the contributors of this volume was enabled by the program "DIES IDC Latin America" funded by the DAAD (German Academic Exchange Program), and we cordially want to thank Tobias Wolf for his continuous support of our project. We would also like to thank Saarland University, particularly its International Office, and Universidad San Francisco de Quito for their assistance in our exchange. A special thanks goes to the Project Coordinator of our DIES IDC Latin America program Dr. María Teresa Amido Lozano, who has kept things together and has pushed this project through. Thanks are also due to everyone who read all or part of this book while the volume was prepared for publication. We are especially grateful for the assistance we have received from Eva Nossem, who paid attention to every detail and who provided indispensable assistance in preparing the manuscript. We also want to thank Yaiza Andarias Ivorra, who has helped with formatting and who has put the finishing touches to this volume.

Our thanks also go to the publisher Universaar and to the editors of the book series Saravi Pontes for including this volume in their series. This volume is the product of yet another fruitful university exchange; it shows Saarland University's commitment to Higher Education in Latin America, and it testifies the importance of transatlantic collaboration.

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LARISA IVÓN CARRERA AND PAULO FALCÓN

The Argentinian University System: An Approximation to its Most Outstanding Characteristics

Abstract

In Argentina, the educational system has a complex structure. It is comprised of public and private institutions which may depend on the municipal, provincial or national governance. Higher level education is not mandatory in this country, and it is composed of two subsystems: the traditional Higher-Level Education system, called "tertiary level,"[2] and the university level, composed of all universities in the country. In relation to Higher Education, it is regulated by the Higher Education Law No. 24.521, the Professional Technical Education Law No. 26.058 and by the provisions of the National Education Law. In Argentina, the general policy of the National State towards the Universities is established by the Secretary of University Policies, always respecting the autonomy of the universities. In the present work, we present a characterization of the Argentinian University System, its main regulatory laws, the organization of the government of the universities, and their main policies in relation to the formation of human resources of concerning degrees and postgraduate studies, research, internationalization, quality management, and financing.

Keywords: Educational Policy, Higher Education, Human Resources, Internationalization, Quality Assurance, Research, Tertiary Level, University System.

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[2] Tertiary level offers a technical-instrumental training. These study programs offer technicians, teachers, and artists training on the most varied disciplines. These programs are shorter than university degree programs and are directly oriented to the acquirement of the required knowledge by focusing on the professional training of each area.

Introduction

About the Argentinian Educational System

In Argentina, the educational system is a complex structure consisting of public and private institutions which may depend on either municipal, provincial or national governance. There are four consecutive levels in the current educational system: initial, primary, secondary, and higher or tertiary.

The state, the provinces, and the Autonomous City of Buenos Aires are responsible for the planning, organization, supervision, and financing of the educational system; and can recognize, authorize, and supervise the operation of educational institutions, regardless of whether their management is public, private, cooperative, or social.

Education at the initial level is mandatory at the age of 5 years. Primary level education takes place at schools. It is compulsory all over the country and begins at 6 years of age. It can last between six and seven years, depending on the region.

Secondary level education follows schedules that can last five, six or seven years. It offers different modalities according to the path that the student wants to follow at the end of high school (Falcón, 2018; Fernández Lamarra, 2018).

As is the case in most countries, higher level education in Argentina is no longer mandatory. It is composed of two subsystems: the traditionally called "tertiary level," and the university level composed of all universities in the country. The tertiary level is related to two major fields of education: technical degree programs and teacher training for the primary or secondary levels (teacher training institutes). In the subsystem of university education, there are some admission requirements such as preparatory courses in several universities and, even though the secondary title is mandatory to enter the university, the law establishes some exceptions for this case. However, the university system in Argentina has several strengths and characteristics that distinguish it from other university systems in the world, such as gratuity, unrestricted income, co-government, and extension (Fernández Lamarra, 2018).

Gratuity means free tuition for all students, and co-government is the participation of all academic levels (teachers, graduates, and students; in some universities also administrative and general service staff) in the collegiate bodies of government.

Regarding university extension, it is considered one of the three substantive functions of the University (together with research and teaching) and aims to promote the transfer of knowledge among the different social sectors of the community. Extension recreates the social mission of the university from the

assumption of knowledge as a social construction, where society benefits from its contributions and the university is enriched with further knowledge. The consolidation of dialogue spaces with social, productive, cultural, and governmental actors allows the construction of collective work agendas and the reinforcement of public policies, especially to benefit the most vulnerable sectors (UNL, 2017).

Argentina has 117 universities, 56 of them being run by the state and 59 privately. There is also an international institution and a foreign university's headquarter in this country (Falcón, 2018).

National Laws or Regulations to Regulate Higher Education

Law No. 26206 "regulates the exercise to teach and learn enshrined in Article 14th of the National Constitution and the international treaties incorporated into it..." and establishes that education and knowledge constitute a public good and a personal and social right, guaranteed by the State. The National State sets the educational policy and controls its compliance while respecting the particularities of different jurisdictions (Law No. 26206).

Higher Education, though, is regulated by different laws. Until the University Reform of 1918, in Argentina, as in practically all Latin American countries, the French professional model had been installed in the university system. After the University reform, the model of the University of Latin America emerged, which differs from the traditional German, English, or French models. This reform movement introduced the postulates of academic freedom, university autonomy, university extension, and co-government to the system (Fernández Lamarra, 2010).

In Argentina, the general policy of the National State towards the universities is established by the Secretary of University Policies, while always respecting the autonomy of the universities. The autonomy of the universities means, in practice, that these institutions are entitled to define their governing bodies, their statute, their academic offer of degrees and postgraduate studies, their own projects and plans of institutional development, their internal organization, the regime of access, permanence, and promotion of the teaching and non-teaching staff; the requirements for the admission, stay, and promotion of students; and the regime of equivalences, among other attributions.

University institutions are the only institutions that grant academic degrees and qualifications. Yet, only the Ministry of Education, Culture, Science, and Technology (ME) is responsible for the official recognition and the granting of the national validity of those degrees through the Secretariat of University Policies. Moreover, the financing for each national university (of the public

system) is defined each year in the National Congress through the approval of the National Budget Law by which university funds are allocated (Falcón, 2017; Fernández Lamarra, 2018).

The Council of Universities (CU) is in charge of the general coordination of the Argentinian University System and represents all university institutions, no matter whether public or private. The CU can define policies and strategies, it is chaired by the Minister of Education of the Nation and it consists of the Executive Committee of the National Interuniversity Council (CIN), which brings together all public universities, and the Commission of the Council of Rectors of Private Universities (CROUP) (see Figure 1). The CU defines the standards for the accreditation processes of the degree programs.

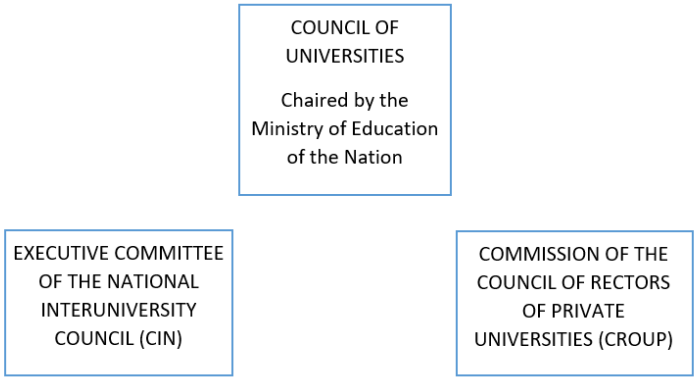

Fig. 1: Constitution of the Council of Universities

As mentioned above, entering the university as a teacher is established in the statute of each institution, since they are autonomous. However, after the University Reform of 1918, a teacher may earn a position only if they go through an open competition process in which they must give a public class, defend their project in an interview, and present their background for evaluation (Perez Centeno, 2012, 2013, 2015).

Research in Argentina, meanwhile, is carried out primarily within the scope of national universities as well as in different institutes distributed in the territory of our country. The National System of Science, Technology, and Innovation is also under the supervision of the ME. This ministry designs and implements policies in this area to coordinate efforts and define priorities.

The main research institutions in Argentina are:

- National Council for Scientific and Technical Research (CONICET)
- National Atomic Energy Commission (CNEA)
- National Commission for Space Activities (CONAE)
- Institute of Scientific and Technological Research for Defense (CITEFA)
- Argentinian Mining Geological Service (SEGEMAR)
- National Water Institute (INA)
- National Institute of Industrial Technology (INTI)
- National Institute of Agricultural Technology (INTA)
- Universities

There are many instruments aimed at fostering and strengthening synergies between institutions. The creation of the National Agency for Scientific and Technological Promotion (ANPCyT) in 1996 was aimed at the distribution of funds through different programs by offering lines of credits and subsidies for the promotion of research and innovation in institutions.

In any case, private investment in science and technology presents a low percentage in the country. Only some areas like biotechnology applied to health and agroindustry, and nuclear energy and nanotechnology applied to the pharmaceutical industry, invest significantly in R&D.

In relation to the R&D system at the universities, the instruments to improve the quality, evaluation, and accreditation practices of the universities were important for the development of research and the concentration of scientific and technological capabilities in the university system in Argentina. As to the evaluation and accreditation of national universities, it is important to point out that the CONEAU (National Commission for the Evaluation and Accreditation of Universities) has been set up in the country. The CONEAU is a decentralized body that operates within the jurisdiction of the ME, whose mission is to improve and ensure the quality of university institutions and their degree programs. The Law of Higher Education established a regulatory framework in Argentina and introduced quality assurance as a new axis in the state policy's for universities. In the case of Argentina, the legislation provides for the operation of both international agencies and the CONEAU itself, but it is the latter that authorizes the intervention of international agencies (Higher Education Law, 1995; CONEAU, 2012).

The university courses that must be evaluated and accredited are those that are incorporated into the regime of Article 43 of the Higher Education Law (LES), which includes those degree programs that are considered of public interest. This includes the mandatory evaluation of postgraduate courses as well. Not only courses considered of public interest are evaluated but also the universities themselves (Higher Education Law, 1995; CONEAU, 2012).

The evaluation process includes a self-evaluation stage followed by an evaluation by external peer reviewers. A renewal of the evaluation is mandatory every 6 years in the case of degree courses and, as a result of the process, generates recommendations for the improvement of institutions (CONEAU, 2012). The aforementioned Article 43 of the LES establishes that

> [i]n the case of titles corresponding professions regulated by the State, whose execution could compromise the public interest directly putting at risk the health, safety, rights, property or training of the inhabitants, it will be required to respect, in addition to the workload referred to in the previous article, the following requirements: a) The curricula should take into account the basic curricular contents and the criteria on intensity of practical training established by the ME, in agreement with the Council of Universities: b) The respective careers must be accredited periodically by the CONEAU. The mentioned Ministry will determine with restrictive criteria, in agreement with the Council of Universities, the nomination of such titles, as well as the professional activities reserved exclusively for them (Higher Education Law, No. 24521, 1995)

The internationalization of Higher Education, to which Argentinian institutions aspire and must work on, defines the need to favor the recognition of studies and degrees at the international level. In this sense, the CONEAU is an integral part of the "Network of National Accreditation Agencies of MERCOSUR" (RANA). The tasks which the RANA must undertake include the management of accreditation processes that are carried out within the framework of the System of Regional Accreditation of University Degree Programs for MERCOSUR—ARCU-SUR System (CONEAU, 2012).

Composition of the Argentinian University System

The Argentinian Higher Education System is composed of 131 institutions currently offering undergraduate and postgraduate programs, on site or remotely. The number of face-to-face degree programs in public universities amounts to twice the number of private universities and the postgraduate offer is more than three times higher in public institutions compared to private ones.

As to the number of students, whereas national universities have circa two million undergraduate and postgraduate students with approximately 490,000 new enrollees and 125,000 new graduates per year; private schools have an

approximate total of 420,000 students, with 120,000 new enrollees and 42,000 new graduates per year. Nearly 160,000 students attend postgraduate programs, of whom 122,000 belong to public universities and 31,000 to private universities, and 7,000 are international students. Furthermore, approximately 16,000 students graduate each year. Nevertheless, the number of students is constantly increasing (Falcón, 2018; Fernández Lamarra, 2018).

Considering the geographical extension and the diverse traditions and university practices, the development of university activity in Argentina spreads over an enormous territory. All provinces have at least one national public university institution. Yet, whereas, in some cases, provinces count on two or more national institutions; in other scenarios there are only provincial institutions available and, in a large part of the territory, there are also private university institutions to be found. Specifically, the curricula have generally been characterized by shortening the duration of the study program, the emergence of intermediate degrees or certificates, the development of curricula offering complementary training so that an academic degree can be obtained, the flexibilization of curricula, the increase and diversification of degree fields, both at an undergraduate and postgraduate level, and the incorporation of Argentina's own academic accreditation system (Fernández Lamarra, 2018).

Industry-University Relations

Since the 1960s, and particularly since a national investment in the country's development got approved, the connection between university, business, and the State has been gaining importance in Argentina. The period beginning in the 1960s is thus characterized by:

- the creation of new departments for the transfer of technology in scientific institutions;
- the introduction of financing lines for research projects oriented to disciplinary areas and priority problems for the development of the country;
- the development of new tools intended to enhance international cooperation in research, transfer and innovation;
- and the promotion of linkages between the academic and productive systems to generate public-private consortiums.

Moreover, universities began to promote the accompaniment of entrepreneurs with innovative ideas aiming to foster the economic and social development of the region, stimulating research, innovative projects, and the transfer of technology to companies. This has given rise to the generation of companies and

jobs. The projects presented in the different calls, when approved, have access to subsidized infrastructure and technical advice related to the project, training and business information networks, and participation in fairs, events, and conventions. Such actions show some of the aspects in which Argentinian universities must work on intensively (Fernández Lamarra, 2010, 2018; Falcón, 2018).

Since the 1990s, the Science and Technology (S&T) policies in the country have introduced the idea of 'innovation' and institutional programs, and structures have been created, among which the National Agency for Scientific and Technological Promotion (ANPCYT), dependent on the Secretariat of Science and Technology (SECyT). The main lines that have been promoted were the energy industry (oil, gas, petrochemical, and alternative energies); the agrifood industry; nanotechnology; genetics, biotechnology, and health sciences; environment; urban development; and sustainability (Rovelli, 2014). Projects in areas like software industry; innovation and design; productivity and quality management of small and medium enterprises; development of marketing plans, brand or product design; and strengthening export capacity, among others, are also financed. This way, the system seeks to strengthen the institutional management capacities of those areas of national universities linked to technology, the training of employees, and their integration into work teams.

The main financing actions vary according to the situation diagnosis made in each university. Many national universities have specific areas aimed at promoting the link between university and business in order to improve regional development, respond to the specific social needs, and foster the commitment of the students attending national and provincial universities. These objectives are achieved through the employment of knowledge regarding the reality of the territory to which these universities belong (Fernández Lamarra, 2010, 2018; Falcón, 2018).

The Universidad Nacional del Litoral (UNL) maintains a policy for generating knowledge in connection with the socio-productive environment of the region and provides services to companies, industry, different sectors of government, and individuals that require research, training, or technical advice services. This work is managed by the Center for the Transfer of Research Results—Centro para la Transferencia de Resultados de la Investigación Litoral (CETRI Litoral)—that was created in 1994, with the purpose of stimulating and ensuring an efficient business development to strengthen the region in which the university is located. In this manner, the University shares its human resources, knowledge, and equipment to companies, investors, governmental organizations, and intermediate entities for the formulation and execution of projects and joint works.

Human Resources Management

The concept of university autonomy refers to the independence of public universities from the state governance, as well as their capacity for self-government and administration. The different institutional stakeholders participate in the management of the university with a democratic logic that guarantees collective deliberation, the majority vote, and an academic sense that is based on a hierarchical order, validation of knowledge, and scientific experience. On the other hand, the government exerts its influence on the universities via the application of regulations and norms, and on the administrative level (Nosiglia, 2015).

The regulation of the university boards, their composition, their functions, their attributions, and the manner of their members' appointment have been aligned with what is established in the Law. Throughout history, different formulas were defined to establish the composition of the different collegiate bodies. In the case of faculties, the highest body of legislative government is the Directive Council, which includes representatives of the different groups, such as teachers, non-teachers, students, and graduates (Nosiglia, 2015; Fernández Lamarra, 2018).

The highest governing body of the university is the University Assembly, consisting of the representatives of the Superior Council and the representatives of the directive or academic boards of each of the faculties, generally composed of the rector (president), the deans, and members of those councils (Figure 2).

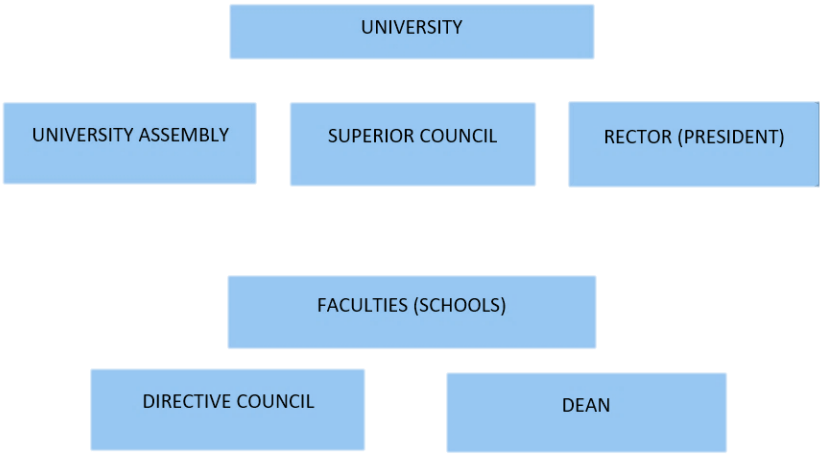

Fig. 2: University government

Currently, the Higher Education Law regulates the composition of the collegial government bodies. It establishes that the faculty has the highest relative representation (no less than 50% of all its members); that student representatives must be regular students and have successfully completed at least 30% of the total subjects of their curricula; that the non-teaching staff is represented within the scope determined by each institution; and that graduates can vote and be elected as long as they are incorporated into the collegiate bodies and do not have a dependency ratio with the institution. This cogovernmental strategy has been a strength of the university system in Argentina since the beginning of the past century (Nosiglia, 2015).

The law also establishes the functions of the governing bodies and assigns legislative functions, general regulations, and the definition of policies to the collegiate bodies. The purpose of the university assembly is to intervene in matters of great importance for the institutional order, such as stipulating and reforming the statute; designating, suspending, or dismissing university authorities, with the exception of universities that elect the rector directly; creating or dissolving academic units; and deciding on the university governance in the event of an impasse in the Superior Council.

Unlike the university assembly, the superior council is the governing body that executes the greatest number of processes related to the daily institutional life of the universities. The executive or academic councils as well as the deans are in charge of managing the schools and departments. The elected deans and vice-deans (in case of not having direct election) specify the necessary regulations for their deanship (the rules according to which the competitions for the appointment of teachers must be carried out), define the qualifications and duties of teachers, students, and employees, grant license to its members, approve study plans, and approve teaching programs designed by teachers (Nosiglia, 2015; Fernández Lamarra, 2018).

With respect to the mechanism for the election of unipersonal authorities, the Law of Higher Education does not establish any regulation. Whereas in some universities there is a direct election of their authorities, in others the election is defined by the collegiate bodies, which implies that the election outcomes are determined by the electoral colleges, usually called "assembly," constituted for that purpose (Nosiglia, 2015; Fernández Lamarra, 2018).

In national universities teachers are appointed in open competitions where the academic background is checked. Additionally, the applicants must pass a job interview and give a public class in front of a jury or committee of professors who are selected by the Directive Council within the faculties or departments. The non-academic staff also enters the university by competition.

Yet, not all universities have the same mechanism for the promotion of their non-academic staff. The UNL and other universities use competitions to improve workers' categories. The dean may assign temporary positions to teachers to fill vacancies. The appointment of academic members who passed the competition is executed by the Superior Council with the participation of the Directive Council of each faculty. The non-academic competitions are executed by the organization units to which the position belongs. This has been a strength of Argentinian universities since the University Reform in 1918 (Perez Centeno, 2013, 2015).

There is a large proportion of part-time teachers in Argentinian universities. An empirical study by Perez Centeno shows that the larger the number of hours a teacher works at the university, the smaller proportion of time that is devoted to teaching. By contrast, those teachers with fewer working hours at the university spend most of their time teaching. Moreover, the study also confirms that the share of teaching duties strongly depends on the level of the teachers' training: the higher the qualifications of the teacher, the more time is spent on non-teaching activities such as research (Perez Centeno, 2012, 2013, 2015).

As stated before, academics in Argentina are not all full-time professionals. Part-time teachers have the same kind of contracts with the university and are considered university members, just as their full-time colleagues.

The composition of faculties in private universities, remuneration, hiring, and discharges are organized in accordance with the legal guidelines on hiring for private companies, unionization, and social security. In the same way, private universities establish the pedagogical and epistemological guidelines.

Each academic unit also has its own organizational subculture derived from the type of profession. It is, however, interesting to note that there is also a subculture of the different groups: teachers, non-academic staff, graduates, and students. Three different positions in terms of time dedication can be identified as well: exclusive, semi-exclusive, and simple. Nevertheless, in the case of non-academic staff, they are only differentiated by category.

The organizational culture of private Argentinian universities is different since their authorities are not elected by the different groups. Moreover, the appointment and promotion of teachers is not necessarily based on competitions. The organizational culture of private universities is different from that of public universities, and the representation of the different groups in the universities' executive boards is lower (Fernández Lamarra, 2018; Perez Centeno, 2013, 2015).

The Higher Education law establishes that

> private university institutions must be constituted with no profit motive to obtain legal personality as a civil association or foundation. It will be authorized by decree of the National Executive Power, which will admit its provisional operation for a period of six years, under the condition of a prior favorable report of the National Commission of University Evaluation and Accreditation, and with express indication of the degree programs, that the institution can offer (Higher Education Law, 1995).

Furthermore, this law mentions that

> [d]uring the interim period of operation: a) The ME will monitor the new institution in order to evaluate, based on reports from the National Commission of University Evaluation and Accreditation, its academic level, and the degree of fulfillment of its objectives and plans of action; b) Any modification of the statutes, creation of new degree programs, change of study plans or modification thereof, will require authorization from the aforementioned ministry; d) In any official document or publicity that they carry out, the institutions must expressly record the precarious nature of the authorization with which they operate […]. Once the period of six years of provisional operation has been completed, since the corresponding authorization, the university authorities may request the definitive recognition to operate as a private university institution, which shall be granted by decree of the National Executive Power under the condition of a prior favorable report of the National Commission of University Evaluation and Accreditation (Higher Education Law, 1995).

Quality Management and Accreditation

The law establishes that any university institution, whether public or private, must ensure the functioning of internal instances for institutional evaluation (self-evaluation) to analyze the achievements and difficulties in fulfilling their functions, and to design actions and measures for their improvement. As mentioned previously, the CONEAU is an organization whose function is the evaluation and accreditation of universities and degree programs.

Argentina has designed an evaluation system with minimum standards that guarantee the quality of academic training in all public and private universities (Higher Education Law, 1995). This system, which has become one of the strengths of the current Argentinian university system, aims at the reduction of asymmetries and differences between universities in international rankings by determining the differences between institutions and degree programs. The implemented evaluation and accreditation model for degree programs is compulsory and of interest to the whole nation, as it allows those universities facing

some difficulties to establish improvement plans supported by the ME through specific funds (CONEAU, 2012).

The CONEAU is constituted by a council of twelve members of recognized academic hierarchy. They exercise their functions in a personal capacity, are appointed by the National Executive Power on the suggestions of the following organisms: three by the National Interuniversity Council; one by the Council of Rectors of Private Universities; one by the National Academy of Education; three by the Senate of the Nation; three by the Chamber of Deputies of the Nation; and one by the ME. The mandate is for four years, with partial renewal every two years. The President and Vice-President are elected annually by this council.

The CONEAU also has a technical team that works on each evaluation process and which consists of experts in the development of evaluation procedures and techniques. The participation of the different universities is carried out through the composition of the advisory commissions and the peer committees nominated by the organism. Its members are chosen by university institutions, scientific and professional associations, and other relevant technical bodies. The opinions and recommendations of said Commissions and Committees, duly substantiated, constitute the basis of the resolutions issued by the CONEAU (CONEAU, 2012).

The organization comprises four Directorates: Institutional Evaluation Directorate; Program Accreditation Department; Directorate of Development, Planning, International Relations, and Management; and a Department of Legal Advice (Figure 3).

The resolutions of the CONEAU, submitted to the ME, are binding in terms of its recommendations on authorizing or not the recognition of institutions. The Higher Education Law establishes that the provisional authorization for the operation of private and foreign university institutions, granted by the National Executive Power, requires a favorable prior report from the CONEAU (CONEAU, 2012).

The ME, in agreement with the Council of Universities, determines the list of titles declared of public interest and establishes the standards (proposed by the councils of deans on each occasion) that the career must meet for accreditation. Through a Ministerial Resolution, the activities reserved for the degree, the minimum workload, the basic curricular contents, and the intensity criteria for practical training are determined. The first degree that was accredited in the country was medicine.

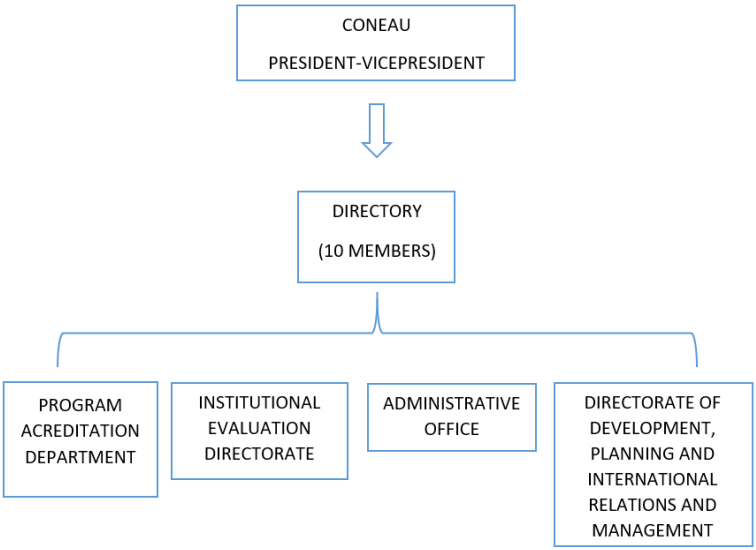

Fig. 3: CONEAU's organization

At the UNL, as well as in other Argentinian universities, there are offices or departments that work in the evaluation and in the institutional development plans with teams trained for this purpose. The departments of the central level of the university work with the academic units in the self-evaluation processes and in the design of the improvement plans. This has allowed for the growth of the institution, the internal structuring, and access to funding for the mentioned growth.

As to international accreditations, accredited degree programs in the country have participated in processes of international accreditation at the level of MERCOSUR, and in the processes of defining evaluation criteria. There is interest in obtaining international accreditations in order to support the exchange of undergraduate and graduate students, and the internationalization of the Argentinian university system.

Funding and Financial Administration

The State finances public universities while private universities do not receive national funds for their operation. Only in the case of funding calls for some research projects can these universities compete for public funds with state universities. The budget granted to each public university is determined by the

National Congress, once the national budget has been approved. This budget is the result of negotiations between the National Interuniversity Council (CIN), which is the body that brings together the entire public university system, the executive branch (through the Secretariat of University Policies of the ME), and the National Congress (parliament). Therefore, the main source of financing of the institutions of Higher Education comes from the National Treasury, although own resources coming from the sale of goods and services carried out by the universities contribute to their funding (Higher Education Law No. 24521, 1995).

In their financing, national universities, in general, also rely on resources granted by the public sector (through different public programs of the ministries) to be used for specific purposes (infrastructure works, programs, agreements, among others). The same law states that

> national university institutions manage their assets, approve their budget, and set their salary and administration regime. [T]hey can implement rules regarding the generation of additional resources to the contributions of the National Treasury through the sale of goods, products, rights, or fees for the services they provide, as well as any other resource that may correspond to them for any title or activity; and guarantee the normal development of their health care units (Fernández Lamarra, 2018).

Normally, national universities have an economic-financial office that manages the funds within the university, but in addition, the Superior Council must annually approve the university budget and the funds allocated to each academic unit.

Private Universities do not depend on public financing, and thus the enrollment fees of their students serve as their main source of income; they are the type of institution which is least controlled by the State and are run as if they were companies.

Towards the year 2005, the ME instituted the contracts-program to assign public funds to public universities to promote the improvement of the quality based on plans elaborated by the universities themselves to fulfill the recommendations which emerged in the processes of institutional evaluation. It is interesting to note that the amounts of these specific programs do not represent a significant proportion of the total budget allocated to the universities but represent a significant change in the direction of Higher Education financing in the country.

In Argentina, the management model of the universities has been mainly public and free. However, especially during the first part of the 1990s, the national government encouraged increasing private participation in the total number of universities (Nosiglia, 2015; Falcón, 2017; Fernández Lamarra, 2018).

Research and Publishing

The scientific activities in Argentina were pooled for many decades by the National Council of Scientific and Technical Research (CONICET), specialized agencies such as the National Institute of Agricultural Technology (INTA), the National Institute of Industrial Technology (INTI), and other offices of various ministries. Today, the CONICET remains the main organ of training of researchers and basic and applied scientific production.

However, as is to be expected, most of the researchers of the national scientific and technological system are related to some public university, and in smaller amount to private universities. Many of them can also be part of the CONICET. This situation means that most of the country's scientific and technological research is carried out in national universities.

Regarding Argentinian universities and their research policies, it is necessary to point out that the Law of Higher Education highlights the importance of research and declares that "Higher Education aims to provide scientific, professional, humanistic, and technical training at the highest level." It also underlines that Higher Education must "train scientists, professionals and technicians, who are characterized by the solidity of their training and by their commitment to the society of which they are a part" (Higher Education Law, 1995). Yet, only universities are responsible for the training of scientists, the promotion and development of scientific and technological research, and the extension of their actions and their services to the community in order to contribute to their development and transformation.

It is interesting to highlight that this law states that "[t]eachers of all categories must have a university degree of equal or higher level to that in which they teach" (Higher Education Law, 1995). Reaching higher-level positions greatly influences teachers to obtain postgraduate degrees after the enactment of this law. Furthermore, salaries improve if teachers achieve postgraduate degrees. On the other hand, the compulsory nature of the accreditation of university institutions, as well as of undergraduate and postgraduate degree programs, was implemented in order to improve the scientific production within academic institutions.

The Argentinian scientific and technological system is governed by the Science, Technology, and Innovation Law which was enacted in September 2001. It governs scientific and technological activities related to the public interest in universities, government bodies, research centers, and companies, among other institutions, in order to:

- promote and consolidate the generation and social use of knowledge;
- contribute to social welfare;
- stimulate and guarantee basic research, and apply technological development and the training of researchers and technologists;
- develop and strengthen the technological and competitive capacity of the productive system;
- and promote actions of scientific and technological cooperation at an international level, with special emphasis on the MERCOSUR region.

The priority topics highlighted in the document are the training of engineers, the increase in the number of doctors, and the reinsertion of researchers who are trained abroad.

Since the beginning of the 1990s, all university statutes have considered teaching, research, and extension to be the three main purposes. Within each university, as well as in each faculty or department, there is an office of science and technology established to deal specifically with scientific activity and to raise awareness for the need to improve the relationship between university and society. This fosters the emergence of areas or units of technological linkage.

Currently, in some universities, multiple links with society have been established. One thing that also hinders the development of research policies in universities is, to a large extent, the difficulty of having an appropriate budget to carry out proper science and technology activities. The offices of science and technology (or equivalent) in the universities facilitate the procedures for obtaining funds, and for the evaluation and selection of projects, as well as the evaluation of the researchers.

The UNL is one of the main centers of scientific research and technological development in the country. Its workforce is made up of approximately 1,600 researchers and it offers not only modern and equipped centers, institutes, and laboratories; but also an efficient administration of research funds. For instance, there are thirteen double dependency institutes articulated with the National Council for Scientific and Technological Research (CONICET), whose objective is to conduct research in different disciplinary fields, train human resources, and transfer the results of research to the socio-productive sector. The faculty of medical sciences is the last faculty that was created in 2010 and is developing a research strengthening program whose priority lines are the prevalent communicable and non-communicable diseases, nutrition, public health, epidemiological studies on different topics, and education in health sciences.

Internationalization

The internationalization processes carried out at Argentinian universities were and are heterogeneous. Internationalization gained relevance in the 2000s and has since then become one of the strategic objectives of Argentinian universities, promoting their international visibility and aligning the quality of teaching and research to international standards.

The internationalization of Higher Education as a topic of educational policy agenda has gained relevance in the last decades and is reflected in various actions, such as the Promotion Program of the Argentinian University implemented by the Office of University Policies. The main difficulty of implementing these actions was, in many cases, characteristic of isolated actions, which, without a clear horizon, did not have continuity or an adequate evaluation of their impact (Suasnábar, 2005; Ramirez, 2017).

At Argentinian universities, internationalization is mainly understood not as a business for student recruitment, but as an opportunity for institutional strengthening and the improvement of the quality of Higher Education. While it holds true that part of the mobility and exchange between universities is based on individual networks and contacts, as stated by Fernández Lamarra (2010), the processes of regional integration have been configured in the last twenty years. South America now offers a regional mobility market, the recognition of degrees and professional practice, the evaluation and accreditation processes, as well as the cooperation networks that determined to a certain extent the construction of a block vision based on the strategic objectives of the region (Fernández Lamarra, 2010; Ramirez, 2017).

Currently, at a national level, the ME has passed a strategy for university internationalization which understands the internationalization of Higher Education as an ongoing process, a general objective, and a pillar of our educational policy. It is widely recognized that internationalization contributes to the integral strengthening of Higher Education and university institutions, to its projection in the international field, to the improvement of the quality of training and teaching, to the increase and transfer of scientific-technological knowledge, and to the development of the community in which the university is located.

As a result of this attitude, the educational and university internationalization has been addressed by the Ministry of Education from a perspective that is in tune with the declaration of the Regional Conference of Higher Education of Latin America and the Caribbean (CRES, 2018), organized by UNESCO in 2018 in Córdoba, Argentina. According to the CRES declaration, the generation of knowledge, science, and the transfer of technology play a central role

in the development of nations. For this reason, the strengthening of Higher Education contributes to the generation of wealth and the overcoming of inequalities. Following this line of thought, regional integration and internationalization are tools to foster the strengthening of academic and institutional strengthening, the training of human resources, and the creation of synergies to overcome the gaps and asymmetries that exist in our own region. Networks play a central role for Higher Education institutions and allow the sharing of scientific, academic, and cultural potential for the resolution of strategic problems and institutional strengthening. This objective must be central to our country and must occupy a central place in the government's agenda (CRES, 2018).

Originally, internationalization actions in Argentina were oriented in particular to the mobility of students (mainly at graduate level) in an outgoing direction and without mediating a real and effective cooperation and exchange between university institutions to the mutual benefit of academics and institutions. However, in recent years, there has been an orientation toward the management of bilateral or multilateral cooperation actions framed in academic and research networks aimed at the inter-institutional association in order to generate lasting links that allow join achievements (Ramirez, 2017).

Mobility becomes a remarkable vehicle for inter-institutional cooperation if it is framed in mechanisms of academic networks that give themselves results and objectives in a structured manner. This is how the programs and projects have tended to increase the mutual exchange of students and teachers, undergraduates and graduates, to deepen the dialogue and inter-university cooperation by promoting the integration of the Argentinian university system in the worldwide networks. Even those programs based on individual mobility are integrated to academic work plans that account for the inter-institutional links between partner universities.

The objectives pursued with the mobility of students and teachers are established in negotiations between the counterparts and are often numerous: to promote joint production of knowledge, increase the quality of graduate programs, improve teaching practices, approximate curricular meshes, promote the mutual recognition of academic trajectories, and internationalize strategic disciplines for development, among others.

Research and joint production of knowledge are recognized as fundamental aspects of the internationalization strategy that has been addressed mainly through postgraduate association programs with universities in Germany, Brazil, and other MERCOSUR countries. This strategy has a notable impact in academic and scientific terms on an institutional level (Ramirez, 2017).

The sustained increase in mobility in the region and with traditional partners in Europe such as Germany and France, has evidenced the need to advance in the mutual recognition of both academic sections and degrees, either for the pursuit of studies or in order to achieve the qualification for a professional career in a country different from the one where the degree was issued. This issue led our country to implement a curricular system that is fundamentally based on the results of the accreditation of the quality of training.

The process of regional integration drives the progress in this direction since it allows the free circulation of professionals, which is facilitated by guaranteeing the quality of training and the recognition of degrees earned abroad. The pillars of this triad, accreditation - mobility - recognition, are interrelated reciprocally in order to achieve results in terms of institutional and academic strengthening, quality, democratization, internationalization, and regional integration; and are expensive to the university policy deployed in recent years.

This mobility has also caused the need to deploy a policy of internationalization "at home" making our university system a preferred system for foreign students and professionals who want to opt for Argentina as an academic destination; proof of this is that the number of foreign students in the Argentinian university system in 2016 amounted to 59,706, accounting for the high esteem of the system by university students from different regions of the world (Ramirez, 2017).

However, teachers have a low level of internationalization in our country and, probably, this is the main challenge for educational policy. This situation can be due to the scarce public mechanisms to promote internationalization or the insufficient resources to undertake international experiences. Although in some cases professors are able to teach courses or have research experiences abroad, generally, investment in this area is limited and these experiences are usually isolated.

The UNL promotes different internationalization instances and participates in missions to different foreign countries and international projects. It has a project management unit whose main objective is to bring teachers and researchers closer to the international level by promoting their participation in calls, advising on the presentation of projects, and offering their administration during execution. This unit manages the projects and promotes the participation in calls for funding from international organizations as well as the Secretariat of University Policies. Each semester the University opens its doors to more than 100 international undergraduate and graduate students who arrive in Santa Fe to carry out various academic activities. These students come from countries

such as Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, France, Germany, Italy, Mexico, Paraguay, Peru, Spain, Switzerland, Uruguay, and the United States.

Through a wide range of academic exchange agreements and scholarships, every year a significant number of undergraduate and graduate students of the UNL travel to other universities in the world. The University has made bilateral agreements with other universities in order to offer different exchange programs for its teaching staff, thus making it possible to undertake academic experiences abroad. The university places its accommodation system for foreign visitors at the disposal of the international academic community. It has fully equipped apartments for the accommodation of teachers and researchers. The UNL also has residences for foreign students and, currently, they are about to open new residences on campus.

Lastly, the Argentinian University System foresees great challenges. Some of them have to do with the consolidation of Argentina as an academic destination for international undergraduate and graduate students. On the other hand, the greater incorporation and development of educational technology will foster better access of the population to Higher Education and guarantee the academic quality of programs in the distance-learning modality. Given the size of the country, programs offering online learning allow access to education to some groups of the population that, otherwise, would be excluded from the learning experience and the obtaining of a qualification. In addition to this situation, our Higher Education system has other challenges to deal with, such as the consolidation of quality assurance processes, the improvement of the permanence and graduation of students, or the integration between research and development.

With regard to the UNL, a centennial university that nowadays is preparing its new institutional development plan, the main challenges are to further promote the international projection in research and teaching, and to obtain not only adequate resources to solve the construction and maintenance of its infrastructure, but also the supply of new equipment for the development of research vacancy areas in the region.

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Higher Education in Colombia: A Perspective from a Higher Education Institution

Abstract

This chapter presents a general view of the Higher Education in Colombia with an emphasis on the case of the Pontifical Bolivarian University Bucaramanga, located in the north-eastern part of Colombia. It explores the legislation that regulates Higher Education and the role of the Ministry of Education's systems in its management of information, evaluation, and promotion. The current situation of internationalization and the university-industry relationship are also approached. The prior sets the challenge of broadening educational programs towards globalization while maintaining a context-based perspective that keeps the programs pertinent to their respective local settings. The latter is highly related to how Higher Education institutions in Colombia interact with the industry to build partnerships.

Research and innovation are presented from two different perspectives: first, the policies established by the Colombian State and, second, the research structure of a particular institution. Nevertheless, the reader will find that research policies influence institutional approaches and determine how research and innovation are managed, valued, and promoted within the institution. Finally, this text analyses the management of human and financial resources as assets to the development and growth of Higher Education institutions.

Keywords: Educational Policy, Higher Education, Human Resources, Internationalization, Quality Assurance, Research, University-Industry.

Introduction

Higher Education (HE) in Colombia is regulated by the Law 30 of 1992 (Congress of Colombia, 1992) and the legal measures that emerge from this piece of legislation such as decrees, guidelines, and resolutions issued by the National Ministry of Education. Some of the most important features of Higher Education in Colombia are the following:

- It is carried out after secondary education and can be offered both by the State and by private entities.
- It is understood as a public service (Congress of Colombia, 1991, art. 67).
- Universities are expected to generate new knowledge and lead the research plans throughout the scientific setting.
- The HE system is monitored by the Ministry of Education through the National System of Quality Assurance.

The institutions allowed to propose and offer HE programs are divided into four types: technical institutions, technological institutions, university institutions, and universities. The difference between University Institutions and Universities was established by the Law 30 of 1992 in the following terms:

> University institutions are those empowered to offer programs of occupational and academic training in professions or disciplines and programs of specialization, while Universities are those currently recognized as such and institutions that accredit their performance with criteria of universality in the following activities: scientific or technological research; academic training in professions or disciplines and the production, development, and transmission of knowledge and the universal and national culture (Congress of Colombia, 1992).

Universities in Colombia can be either public or private (see Figure 1). Public universities are state-funded and belong to the Higher Education Public National University System, which supervises them in areas like admission systems, financial performance, quality systems, research, and areas of knowledge. Private universities are self-governed, though subject to state inspection in what concerns their financial sustainability and the quality of their programs. Universities are in charge of offering undergraduate and graduate programs on four different levels: bachelor degrees (4-5 years), university specializations (1 year), master's degrees (1.5-2 years), and doctoral degrees (4-5 years).

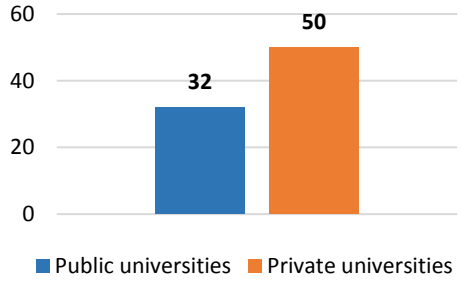

Fig.1: Universities in Colombia[3]

Besides universities, Higher Education in Colombia contemplates other institutions whose programs vary in nature (see Figure 2). There are technical programs whose aim it is to train students in specific skills. They are offered by Technical Institutions and last for about one year. Also, there is a level called Technological Education defined by the Law 30 of 1992 as "the one that offers training programs in occupations" (Congress of Colombia, 1992). These programs are usually offered at Technological and University Institutions (although some universities might offer them as well), and their duration is mostly six semesters.

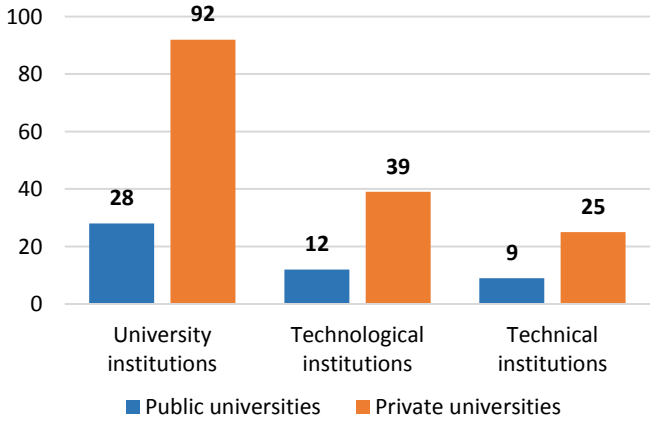

Fig. 2: Distribution of other HEIs in Colombia[4]

[3] Source: Ministry of Education of Colombia, 2016.
[4] Source: Ministry of Education of Colombia, 2016.

According to the Ministry of Education (2017), student population enrolled in HE programs by the second semester 2017 represented a total of 2,363,766 individuals distributed throughout the entire national territory (see Figure 3).

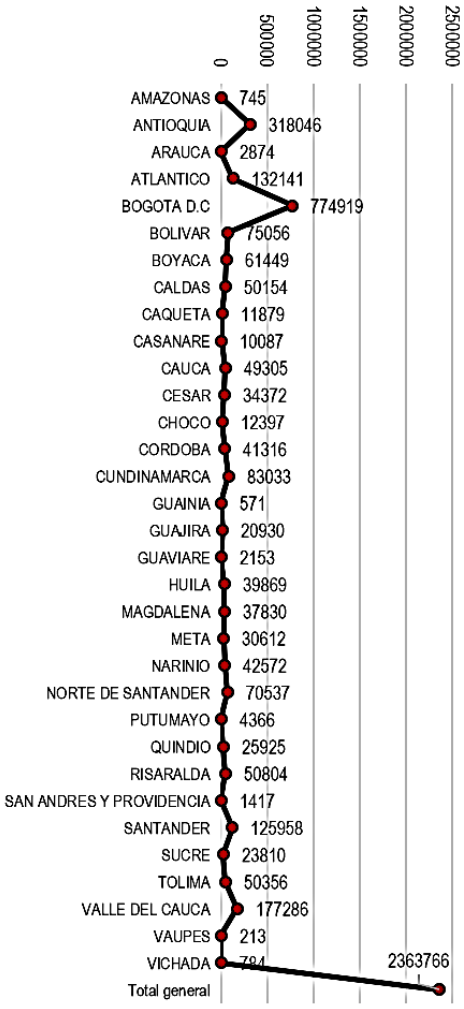

Fig. 3: Distribution of student population throughout the country[5]

[5] Source: Ministry of Education of Colombia, 2018.

The prior figure shows that student population is mainly concentrated in areas with huge urban centers such as Bogotá D.C., Antioquia, Santander, and Valle del Cauca, all of which comprise big cities and metropolitan areas. The distribution of student population per areas of knowledge is shown in Table 1.

Area of Knowledge	Men	Women	TOTAL
Agronomy, Veterinary, and related fields	24,272	21,936	46,208
Fine Arts	39,594	36,456	76,050
Education	70,509	119,667	190,176
Health	51,436	115,768	167,204
Social Sciences and Humanities	155,203	257,391	412,594
Economy, Administration, and related fields	299,448	475,878	775,326
Engineering, Architecture, and related fields	443,669	205,075	648,744
Mathematics and Natural Sciences	24,749	22,715	47,464
TOTAL	**1,108,880**	**1,254,886**	**2,363,766**

Table 1: Distribution of areas of knowledge and student population according to gender[6]

Colombian Higher Education is controlled by a Quality Assurance System that covers both academic programs and entire institutions. It is a combination of many different state and non-state institutions such as the Ministry of National Education, the National Council of Higher Education (CESU), the National Intersectoral Commission for the Quality Assurance of Higher Education (CONACES), the National Accreditation Council (CAN), the Colombian Institute for the Promotion of Higher Education (ICFES), and HEIs (mainly universities).

This set of institutions regulate activities like student selection, faculty, infrastructure, and financial management. Currently, the National Accreditation Council is working with the Ibero-American Network for the Accreditation of the Quality of Higher Education (RIACES) and in collaboration with other national accreditation agencies of Ibero-American countries, to design and develop two pilot projects aimed at developing new instruments and practices for "international accreditation." The two pilot projects are the project for the International Accreditation of Undergraduate Programs, and the pilot project for the International Accreditation of Doctoral Programs in Basic Sciences (National Accreditation System, 2015).

6 Source: Ministry of Education of Colombia, 2018.

Industry-University Relations

Relations between universities and industry in Colombia have been relatively scarce; Colombian Universities have initiated communication strategies with the State and the private sector to create focal points of interest. Universities are expected to create models that contribute to generate ideas to boost the economic development of the regions and the country in general, and they look forward to searching for help inside the companies and the state policies to finance the projects that will impact the real sector.

Most institutions have a policy for Research and Development (R&D) by linking projects to the field of investigation and promoting consultancy projects. "Since the beginning of the nineties, Universities have been participating in mechanisms (such as Mixed Corporations supported by the Law 29 of 1990) that promote 'scientific research and technological development'" (Congress of Colombia, 1990).

Universities have been working to make agreements with private and public companies in order to create linkages that promote fruitful relations with the industry. One of the main challenges is to link researchers with companies and to sign agreements that stipulate the access to laboratories and findings of the group in charge. Additionally, these agreements provide a possibility for students to do an internship in the company. The priority is to make joint projects that cater the needs of the region in development issues. The generation of new knowledge at Universities allows direct connections between researchers and the industry to promote the economic and social growth of a region. In addition, an approach that seeks for coherence between the business reality and real context problems offers the chance of reaching suitable solutions. This is the relevant contribution from the scientific component and some of the benefits with greater impact.

In the case of the Pontifical Bolivarian University—Universidad Pontificia Bolivariana (UPB)—Bucaramanga, the university-industry cooperation is established in the general objective of the university related to the relevance of academic programs, curricular management, and the virtual campus UPB. The objective is to design and implement innovative and sustainable training in accordance with the research focuses and the requirements of the society, based on an approach of human capabilities and competencies.

The Office for Interinstitutional and International Relations fosters agreements, job opportunities, and transfer of knowledge to different sectors of the region. At present, for instance, the UPB is developing several projects with Ecopetrol (the leading Colombian Oil and Gas company) by means of the Colombian Oil Institute that involves the participation of 40 researchers from both

institutions in projects that aim at managing, controlling, and maintaining the equipment of laboratories and pilot plants during their life cycle. A coordination of business practices was created in order to strengthen these alliances thanks to a more focused strategy and contextualization. Although the positioning of the university in terms of research production, student enrolment, consultancy and its graduates is very positive, we must continue to work for the employability indicator of our graduates.

Human Resources Management

Human Resources Management plays a key role in the growth of Higher Education institutions (HEIs). In Colombia, most of the HEIs have a department that manages Human Resources. Particularly, at the Pontifical Bolivarian University, the General Statute establishes the organizational structure of the Pontifical Bolivarian University. In accordance with this statute, the governing body includes the Great Chancellor, the Directive Council, the Rector General, and the Vice-Rector General. The General Statute also establishes the authorities of each university campus as follows: rector, vice-rectors, and deans. The organizational structure of Bucaramanga Campus was set by an agreement of the Directive Council. The structure is based on divisions, which are subsystems led by a vice-rector. There are three divisions: academic, administrative, and pastoral; subdivided in directorates and departments for the administrative area, and Schools for the academic areas. Schools are divided into faculties and academic departments as well.

The organization of the university combines a functional and a process-oriented structure. The functional structure is hierarchical, based on a type of professional bureaucracy. It is composed of the basic elements of specialization, standardization, coordination, and authority organized into units according to areas of competence that differentiate university functions in three major subsystems called vice-rectories: Pastoral, Academic, and Administrative and Financial (Pontifical Bolivarian University, 2013).

The process-oriented structure has five macro processes led by individuals appointed by the Rector. The macro processes and their managers are:

- Macro process Strategy: Director of the Planning Office.
- Macro process Teaching and Learning: Academic Vice-President.
- Macro process Research, Transference and Innovation: Director of Research and Transfer.
- Macro process Social Projection: Pastoral Vice-President.

- Administrative and Financial Macro process: Vice-President for Administrative and Financial Affairs.

The two structures are articulated by the leadership of the macro processes that govern the functional structure, "which allows for coherence in the division of labor and decision-making" (Pontifical Bolivarian University, 2013).

The Academic Vice-President is in charge of the entire academic division, which includes the Teaching and Learning macro process, the Directorate of Research and Transfer, the Office of Continuing Education, the Office of International and Interinstitutional relations, the Office of Admissions, and other dependencies that support the academic processes. The purposes and responsibilities of the Academic Vice-President are to ensure the academic excellence of the university in all its programs and promote teaching, research, and extension under inter and transdisciplinary approaches. This position coordinates deans and other academic authorities, ensures the adequate qualification of faculty and researchers, and plans, directs, controls, and evaluates the functioning of all dependencies under his/her charge.

In Human Resources Management, the Academic Vice-President provides the guidelines for the selection, evaluation, and promotion of faculty. He/she establishes the mechanisms and requirements for faculty selection and assessment—for this task, there is a Teacher Assessment Committee that assists the Academic Vice-President. The roles, responsibilities, and competences of the Academic Vice-President are wide as to manage human resources. Yet, due to the growth of the organization, it is necessary to review the organizational levels and their functions and/or responsibilities, since some operational activities are carried out at tactical and strategic levels, thus actually preventing people in those positions to focus their attention on the appropriate tasks that contribute to the growth of the organization (Uribe, Garrido, and Rodríguez, 2011).

Currently, HEIs in Colombia are undergoing a process of transformation from a perspective based on the curricular and didactic dimensions of education to a management-centered model. This implies the reinforcement of competencies on leadership, strategic planning, quality assurance, and a managerial view. In this context, there is need for a close articulation of institutions with external organizations such as the Ministry of Education, but mainly among the internal units so that leadership capacities are fully assumed.

There has always been a Human Resources Management Direction at the UPB which contributes to the construction of the organizational culture. Although the growth of the university is an articulated work, innovation in administrative and financial management is necessary. Regarding the intersection of the different units of the UPB to promote Human Resources Management, there

are programs like the Human Talent Qualification and Development program, which aims at providing training opportunities for staff in all areas. This program pursues common objectives by prompting the participation of the agents involved (Uribe, 2012). Likewise, in different committees, clear objectives and participation in the criteria for decision-making are established (administrative committee, planning committee, and academic council, among others).

The Rector is the top leader of human resources management, and each one of the vice-rectories and deans' offices support his/her work. Currently, the university has two units for the achievement of the goal in the area of Human Resources Management and Planning, each one immersed in the macro process of Administration and Strategy respectively. This distribution is coherent with the perspective of "collaborative work throughout different units of an organization" (Contreras, Barbosa, Juárez, and Uribe, 2010).

In general, Colombian HEIs present various strategies to manage Human Resources. Some universities are more into a committee-based organization in regard to human resources, while others are more inclined to define different levels of decision-making within the positions that compose the organizational chart of the institution. The Ministry of Education in Colombia recommends that institutions design strategies for human resources management in which this process is understood as an integral strategy of the institution, a collective good rather than a private and individual asset (Elmore, 2003; cited by the Ministry of National Education, 2013).

Quality Management and Accreditation

The Colombian State guarantees the quality of the educational service through the inspection and surveillance of Higher Education (Congress of Colombia, 1992). These are conducted by the National Accreditation System in Colombia (NASC). In Higher Education specifically, the State created the National Council for Higher Education (CESU) in 1992 through article 34 of the Law 30. This council is part of the NASC and is responsible for "establishing the mechanisms to evaluate the academic quality of Higher Education institutions and their programs" (Art. 36). The mechanisms used to assure quality in Higher Education lie with the National Accreditation Council—Consejo Nacional de Acreditación (CNA)—whose focus are the high-quality accreditation processes of both academic programs and institutions. These processes are voluntary and their main objective is to differentiate a program or institution from others, in terms of their levels of quality. A program can apply for this certification when it has had at least one cohort of graduates. Institutions can pursue high-quality accreditation only when at least 25% of their academic programs are accredited

of high quality. A certification of high-quality accreditation is awarded for a period of 4, 6, 8, or 10 years according to the National Accreditation Council findings in the assessment process.

On the other hand, there is the National Intersectoral Commission for Quality Assurance of Higher Education—Comisión Nacional Intersectorial de Aseguramiento de la Calidad de la Educación Superior (CONACES)—, whose purpose is to ensure the minimum quality requirements of every academic program. This system is mandatory for every institution that offers an academic program in tertiary education (undergraduate and postgraduate). This commission is composed of ten different boards organized around an area of knowledge and a general board in charge of coordinating the work developed by the other ones (MEN, 2010). CONACES is the body in charge of verifying compliance with minimum quality conditions and provides the Ministry of Education with assessment reports for granting the so-called "Quality Register" license that allows institutions to offer an academic program and validates the professional status of the holder's degree.

The main difference between the two quality assurance systems lies in their compulsory/voluntary nature. The National Accreditation Council is a voluntary system that enables institutions to offer programs that have been previously validated in regard to their quality systems and their quality goals. On the other hand, the National Intersectoral Commission for Quality Assurance is the guarantor that the program offered by an institution complies with the necessary quality requirements.

The Quality Assurance System of Higher Education is composed of three interconnected components: information, evaluation, and promotion (MEN, 2010). Information involves the participation of both the Ministry of Education as well as the institutions since both provide valid information to feed the databases. The prior validates information and publishes it through three different specialized mechanisms:

- The National System of Higher Education Information (SNIES) that collects and processes all official data provided by HEIs regarding enrolment, number of applicants, number of graduates, finance structure, faculty, etc. (OECD, 2012).
- The National Information System on Higher Education Quality Assurance (SACES), which keeps track of all programs offered throughout the country in terms of their status, nature of accreditation (minimum or high quality), location, knowledge area, etc. (OECD, 2012).
- The Information System for Dropout Prevention and Analysis in Institutions (SPADIES) is mainly focused on gathering data and providing infor-

mation about students enrolled in HE programs, their socioeconomical and academic features, and the possible causes for dropouts (OECD, 2012).

Apart from the previous three systems of information, it is also possible to access information about the graduates' progress. This is done through the Labor Observatory for Education (OLE), which keeps track of the entry and progress of graduates in the labor market. This helps to shed light on the relevance of the study programs for the future employment performance and earnings (OECD, 2012).

The second component of evaluation includes two main components, one mandatory for the creation, extension, and continuity of the programs, and one that is voluntary, with institutional high-quality accreditation of both programs and institutions. For the creation of programs, institutions must comply with ten institutional conditions: students, faculty management, graduates' policy, research, welfare system, institutional government, planning and quality management, administrative management, infrastructure, and finance management (MEN, 2018). Besides that, institutions need to demonstrate the compliance of six program-associated conditions: faculty, curriculum, educational resources, extension, national and international interaction, and research (MEN, 2018). When interested in getting a high-quality accreditation certification, institutions must comply with the same conditions but the level of performance in each of them must be higher. This is to demonstrate that the institution does not only comply with the minimum requirements to offer a program but possesses added-value features that make a program or institution stand out over their counterparts.

The third component of promotion is developed by means of the articulation of adequate and available information and processes of evaluation that end up with an action plan for the improvement of both programs and institutions. In this context, HEIs are perceived by both society and academic communities according to their performance in the system of Quality Assurance. An institution whose programs are accredited or which has got the institutional accreditation is more likely to be perceived as of high quality. This factor influences the image of the institution and differentiates it from other institutions whose programs have been granted only the Quality Registry.

The Pontifical Bolivarian University in Bucaramanga has aligned with the Quality Assurance System established by the Ministry of Education. The self-evaluation process constituted a valuable tool that leads to improvement in the quality of education and, consequently, to the creation of the Institutional Self-evaluation Committee in 1998. This committee is in charge of managing the process, determining goals, and designing the organizational structure for the

self-evaluation process. The regulations of the Quality Assurance in this institution are updated according to needs.

Currently, the university campus in Bucaramanga has fourteen undergraduate programs, sixteen postgraduate specializations, and seven master programs. All of them have been granted Quality Registry. Apart from that, the university has achieved the accreditation of the next five undergraduate programs:

- Psychology was renewed for six years according to the Resolution of the Ministry of Education No. 5084 of April 10, 2014.
- Electronic Engineering was re-accredited for four years in accordance with the Resolution of the Ministry of National Education No. 528 of January 15, 2016.
- Industrial Engineering was accredited for six years, according to the Resolution of the Ministry of Education No. 3984 of March 1, 2016.
- Environmental Engineering was granted accreditation for four years following the Resolution of the Ministry of National Education No. 11936 of June 16, 2016.
- Lastly, Civil Engineering was re-accredited for four years according to the Resolution of the Ministry of Education No. 012785 of August 6, 2018.

Nowadays, three more undergraduate programs are under the National Accreditation Council's evaluation: Law, Social Communication Journalism, and Business Administration. They have received the Council's envoy visit and are currently waiting for the results of the evaluation process. Finally, the university was granted the high-quality institutional accreditation recently by means of the Resolution of the Ministry of National Education No.017228 of October 24, 2018. This means that the Ministry of Education recognized the quality of the institution as a whole.

Funding and Financial Management

Funding in Higher Education institutions takes place at two different stages: the funding of academic offer and that of demand. The funding of academic offer refers to how state funds grant public Higher Education programs the resources for the demand, and the way in which private institutions' income warrants the availability, continuity, and sustainability of their programs. This is because state funds finance public institutions (28.2%) while private institutions (71.7%) have to obtain their own resource mechanisms such as donations,

tuition fees, research projects, consultancy, and the like (Ministry of National Education, 1992, 1994).

Funding of demand is usually managed through financing projects designed to ensure the access of secondary education graduates to Higher Education programs in public institutions mainly. The two fundamental access strategies are the educational credit offered by ICETEX in its different modalities and the granting of subsidies for the permanence of students in the system.

According to the Ministry of National Education (2010), public Higher Education is financed

> through mechanisms aimed at supplying and demand subsidies. Among the mechanisms of supply are the direct contributions of the Nation and the territorial entities, the generation of own resources that each institution obtains in the exercise of its missionary work of formation, extension, and investigation. The resources might also come from special taxation bills passed by the National Congress to fund universities, the COLCIENCIAS support to the projects of the universities and the promotion projects directed by the Ministry of National Education (Ministry of National Education, 2010).

Private HEIs manage their own resources with a certain degree of independence. Nonetheless, they are accountable for the sustainability of their institutions since they offer a public service considered as such by the National Constitution of Colombia. Both private and public institutions can apply for state calls for research grants, projects, and endowments.

These projects and grants are usually addressed to HEIs without distinguishing their public or private nature except in some cases in which the calls for projects are addressed to public institutions only. Both kinds of institutions are to demonstrate their capacities to design, implement, and control and evaluate the projects or programs being funded. The mechanisms through which Higher Education institutions can participate in state-funded projects are consultancies, scholarships to train human resources in the institutions, and scholarships for staff to pursue Higher Education programs. Additionally, innovation project calls are sometimes open for HEIs to build up proposals and get funding.

State funds allocated to research and innovation through the Science and Technology Fund (STF) are significant for both private and public Higher Education institutions, since a part of the STF is usually bound to projects and programs in which HEIs can apply for getting resources for their development.

For the period 2017-2018, the total funds allocated to science, technology, research, and innovation were about 1.3 billion Colombian Pesos—COP (Colciencias, 2018). This means that at least a part of these resources ends up supporting HEIs through their participation in calls for projects and programs.

To build up a broader idea on how financial resources are distributed between public and private HEIs, it is necessary to look at the total spending on tertiary education attributed to either state or private/individual funding. For example, in 2016, this distribution in Colombia was as follows: whereas 36.1% of the total spending came from public funds, 63.9% of the expenditure came from individuals or "other private entities, including private businesses and non-profit organizations, such as religious organizations, charitable organizations, and business and labor associations" (OECD, 2018).

Research and innovation policies and their associated resources have become a relevant opportunity for HEIs to raise funds that complement their usual tuition incomes. Additionally, an increase in the interest of the private sector can be observed, such as for consulting universities and research groups in topics related to the development of their business core topics. Rebolledo (2017) states that the increase in the number and diversity of academic offer has prompted Higher Education institutions to diversify the services offered and try to get income from other areas such as consultancy.

In the context described above, the UPB Bucaramanga, as a private Higher Education Institution depends financially on tuition income mostly (around 80%) from both undergraduate and postgraduate programs. The other income (around 20%) comes from research grants, continuing education, and consultancy (UPB, Financial Report, 2017). Research grants and endowments are mainly promoted through the Directorate of Research and Transfer of the university, who disseminates information for the academic community to participate in calls, projects, and programs addressed to HEIs. The same office promotes the involvement of the university in consultancy with both public and private institutions.

Currently, the main ally in the private sector for the UPB is the Colombian Oil Company Ecopetrol. Another important source of income for the UPB are accredited laboratories, which offer specialized services to the community and rent their facilities to the industry. In terms of continuing education, there are two ways of getting resources. One of the strategies is by means of the portfolio of courses, workshops, and diplomas that certify competencies of professionals in a specific area. Another strategy lies with the continuing education programs developed on request of an organization or a person.

In this institution, the administrative and financial macro-process comprises and articulates the processes of administrative management and planning of financial resources of the university in order to guarantee the viability and permanence of the institution (Educational Institutional Project, 2016). This macro-process is managed by the Administrative and Financial Vice-Rector and is composed by four policies that complement one another:

- The *policy of the administrative and financial subsystem*, in accordance with institutional objectives, responds to the present and future challenges of the University in terms of the planning and execution of strategic plans for institutional development and for strengthening individual and collective capacities. Its aim is an administration with social responsibility, well-planned finances, efficiency and innovation in the processes, and the self-regulation of the system through control mechanisms.
- The *financial management policy* guarantees the consolidation of the university's assets through the increase in income, the optimization and control of expenses, the creation of value, the return on investment, and the profitability of the investment portfolio. This is done by controlling the levels of risk and indebtedness according to the cash flow of the institution, in order to ensure the organization's sustainability in the long term.
- The *human talent policy* is aimed at the promotion, transformation, and social and human development of its employees within the conception of Christian Humanism [being a Catholic university], as support for innovation and institutional strengthening. To do this, it promotes a comprehensive human talent management system with a comprehensive model of skills and competencies that generates a culture of equity and improvement of quality of life of the collaborators and their families in accordance with the institutional mission and vision.
- The *logistics and operations policy* conceives a university that is reconstructed organizationally while guaranteeing and promoting a comprehensive management of institutional capacities, and ensuring a dynamic, transparent operation which is responsible and efficient and which watches over the opportunity and availability of resources.

The Administrative and Financial Vice-Rector is responsible for the financial mega-goal that the university has adopted. This position oversees directing the financial management, development, evolution, and sustainability of the institution. Throughout the history of the campus in Bucaramanga, it has shown very good financial and economic performance. However, in the last few years

the financial results have been affected by the decrease of the number of applicants to the undergraduate and postgraduate programs due to the economic crisis in the region, mainly caused by the decrease in the price of oil on international markets.

The units in charge of managing and allocating financial resources belong to the Administrative and Financial Vice-Rectorate and mainly entail the Finance Department and its sections: budgeting and portfolio, and the Accounting Department. The Office of Planning of the university intervenes in the projection and creation of new academic products and programs that contribute to generating new opportunities for the institution to grow.

The promotion of practices that help to build a sustainable financial environment is under the accountability of all the actors involved. Principally, the academic division led by the Academic Vice-President and its dependent units are expected to design promotion and marketing strategies, strategies for student retention, and budgetary adjustments strategies that, in turn, result in the organization of a financially sustainable institution.

The general objective of every financial strategy is to improve the facilities and the technological infrastructure to contribute to the strengthening of the Teaching University model, with emphasis on research and innovation. At the same time, it helps to diversify the sources of income of through the identification and consolidation of policies, strategies, and tactical plans around their differentiating capacities from training, research and innovation, and social projection.

The main challenges for the funding of HEIs in Colombia are mainly given by the fact that most students or their families have to pay high rates of tuition costs and their income is not sufficient to cover this expense or the fact that students' choice of Higher Education is hugely influenced by students' beliefs and misbeliefs (Benavides, Otálora, and Hernandez, 2013). Another important challenge is the low amount of institutions (especially those located in remote regions) that are able to diversify the sources of funding to opportunities such as public and private investment funds (mentioned above) or consultancy.

The specific case of the Pontifical Bolivarian University in Bucaramanga presents several challenges associated to the diversification of funding, internationalization of working and cooperation nets, fundraising through donations and participation in international organizations networks. In the next few years, the institution needs to develop and implement strategic actions that allow it to participate in a wider system of national and international nets that carefully engineer diverse funding sources for the institution.

Research and Publishing

The Pontifical Bolivarian University, in accordance with the Higher Education guidelines in Colombia, has adopted research as one of the fundamental components and as a way of articulating the academic dimension in connection with social reality and industry. This consideration responds to the construction of knowledge according to diverse contextual conditions and favors the systematization of research experiences and results. This vision has increased the need to broaden the horizons to opening up to dialogue with local, regional, national, and international academic peers as a way to consolidate quality knowledge and to strengthen the development of personal and professional skills in the graduates, thus placing them in a competitive position.

In most HEIs in Colombia, research has become one of the cornerstones of organization and development. This conception of research emerges mainly from policies established by the country's successive governments and managed by the nationwide scope Administrative Department of Science, Technology, and Innovation (COLCIENCIAS). It "promotes the policies to foster Science Technology and Innovation (ST+I) in Colombia and involves agreements aimed at the production of knowledge, the construction of ST+I skills, and the circulation and uses of such skills and knowledge for the integral development of the country and the welfare of Colombian people" (COLCIENCIAS, n.d.).

The policies in this area impact the internal organization of research at universities through promotion programs, national and international mobility of faculty researchers and postgraduate students, open calls for funding research projects, and the existence of an information system (SCIENTI). The latter allows institutions and researchers to manage their research production by categorizing research groups and researchers by means of a model that includes the generation of new knowledge, the spread and circulation of knowledge, and the training of human resources for research—science, technology, innovation, and transfer.

Research groups can be categorized according to their academic output in levels A1, A, B, C, or the status of "recognized." Researchers can be categorized as Junior, Associate, Senior, or Emeritus/a according to their research production. Both categorizations occur when COLCIENCIAS launches an open call for groups and researchers to apply for categorization voluntarily. This call usually takes place every two years and includes a description of the model, the research products that are recognized, and the timetable for the categorization process.

The model of COLCIENCIAS has contributed to the emergence of a research culture in HEIs. In the case of the UPB Bucaramanga this culture has led to the promotion of high-quality scientific research, the dissemination of the results of research work, and the development of so-called formative research. Because of these concerns, a series of research policies have been issued at different times and various administrative and financial measures have been adopted to facilitate and stimulate the work of the researchers.

Accordingly, the university has designed strategies for the promotion of research by stating that it will finance research and innovation with resources from the Research and Transfer Directorate. This includes support for the generation of research projects, support to emerging research groups, training of novel researchers, dissemination of research results, encouragement of national and international participation of research groups and researchers in events and publications, promotion of scientific and technological publications, etc. In order to be able to comply with these objectives, the institution has created a structure that manages research in the institution departing from a system of research, transfer and innovation. This system is managed by the Directorate of Research and Transfer established in all the campuses of the university.

For the operation of the Research, Transfer and Innovation System there are instances on a strategic, tactical, and operative level such as the National Scientific Committees on Strategic Focal Points (strategic level), the National Research Committee (strategic level), the Research Committee of the Campus (tactical level), and the Research Committee of each academic unit (operational level). The previous structure places the UPB in the ecosystem of Science, Technology, and Innovation, enabling the contextualization, articulation, and guidance for its research, transfer, and innovation to contribute to changes and affect social and economic development with equity and environmental sustainability. The university prioritizes certain scientific and technological areas through the creation of five strategic focuses that go beyond the disciplinary boundaries of knowledge (see Figure 4).

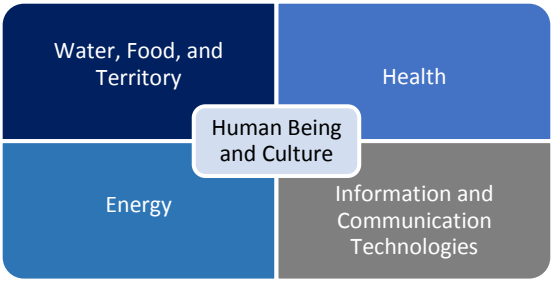

Fig. 4: Strategic Focuses[7]

The Pontifical Bolivarian University (UPB) has promoted the evolution of research groups and researchers by means of stimulating the production and recognizing high impact products such as articles published in indexed publications, patents, and books or book chapters as a research result. By the end of 2017, the University campus in Bucaramanga had 23 research groups officially recognized by COLCIENCIAS and classified as shown in Figure 5. The maximum level according to this model is category A1, which entails a significant new knowledge research production and the constant progress of researchers.

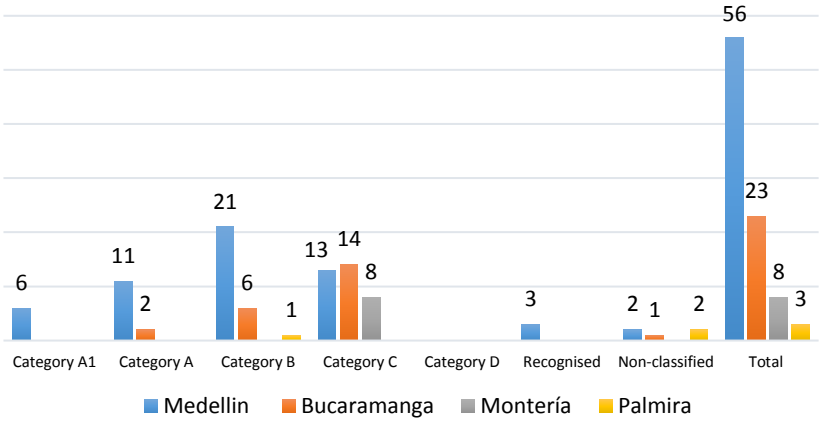

Fig. 5: Classification of university research groups[8]

[7] Source: UPB, 2013.
[8] Source: University Statistics Bulletin, 2018.

Researchers are also classified by COLCIENCIAS according to their production in a scale that begins with junior researchers, moves up through associate and senior researchers, and ends with emeritus/a researchers. In the last classification, the UPB had its researchers classified as shown in Figure 6.

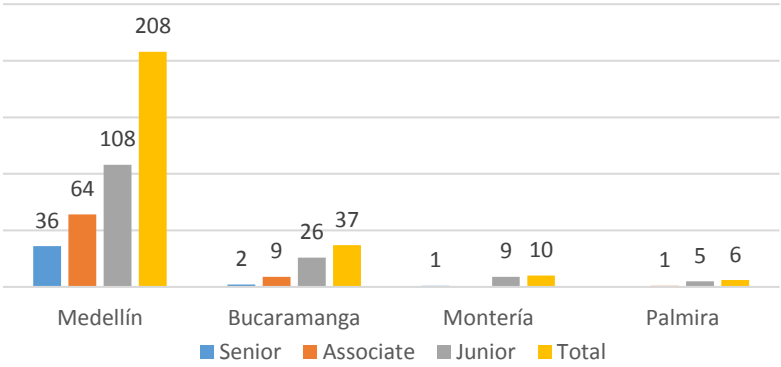

Fig. 6: Classification of university researchers[9]

The university campus in Bucaramanga has had an active role in the publication of research results in indexed publications both internationally and nationally. In the first case, 104 articles had been published in the period 2010-2017, while in the latter 381 articles had been published for the same period, as shown in Figure 7.

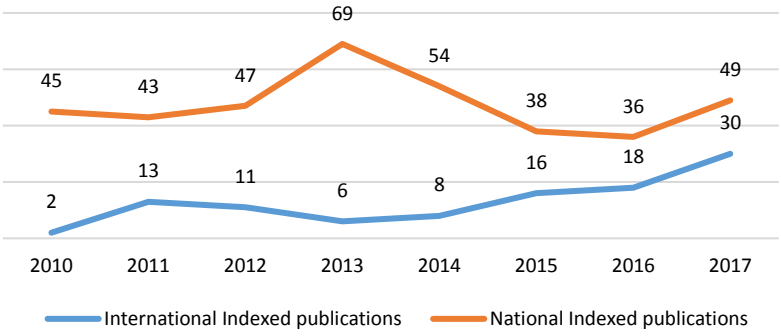

Fig. 7: Articles published by researchers belonging to the University campus in Bucaramanga[10]

[9] Source: University Statistics Bulletin, 2018.
[10] Source: University Statistics Bulletin, 2018.

Internationalization

Internationalization of Higher Education has been a goal in Colombian institutions. National and International accreditations have been focusing their interests on this important factor. For making this process a reality inside each university, institutions must incorporate international and intercultural dimensions within teaching and research mechanisms; this can be implemented through different strategies such as student, faculty and staff academic mobility, joint research programs with international institutions, double degree programs, internationalization of the curriculum, instructions and other international practices that provide faculties and departments of the institution with global academic components.

The partnership to make internationalization policy a reality starts with mutual recognition agreements with partner institutions around the world in order to guarantee quality assurance. In this case, internationalization in the field of Higher Education must be a priority not only to be evaluated but to guarantee high standards in the academic and research field. From a general view, institutions are trying to make their academic offer visible in a global context. That is why, in connection with Marca Colombia and CCYK, universities have been participating in the biggest conferences around the world to promote Colombia as an academic destination. Through these activities, institutions have been constructing strong partners to create different lines of cooperation. The ASCUN (Colombian Association of Universities) has also promoted partnerships on a national level to create a strong cluster in order to create strategic lines that boost internationalization of Higher Education on a national level. The national programs ICETEX and COLFUTURO have made efforts to make agreements that help universities all over Colombia to improve their international activities by offering scholarships and capacity building training in this field.

At the UPB Bucaramanga, the goal of internationalization is immersed in the macro process of Teaching and Learning, Research, Innovation, Visibility, and Internationalization. Its objective is to define strategies and instruments for the promotion of the intellectual production of the UPB with the purpose of increasing the quality of its production, impact, and visibility with criteria of effectiveness and efficiency. A fundamental objective of the university is to increase internationalization through mobility, interinstitutional and international relations that favor academic research, investigative cooperation, and further agreements. Although the UPB currently has an office, more than 200 agreements, and a good level of mobility, its goal is to increase the awareness on the importance of internationalization in the accreditation processes.

The UPB is constantly working on improving its internationalization policy by creating a global perspective within the institution by making activities such as the international week, welcome team, use of virtual technologies in the classroom, comparative international cases, courses taught in English, and international speakers and faculty. Additionally, the UPB is constantly establishing new partnerships around the world, joining new international networks, and promoting cooperation projects with the research and innovation department such as Erasmus Plus, 100K Strong in the Americas, DAAD, CREPUQ, and Fulbright.

In the mobility process, the UPB is implementing new strategies to make sure that every single student in the institution can have an international immersion. The UPB is applying to more scholarships such as Alianza del Pacífico, ICETEX, ELAP, DAAD, BRACOL, and other international funds. However, the UPB is becoming more flexible in the recognition of credits from other institutions, as well as constructing new models of mobility such as academic missions and summer courses that can also be accredited in the study plans.

One of the strengths of the UPB's internationalization path is mobility in the form of internships that our faculty and students make in partner institutions. Currently the UPB has more than 60 students and faculty making this type of mobility each year. The UPB receives international students and faculty within this framework as well, which improves its research groups' competences and helps to develop the internationalization policy.

The UPB is in a constant challenge of creating a university with high international standards. Its aim is to construct an institution with a multicultural spirit and promote the integration of every person that is part of the community to the institutional goals. Many challenges remain for the UPB such as the need to increase participation in the opportunities that the world is offering, and to build programs with global impact.

Conclusion

Colombian Higher Education has become one of the most powerful mechanisms for Colombian society and economy to access global dynamics and improve its participation in worldwide opportunities. This scenario sets challenges to the agents involved in the management of Higher Education in aspects such as industry-university interaction, human resources management, quality assurance systems (national and international), research, transfer and innovation, and internationalization.

One of the biggest challenges in the relation between university and industry is to raise awareness among the industrial sector about the relevance of research and academic work happening within the context of universities. This intends to improve and increment industrial production and its impact on social and economic development of the country.

Furthermore, in the area of human resources management there should be a model of governance that promotes adequate control and quality assurance. This area is intended consolidate the Institutional Governance System via the establishment of appropriate selection, evaluation, and promotion systems for the professional and academic growth of staff members.

In terms of quality assurance, there has been significant evolution of the academic offer in both coverage and excellence. This has been specially motivated by the existence of two systems that measure the quality of academic programs, which stimulate institutions to pursue high quality accreditation voluntarily once they have got the initial approval by the Colombian Ministry of Education to offer basic academic services. Thus, it has created a scenario of continuous objectives of assessment and improvement.

In Colombia many institutions have developed different models of internationalization, that is why some institutions are more advanced than others in this topic. Also, the academic quality and the ranking positions make this exercise easier for some universities. Internationalization policy is so important in any Higher Education Institution that this issue should be analyzed as a pathway to improve programs and quality and reach global standards at a high percentage. Internationalization should be seen as something that goes beyond the requirements of the Ministry of Education. This transversal topic must be constructed and improved day by day as a way of improving the quality of the academic programs taught in order to make an impact in the world.

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GUSTAVO BADO, NORMAN ROJAS, LIZBETH SALAZAR, AND JAVIER TREJOS

Higher Public Education in Costa Rica: A Challenging Task for Quality and Relevance

Abstract

The present text describes the historical evolution of the Higher Education system in Costa Rica, putting special emphasis on the University of Costa Rica, the oldest and biggest institution in the country. Academic and administrative structures are described in a hierarchical organization chart, including human resources management and the procedures which determine the hiring processes and how to become a faculty member. The different systems of accreditation in the country, with their pros and cons, are evaluated as well. The positioning of the university in international rankings is presented as a way of comparing the institution among other universities in the region and the world. The university is funded mostly by public funds, but it also gets some funding from contracts with external entities, tuition fees, and copyrights. Research is a substantial activity undertaken by several research centers and institutes and organized in time-limited projects. Teaching and research are strongly related to external agents such as industry, government, and institutions, and to agencies that intend to develop this relation. Social action is also a substantial activity in which the relation to social and external sectors (such as poor communities, Indigenous communities, and environmental organizations) is handled. This text relies on information provided by the Faculty of Science, especially concerning details about the different topics in the sections.

Keywords: Education Administration, Internationalization, Quality Assessment, Rankings, Social Action.

Introduction

The first university in Costa Rica was founded in 1843 as a catholic Higher Education institution in line with the model of colonial institutions in Latin America. According to this model, the university had to comply with the professional training goals following the parameters established by the Catholic Church in Rome. This university, named Santo Tomás, disappeared in 1888, and gave way to a stronger secondary education, oriented to a larger population and not only the elite. Fortunately, the schools of Law, Medicine, and Engineering remained and, some years later, Pharmacy and Fine Arts were created.

In 1940, the government decided the open a new university without ties to the Church. It was a public, autonomous, secular institution, called Universidad de Costa Rica (UCR). At first, the UCR was an agglomeration of the existing mentioned schools but between 1953 and 1954 it became reorganized as an institution with a central administration and structured in faculties and schools, promoting a critical, humanistic, and cultural formation (Facio, 2017).

In the seventies, new public universities were founded in Costa Rica. Such is the case of the Technological Institute (ITCR) established in 1971, the Universidad Nacional (UNA) founded in 1973, and, lastly, the Universidad Estatal a Distancia (UNED) set up in 1977. Later, in 2008, the Universidad Técnica Nacional (UTN) was created merging some existing schools of agriculture and technical education.

All these mentioned public universities have several campuses throughout Costa Rica, covering almost the whole territory and population in the country.

During the university congress of 1972-1973, the three main purposes of the UCR (teaching, research, and social action) were established and all other public universities followed the same direction. In 1974, the UCR, the ITCR, and the UNA established the National Rectors' Council—Consejo Nacional de Rectores (CONARE)—, an organization for the coordination of public Higher Education which both the UNED and the UTN rapidly decided to join.

All public universities in CONARE are autonomous and democratic by Constitutional Law: they decide their own governance, organizational structures, and responsibilities. CONARE periodically negotiates financing with the government, according to the financial availability and growth of the gross domestic product.

The first private university of the country, Universidad Autónoma de Centroamérica (UACA), was created in 1976 with the purpose of providing Higher Education in some specific study programs. UACA's initial structure was constituted by a consortium of colleges that shared some characteristics such as basic courses, administration, and external relations, but with some independ-

ence in the offer of their study programs. Through time, most of these colleges became autonomous universities.

Currently there are over 50 public universities in Costa Rica with a wide range of coverage all over the country. A few of these universities are part of international consortiums as well. Private Higher Education is regulated by the National Council for Higher Education—Consejo Nacional de Educación Superior (CONESUP). This council is simultaneously supervised by the Ministry of Public Education and has no relation to CONARE or any public university.

Given that CONESUP does not regulate the quality of these institutions but solely its requisites to operate, regulation of private universities in Costa Rica is weak. Thus, the duration of study programs is shorter in private institutions than in public institutions, comprising the former terms of 15 weeks in contrast to the terms of 18 weeks stipulated in state universities. Furthermore, private universities do not have mandatory courses in Humanities for all study programs, as they intend to train professionals through a technical orientation rather than an integral formation.

In 2014, approximately 201,000 Costa Ricans were enrolled in Higher Education institutes. The public and private sector shared approximately half of the university population. The biggest institution in the country is the UCR, with nearly 40,000 registered students.

In order to be admitted as a student into the Costa Rican university system, applicants require a high school or secondary degree based on eleven years of education. The University of Costa Rica confers four types of degrees:

- 190 bachelor's degree programs: four years of university education.
- 166 licentiate degrees (*Licenciatura*): one additional year to a bachelor's degree, ending with a short dissertation.
- 171 master's degrees: two additional years to a bachelor's degree, ending with a thesis.
- 11 doctorate degrees: three additional years to a master's degree, ending with a thesis.

In 2010, the average age was 25.7 for the obtention of a bachelor's degree and 27.7 for licentiate degrees (Kikut, 2015).

To become a faculty member, it is necessary to fulfill the requirements established by each academic unit. This generally implies the obtention of a master's or doctorate degree, demonstrable teaching proficiency, the publication of previous research projects, and, in some schools, verifiable English proficiency as well. All lecturers can apply for investigation time and funds, provided that they are supported by a research unit once a project gets approved.

Usually, projects are scheduled for 2-3 years and must be authorized by the scientific committee of a research unit. In the section "Research and Publishing" we refer to research at the university and the country.

The seven principles that guide the UCR's work are:

- Academic freedom.
- Respect for cultural and ethnic diversity.
- Right to Higher Education.
- Academic excellence and equal opportunities.
- Respect for people and for freedom of speech.
- Commitment to the environment.
- Planned university action.

The substantive areas of the University of Costa Rica are teaching, research, and social action. The main campus of the UCR is located in San José, the capital of the country and it comprises three sections stretching over 72 hectares (178 acres). Furthermore, there are six regional campuses in different cities: Occident (San Ramón), Atlantic (Turrialba), Guanacaste (Liberia), Pacific (Puntarenas), Caribbean (Limón), and South (Golfito). The total constructed area half decade ago was 559,742 square meters, growing up over 200,000 square meters in the last years. This investment has been possible thanks to World Bank funding, trust funding, and own resources.

Industry-University Relations

Costa Rica is a developing country with a small industry sector. The country's GNP is US$ 57.44 billion: industry 29.1%, agriculture 7.6%, and services (including tourism) 63.3%.

The University of Costa Rica has three offices in charge of industry-university relations:

- AUGE: Agencia Universitaria para la Gestión del Emprendimiento (University Agency for Entrepreneurship Managing). AUGE was established in 2012 and specializes in creating and boosting knowledge-intensive companies and organizations. It encourages the completion of innovative projects and dynamic organizations to contribute to an inclusive and sustainable development.
- Proinnova: Unidad de Gestión y Transferencia del Conocimiento para la Innovación (Unit for Knowledge Management and Transfer for Innovation). Proinnova brings newly developed knowledge to the society; it man-

ages, protects, and transfers knowledge for innovation. It also serves for the promotion, advice, and training on creativity, innovation, and intellectual property, to make an impact on external sectors.

- There is also a foundation, Fundación UCR, that facilitates relations with outer sectors.

In 2016, AUGE distinguished five projects intended to boost performance and innovation:

- *Licitaciones Inteligentes and UPE* entered in phase one on Startup Chile. UPE is a social entrepreneurship that offers housing and touristic activities in rural communities.
- *My Green Cloud*, a contract with CAF (Corporación Andina de Fomento) and accreditation with EARTH (Escuela de Agricultura de la Región del Trópico Húmedo).
- *PARSO (PARking SOftware)* got a municipal contract for digital payment of parking, it is active in Costa Rica and Chile.
- *StudioFlex* launched *Jesus Stories* in 300 stores in the United States, jointly with Herald Entertainment.
- *Hulilabs* won a Google contest as the most promising entrepreneurship in health sector.

Table 1 shows some data on this university-industry relation, concerning intellectual property rights (Jensen, 2016; Jensen, 2017):

Intellectual property rights	Up to 2016	New in 2016
Registered trademarks	263	2
Trademarks in process	N/A	9
Registered patents	8	0
Patents in registering process	N/A	8
License contracts	16	2
Option license contracts	1	0
Registered author rights	14	0
Registered industrial designs and models	6	0
Rights on vegetal varieties	1	1
Commercial rights on vegetal varieties	6	1

Table 1: UCR intellectual property rights

Some research centers and institutes have also a strong relation with external, mainly national, sectors. For instance:

- ICP (Clodomiro Picado Institute) is the world main producer of antivenom serum, with exports to most of the tropical countries, including India, Bangladesh, Sri Lanka, Brazil, Colombia, Peru, Philippines, and several African countries.
- LANAMME (National Laboratory for Materials and Structural Methods) is a national laboratory that evaluates roads, streets, bridges, and public infrastructures. It is funded by law and its analyses are mandatory for some institutions, such as the Ministry of Public Labor.
- CELEQ (Center of Electrochemistry) monthly evaluates and controls all fuel sales done by gas stations and national refineries in Costa Rica.
- CICAP (Center of Public Administration) trains periodically public servants in ministries, municipalities, and other public institutions.
- CICA (Center of Environmental Pollution) makes regular analysis of water waste and other pollutants originated from industry, institutions, and other agents.
- CIMPA (Center of Pure and Applied Mathematics) collaborates with retirement funds, insurance companies, and the stock market for financial and actuarial analyses.
- CIGEFI (Center of Geophysics) monitors climate change. It has designed a map of winds in the country, searching for the best places for wind energy.
- IICE (Institute on Economic Sciences) makes regular consulting in economics, finance, and market research.
- CIGRAS (Center of Grains and Seeds) produces new fruit species that are sold in many foreign markets, such as "papaya perfecta," developed in the UCR.

Case Study: Recent Regulations

The previously mentioned Research Centers developed relations with private and public industries, and AUGE and Proinnova try to promote these interactions. However, connections with industry and other institutions have not been well established yet, as some sectors oppose this idea. Instead, they have opted for a pure academic institution, arguing that knowledge is transmitted without the need to establish cooperation or alliances.

Recently, a new regulation established that the director of any Research Center is responsible of all contracts, even if he or she is not involved in the project, and that earnings must be fully invested in the projects. This regulation

is even more detrimental since it strictly limits the use of resources generated by collaborations.

Many academic authorities stand up for the abrogation of this regulation and are looking for a more flexible one. We consider that the relation with industry should be strongly linked to research and knowledge generation, such as thesis and dissertations that benefit graduate students and facilitate their access to the labor market. Also, spin-offs should be supported for the conception and fabrication of interesting products for the industry. The university could then benefit by generating patents.

Certainly, in some cases only an institution such as the university can intervene at a national level because of the dimensions of the investment. This is the case, for instance, of the analysis of hydrocarbons; the analysis of asphalts and structure of bridges all over the country; the analysis of grains and seeds; and the production of antivenoms. However, flexibility is needed since these investments are made by the institution and not only by the Research Centers. Hence, benefits should reach out to the entire institution and not only to the units that host the collaboration contracts.

Case Study: Social Action

The relation with society goes beyond that with industry. In other words, alliances with municipalities, organized communities, government, small producers, indigenous communities, etc. tend to be stronger. Particularly after the Córdoba movement of 1918, universities in Latin America have focused not only on teaching and research, but also on social action. For instance, social action is one of the substantive academic activities at the University of Costa Rica. These activities can take place mainly in the form of community work—*trabajo comunal universitario* (TCU)—, teaching extensions, and cultural extensions.

The TCU is mandatory for all graduating students and comprises 300 hours of collaboration in a community within the framework of over 160 projects supervised by the different faculties. About one million student-hours are contributed each year.

A teaching extension consists of permanent and continuous educational and special services. Industry and public companies are the main targets of this continuous education, since the university permanently offers courses and diplomas with the purpose of expanding studies from the technical to the professional level.

Human Resources Management

The University of Costa Rica has a University Council (CU) consisting of twelve members in charge of defining the politics and internal rules of the institution: the Rector, one representative of each knowledge area, one representative of the regional campuses, two students elected by the students themselves, one administrative representative elected by the administrative staff, and one representative of professional guilds.

The Rector is the executive authority and is responsible for the guidance and evaluation of the institutional activities, and is the representative of the UCR for all external instances. Both the CU and the Rector are elected for a four-year period by the University Assembly, which comprises all faculty academic staff (about 2,000 teachers and researchers elected by school assemblies) and a proportion of students equivalent to 20% of the faculty staff. The university is structured in five vice-rectories, which are appointed by the Rector:

- Teaching: Vicerrectoría de Docencia (VD).
- Research: Vicerrectoría de Investigación (VI).
- Social action: Vicerrectoría de Acción Social (VAS).
- Student life: Vicerrectoría de Vida Estudiantil (VIVE).
- Administration: Vicerrectoría de Administración (VA).

The knowledge areas are divided into six areas and thirteen faculties, some of these divided into schools as well:

- Basic Sciences Area: Faculty of Science with five schools.
- Health Sciences Area: Faculty of Medicine (five schools), Faculty of Microbiology, Faculty of Dentistry, and Faculty of Pharmacy.
- Social Sciences Area: Faculty of Economic Sciences (four schools), Faculty of Education (five schools), Faculty of Social Sciences (eight schools), Faculty of and Law.
- Agricultural and Food Sciences Area: Faculty of Agricultural and Food Sciences with four schools.
- Engineering Area: Faculty of Engineering with nine schools.
- Humanities Area: Faculty of Letters (three schools) and Faculty of Arts (three schools).

There are also two special systems: the General Studies system (offering general humanities courses for all students in the institution), and the Graduate Studies system (offering graduate studies in coordination with the schools and the graduate committees for each discipline).

Authorities in each Faculty and School are elected democratically by faculty members, and 20% of the votes from student delegates, elected by student assemblies. Administrative personnel have no vote in these committees.
Figure 1 shows the administrative organization of the UCR:

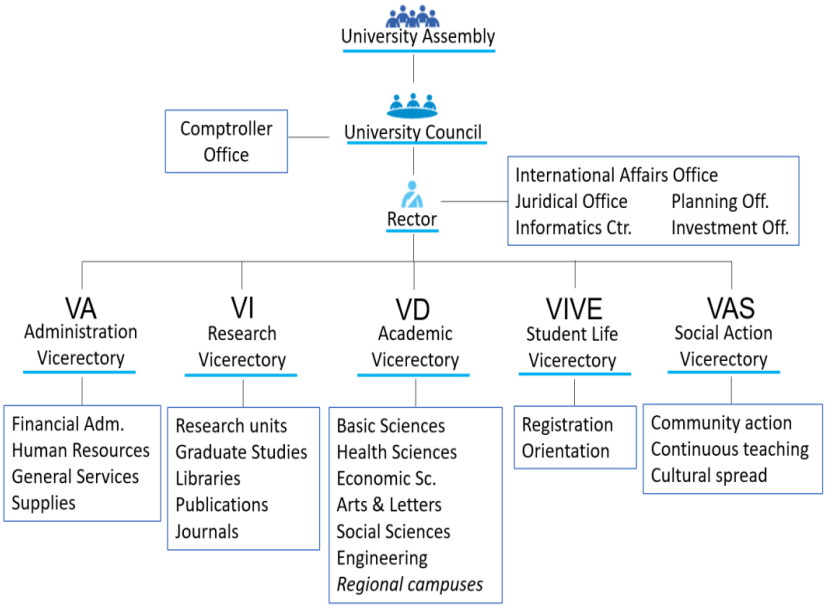

Fig. 1: Administrative organization of the University of Costa Rica[11]

In 2018, the UCR had about 9,700 employees, 6,500 teachers (out of whom 2,000 were faculty members), and 3,200 administrative employees. In order to become a faculty member there are two possibilities: by public contest and by position reservation. In the first case, each assembly decides by majority vote. In the second, positions are reserved for graduate students from foreign universities that come back with a doctorate degree.

[11] Source: UCR, 2016.

Whether all academic staff, including those with temporary contracts, should be able to vote, is a subject of ongoing debate. In the same manner, discussion exists regarding the vote of administrative staff in the election of academic authorities. Any change in the election system must be approved by the Collegiate Assembly, but none of the discussed amendments has received enough support yet.

Faculty members can pursue an academic career according to the following criteria, translated into academic points:

- degrees obtained,
- publications in journals,
- mastered languages (including up to 2 computer languages),
- years of service (up to 10 years),
- teaching evaluation,
- social action evaluation,
- and administrative work (at least 4 years in a direction position).

Ascending in an academic (and salary) scale is accomplished by meeting these criteria. Positions obtained in the academic scale can never be lost and are not subject to a re-evaluation. Administrative staff has its own scales, depending on the functions performed for each position. Academic degrees may also increase the salary or give access to a better position. Seniority also influences wages, in all cases at a scale of 3.75% of increase per year, with no upper bound regarding the number of seniority steps.

Case Study: Hiring Procedures

The hiring of teachers and researchers for the support of the academic work takes place at the schools, not at the faculties. That vertical/hierarchical structure generates a culture of niches or feuds, where those in charge of each school defend their privileges to manage the budget directly.

Deans are only entitled to hire administrative staff for their own office. The selection procedure does not allow for flexibility and is related to national procedures in the public administration. Once a pre-selection process has been conducted by the Human Resources Office, there is a probationary period of three months, during which it is possible to dismiss the personnel. After that period, dismissal processes should be made very carefully and be well justified. Deans can assign the position to the provisional administrative staff as soon as

they are satisfied with their work. Yet, deans are not compelled to assign positions in a bounded time, and thus provisional staff can work at the university indefinitely.

One flaw of the labor relation at the University of Costa Rica is that there is no reassessment of tasks after a definite contract has been signed. Also, due to the inflexibility of the system it is not possible to move personnel horizontally according to corporate benefits since staff is attached to the academic units. Moreover, tasks are not updated in time according to new realities.

In the case of academic staff, the university has to improve the procedures for hiring temporary teachers. Given that holding a degree is the only requirement in order to opt for a position at a university, sometimes employment begins without a previous introduction to educational work. Therefore, a full program of institutional induction should be implemented. Although at a first stage such induction could be implemented merely at a faculty level, a broader program is needed, since it is often the case that academic staff does not know many institutional procedures and rules.

Further complications arise when hiring under a permanent contract, since it requires the fulfillment of several prerequisites. Firstly, whenever the position gets included in the school's budget, the school director must announce the competition. Secondly, after all applications have been received, degrees, academic production, evaluations, teaching experiences, and languages mastered must be considered. The director then establishes a committee responsible for the examination and ranking of the applications in line with the established scoring assigned to each topic. The school assembly then examines these results in order to vote on who will occupy the position. Unfortunately, the character of the ranking established by the committee is merely indicative and thus this procedure can sometimes foster decision-making based on political reasons and not solely on academic reasons.

Another flaw of the hiring procedure is that it inhibits the possibility of opening interdisciplinary positions, since the academic personnel is attached to academic units.

Lastly, a performance evaluation method should be strictly implemented by universities to facilitate terminating a contract with academic staff in the event of non-compliance with the institutional expectations. This is due to the fact that, at present, performance evaluations are conducted but no action is taken in the case of negative outcomes.

Quality Management and Accreditation

Costa Rica possesses a national system for quality assurance in Higher Education named Sistema Nacional de Acreditación de la Educación Superior (SINAES). The purpose of SINAES is not to evaluate departments or institutions but specific study plans at individual campuses. Instead of employing a general framework for evaluating education, SINAES is based on ad-hoc evaluating strategies for each institution. Nevertheless, SINAES has had difficulties to become an effective organization for assessing the quality of Higher Education. As a result, an uneven system has been established. Through this system, an ample variety of study programs are credited with the same label but according to completely different standards (Mora and León, 2012).

In our point of view, SINAES does not have a broader vision of quality management and it does not consider the disparate realities that characterize the different study programs. Thus, although SINAES checks whether institutions fulfill their commitments, there is no comparison between them in order to set at least the minimum standards of excellence for emerging universities.

The UCR is lacking a centralized information system, which complicates accreditation tasks. The institution is therefore working on providing accurate and upgraded relational data bases on several institutional activities, not only in administrative matters but also in teaching, research, and social action.

Despite some flaws in the accreditation process undergone by SINAES, it has helped academic units to organize properly most of the information, facilitating the evaluation process. Hence, the systematization of information is easier and faster after this process.

Besides SINAES, other accreditation systems have been consulted. For instance, some engineering careers apply the Canadian Engineering Accreditation Board (CEAB), as well as the Central American system—Agencia Centroamericana de Acreditación de Programas de Arquitectura y de Ingeniería (ACAAI).

Quality Management at the University of Costa Rica

The Center for Academic Evaluation (CEA) is an office operated by the academic Vice-Rectory, structured in three sections: approval of study curricula, quality assessment of teachers, and assistance in program evaluation processes and accreditation. Recently, the CEA started assessing the quality of programs and academic units, and certifying the quality at the end of the process.

At present, 36 study programs at the UCR have obtained the SINAES accreditation, other five have been awarded the CEAB credential, another one holds the ACAAI label and, lastly, other program has acquired the CEA certif-

icate. Moreover, the UCR initiated a new international institutional accreditation process with a European agency by the end of 2017.

All study programs at the University of Costa Rica comprehend an initial year of general studies which are mandatory for every student. It comprises two semester courses in History, Spanish Language, and Philosophy; as well as two cultural courses (e.g. in arts), two physical activities, and two national reality seminars (i.e. thematic seminars covering national problems and present topics). Given that most private universities do not offer this training to their students, competition between public and private universities in accreditation procedures might be uneven.

The University of Costa Rica at International Rankings

Concerning international rankings, the University of Costa Rica boasts the best position of all Central American countries in any ranking and, in most of them, it also attained the better positioning taking the Caribbean into account (see Table 2). Even though these rankings measure only one determinant of the academic quality, they provide nevertheless an indication of relative, comparative quality.

Ranking	Worldwide	Latin America	Central America and the Caribbean
Webometrics	833	30	2
QS World University Rankings	500-510	18	1
The World University Rankings (Times)	601-800	41-45	1
Scimago Institutions Ranking	638	40	2

Table 2: Position of the University of Costa Rica in some well-known rankings[12].

[12] Sources: QS University Ranking, n.d., The World University Rankings, n.d., Webometrics, n.d., Scimago Institutions Rankings, n.d. [In all cases, last ranking available in 2018 or 2019].

Certain schools are also included in specific rankings. That is the case of the School of Management, which is included in the Eduniversal ranking,[13] credited as a "good business school with strong regional influence." Nature Index[14] considers authors by UCR staff in the natural sciences as well.

However, it is worth noting that UCR does not appear in any well-known ranking such as the Academic Ranking of World Universities (known as Shanghai Ranking), the CWTS Leiden Ranking, or the U-Multirank. Entering these prestigious systems would therefore present a considerable challenge for the University of Costa Rica

Funding and Financial Management

Given that Article 85 of the Constitution of the Republic of Costa Rica establishes that public universities are state-funded, lately, 8% of the gross domestic product (GDP) has been dedicated to education. From that amount, 1.5% of the GDP is allocated to Higher Education. Yet, in recent years, the budgets of public universities almost achieved that value (1,423% in 2017).

This funding is known as the Special Fund for Higher Education—Fondo Especial para la Educación Superior (FEES)—and is expected to be renegotiated every five years. Public universities distribute it with percentages negotiated decades ago, allocating 57.79% to the UCR, 23.40 to the UNA, 11.30 to the ITCR, and 7.51 to the UNED. The funding of the UTN has been regulated by special laws up to now, but shortly it will also be part of FEES.

In the last five years, universities have not been able to negotiate a budget for a five-year term, but negotiations have taken place every year. Deputies at the Congress discuss every year about the advantages of financing public Higher Education, and there are considerable discussions within society, even if it does not take part in FEES negotiations. The potential costs that each student could entail is calculated by dividing the university budget by the number of students, although leaving out major activities of the university such as research, social action, and student services.

The University of Costa Rica is making a major effort to optimize the use of its resources. For instance, the collective agreement signed with the Personnel Union has reduced seniority from 5.5% per year to 3.75% per year, saving about US$20 million in the following two years.

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13 Cf. <www.eduniversal-ranking.com>.

14 Cf. <www.natureindex.com>.

At the UCR, tuition fees of about US$350 per semester must be paid for each full-time student. This fee, however, does not cover all education expenses but only some basic student services. The university has a wide system of non-refundable scholarships for students in line with their respective socioeconomic factors. This system can provide not only discounts on tuition fees, but also support for housing, feeding, and even transport. In order to determine who will be awarded these scholarships, the UCR performs a socioeconomic study based on interviews, home visits, and recorded information.

The university budget is proposed by the Rector, approved by the University Council, and managed by the Financial Office. From one year to the next, there is an inertial tendency favoring the basic operational budget to remain the same. However, internal negotiations are yearly made in order to determine potential budget variations and new funds. These negotiations for additional budgets are made upon the needs of each school and research center (e.g. new buildings or new staff).

In the case of the Faculty of Science, the budget for 2018 increased significantly because of the construction of a new building and new positions such as a new secretary, eight concierges, five laboratory technicians, and a computation technician were allocated.

In Costa Rica, research grants are usually assigned by the public university system itself, not by the government. The Science and Technology Ministry relies on limited occasional resources in a competitive system. Under our point of view, budget allocation should be made according to quality indicators since needs in the diverse units are dynamic and should be re-examined at least every five years. Additionally, more compliance rules should be made in order to that regulate relations with industry and to obtain new, fresh, and clean resources.

Research and publishing

According to the national Ministry of Science, Technology and Telecommunications,[15] in Costa Rica 64% of research investment is made by public universities. This is distributed in 44.5% for basic research, 40.7% for applied research, and 4.6% for experimental development.

Research is defined at the UCR as the generation of knowledge by means of projects. This is important for a country that aims to base its development on knowledge rather than on the imitation of productive processes. To this aim, the optimal qualification of human resources is essential. Such qualification

[15] Cf. <www.ucr.ac.cr/presupuesto-universitario.html>.

can be obtained by implementing a strong program of academic formation and exchange like some of the ones mentioned in the section "Internationalization." This may avoid inbreeding practices, since the international exposure of the faculties forces researchers to look for excellence and originality.

Research is supervised by the Vice-Rectory of Research, which manages funds from the university budget. In 2017, this fund was about US$84 million, representing 14% of the institution's budget. These funds are usually allocated not only to salaries but also to goods, equipment, and functioning. Eventually, also student assistance can be paid with those funds.

Research is organized in projects: academics must write a research proposal, including a description of the problem, objectives, methodology, resources (human and other), chronogram, and budget. Proposals are evaluated by a scientific committee of the research center or institute where the project will take place. However, some bureaucratic procedures have been added recently for the final approval of projects. Usually, projects have a duration of two to four years, but there are also more permanent programs and other activities that develop a research line for five to ten years.

At the UCR there are 33 research centers, 13 research institutes, 14 experimental farms, one planetarium, and 3 museums. These research units cover almost all academic fields:[16]

- *Basic Sciences:* Pure Mathematics, Applied Mathematics, Nanomaterials, Geophysics, Nuclear Physics, Natural products, Electro-chemistry, Cellular and Molecular Biology, Marine Biology, Astrophysics, Geology, Mathematical Philosophy, Pollution and Environment, and Microscopic structures.
- *Agricultural Sciences:* Agronomics, Agrarian Economy, Grains and Seeds, Animal Nutrition, Crop Protection, Food Technology.
- *Health Sciences:* Tropical Diseases, Haematology, Neurosciences, Snakes, Health Institute, Pharmacy Institute.
- *Humanities:* Latin American Identity and Culture, Arts Institute, Linguistics, and Philosophy.
- *Engineering:* Sustainable Development, Information Technologies and Communication, Engineering Institute,

[16] Cf. <www.vinv.ucr.ac.cr> for a complete list.

- *Social Sciences:* Anthropology, Human Movement, Communication, Cultural Diversity, Women Studies, Politics, Central American History, Population, Economics, Education Institute, Juridical Institute, Psychological Institute.

In 2017, 1,403 research projects and programs were active, and 1,524 researchers were involved in those projects. At the end of each research project, at least one publication is expected in a (preferably well-ranked) journal. Moreover, researchers previously present their results in internal seminars and international conferences.

Case of the Faculty of Science

According to the Dean's Office data, in the Faculty of Science we devote 20.4% of our staff budget to research, 57.4% to direct teaching, 4.3% to innovation teaching projects, 3.6% to social action projects, 13.3% to administrative tasks (such as committees), and 1.0% to the direction of thesis (see Figure 2). These percentages entail about 12,000 hours per week to be distributed within 389 employees, although budget distribution may be slightly different among other faculties.

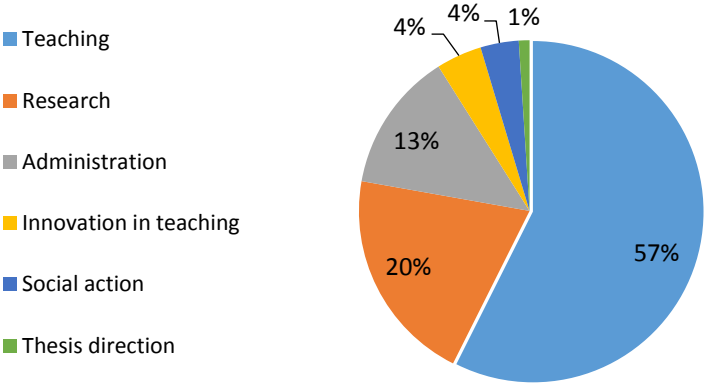

Fig. 2: Faculty of Science: Distribution of time between tasks in 2017

Case of the Faculty of Microbiology

According to the CEA, the distribution of academic and administrative tasks for the Faculty of Microbiology in 2018 is 47% teaching, 32% research, 9% social action, and 9% administrative work.

Institute of Advanced Studies

In 2016, the university created the University Space for Advanced Studies—Espacio Universitario de Estudios Avanzados (UCREA)—, which resembles the consortium of University-Based Institutes for Advanced Study (UBIAS). For instance, the universities of Sao Paulo and Campinas (Brazil), Bielefeld, Konstanz, Freiburg and Munich (Germany), Waseda Tokyo (Japan), Perth (Australia), and Jerusalem (Israel) already have these kinds of institutes. UCREA promotes transdisciplinary research and distributes funds for proposals approved after a satisfactory external and international peer review. In 2017, four projects were approved, each with a support of about $50,000:

- Edition of rice genome: an alternative for climate change mitigation and a contribution for food security.
- Social networks and democracy in Costa Rica: Meta-analysis from big data.
- Development and resilience to climate change in the dry corridor in Central America.
- CEmerge: emerging pollutants, monitoring and design of strategies for environment impact mitigation.

In 2018, another group of four projects was approved:

- Territorial and interethnic conflicts in Buenos Aires, Costa Rica. Multidisciplinary contributions for a solution.
- An integral and multidisciplinary strategy for approaching animal and human brucellosis, an unattended zoonosis in Costa Rica.
- Mathematical models for the development of prevention/control strategies of Aedes aegypti in Costa Rica.
- CHILD: Costa Rica Hydrology impacts of El Niño and Development.

In the next few months, UCREA will fund short meetings for incubating ideas for the generation of new transdisciplinary projects.

Publication System

The University of Costa Rica has a publication system called SIEDIN which includes an institutional press. In 2016, 203 books were published: 178 in paper format and 25 in digital format, 95 of them textbooks. In 2017, the total of books published was 172, 36 of them new books (Cascante, 2017).

About 40 journals are published every year, most of them both in hardcopy and digital. An evaluating index was developed in order to improve the quality

of the publications, and most of the journals satisfy the standards of this index. All of them are available in Latindex, and many in SciELO, Redalyc, DOAJ, Redib, and Dialnet as well. Some well-quoted journals are also in high-level indices such as Scopus, Clarivate, MathSciNet, and Zentralblatt Math. Websites of these resources are listed at the end of this article.

The University also has a repository, called Kerwà,[17] for the preservation of academic production, with about 20,000 entries. Most of the press production is in the Social Sciences and Literature. In the Basic Science area, to which the Faculty of Science belongs, the following new titles were published in 2017:

- *Ciencia, tecnología y desarrollo: la investigación científica en la Universidad de Costa Rica 1972-2012 [Science, technology and development: scientific research at the University of Costa Rica 1971-2012]*, by A. Fallas, A. Ulate, and S. Ramírez. 206 pages.
- *Guía de los macrohongos más comunes del Parque Nacional Corcovado, Estacón La Leona [Most common macrofungi guide from National Park Corcovado, La Leona Station]*, J. Carranza, W. Marín, A. Ruiz, and J.F. DiStéfano. 102 pages.
- *Cálculo en varias variables [Multivariate calculus]*, J.F. Ávila. 590 pages.

The journals in basic sciences published in 2017 were:

- *Revista de Matemática: Teoría y Aplicaciones [Journal in Mathematics: Theory and Applications]*: volume 24, 2 issues, 329 pages.
- *Revista de Biología Tropical [Tropical Biology Journal]*: volume 65, 4 issues, 1659 pages, and a supplement of 308 pages.
- *Revista Geológica de América Central [Central American Geological Journal]*: numbers 57, 159 pages; and 58, 128 pages.
- *Revista de Ciencia y Tecnología [Science and Technology Journal]*: volume 33, 1 issue, 33 pages.

[17] Cf. <www.kerwa.ucr.ac.cr>.

Internationalization

The University of Costa Rica has an Office of International Affairs and External Cooperation—Oficina de Asuntos Internacionales y Cooperación Externa (OAICE)—in charge of internationalization. The purpose of this office is to establish links with foreign academic institutions to promote mobility and graduate formation of students and teachers.

According to OAICE[18], the UCR penned international agreements since its inception. The first agreements were signed with Louisiana University. Then, in 1958, a new one was signed with Kansas University (KU), which is actually the oldest and most fruitful active agreement the UCR has with universities in the Western hemisphere.

The UCR has benefited from this agreement with KU in many ways. Between 1962 and 1998, 42 academic staff obtained their postgraduate degrees (doctorate or master) from KU. Contrastingly, between 2006 and 2012, 15 staff members graduated at KU and 27 have made a short academic visit to KU.
On the other hand, the UCR has received 146 KU students and 24 visiting professors in the period 2010-2017. As part of this agreement, academic guests pay the host university the same amount as locals. For instance, fees for a doctoral degree in KU for the UCR staff are the same as for residents in the state of Kansas.

Currently, the UCR holds 321 academic agreements with 42 countries that favor student mobility, academic exchange, professional updating, and joint research initiatives (see Table 3).

[18] Cf. <www.oaice.ucr.ac.cr>.

Continent	Countries
America	Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Cuba, Ecuador, El Salvador, Peru, Puerto Rico, United States, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Dominican Republic, Uruguay, and Venezuela.
Europe	Germany, Belgium, Denmark, United Kingdom, Czech Republic, Sweden, Switzerland, Spain, France, Italy, Norway, and Finland.
Asia	South Korea, Japan, China, Israel, Singapore, Emirate of Sharjah.
Oceania	Australia

Table 3: Countries with whom the University of Costa Rica has agreements[19]

Collaborations with foreign institutions may take place in many different forms. The program of academic visitors was established to encourage schools and faculties to invite their researchers to undertake short stays in order to exchange experiences, give talks, and participate in local seminars and conferences, among others. Students of the UCR can also visit universities abroad for half or full year periods in mobility programs. During these programs, they can have their credits recognized in their local study programs. The program for faculty members without degrees encourages our staff to earn a master's or doctoral degree abroad and ties them contractually to the UCR, where they have to return to and work afterwards, for at least ten years. Table 4 shows some data of the major internationalization programs handled by the Office for International Affairs.

[19] Source: <oaice.ucr.ac.cr/es/convenios-vigentes.html>.

Program	Quantity
Cooperation agreements	284
Visiting professors	209
UCR students abroad	118
Visiting students at UCR	316
Semester exchange students	165
Research interns	61
Students on special programs	90
Faculty staff completing a graduate program abroad	259
Men	157
Women	102
New scholars abroad this year…	64
…for a doctorate degree	48
…for a master's degree	16
Scholar returned this year	37
Short-stays scholarships abroad	52

Table 4: Internationalization at the University of Costa Rica, 2016[20].

There is a well-established program called International Foreign Scholarship Program for Personnel (Programa Institucional de Becas al Exterior para Funcionarios Universitarios) that provides grants for doctorate studies abroad, together with a contract for future service provision at the University. Most of our researchers have earned their doctorates at very prestigious institutions in Europe, North America, and South America. In order to benefit from this program, the candidate must have taught at the institution for at least one semester, have the support of one academic unit that is interested in his/her future services, and sign a contract with the university when he or she comes back to the country. Furthermore, it is desirable to have some basic funding from the host university or any other source, such as a government grant.

Table 5 shows the distribution of the 64 new scholars that went abroad in 2016 pursuing degrees, sorted by area. The most important emphasis has been made on strengthening regional campuses.

[20] Source: De Lemos and Otero, 2016.

Area	Quantity
Regional campuses	16
Basic Sciences	12
Engineering	11
Social Sciences	9
Health Sciences	6
Arts & Humanities	6
Agricultural Sciences	4

Table 5: Distribution of scholars that went abroad in 2016 for graduate studies[21].

The UCR takes part in several academic consortiums, being the one with UDUAL the most important. UDUAL stands for the Latin American and Caribbean Universities Union (Unión de Universidades de América Latina y el Caribe), the most important organization in Latin America and the Caribbean, which groups the major universities of the region. Not long ago, the UCR's Rector was indeed the president of UDUAL.

All public universities in Costa Rica, the UCR, the UNA, the ITCR, the UNED, and the UTN, are part of the CSUCA, Central American Higher Education Council (Consejo Superior Universitario de Centroamérica). CSUCA promotes cooperation between universities in Central America, as well as the recognition of diplomas and the creation of joint programs in teaching and research. The UCR has been part of many European programs such as ALBAN, ALFA, and Erasmus.

Recently, the UCR has established a time-limited postdoctoral program for visiting researchers who collaborate with host research teams. Being the UCR part of the UCREA, a fellow program should be established in the near future to promote visiting fellows in multidisciplinary research projects in internal research teams. The characteristics of these fellows have not been defined yet: Should they be senior or junior researchers? Should they stay for long periods or mid-term periods? Should they be selected after an open call and invited to submit a project with specified objectives? Should they be associated a priori with local teams or not? All these questions were discussed during 2018 in order to issue a call by the end of that year.

[21] Source: De Lemos and Otero, 2016.

Among the main challenges to achieve a proper internationalization is the establishment of dual-degree programs throughout different academic areas. In this respect, the UCR has already gained some experience, for example, in Law studies with a French University, but many other partners are interested in developing this kind of programs in other knowledge fields such as Mathematics and Agronomics. Nevertheless, this could be quite difficult in other areas like Health Sciences, as there may be strong differences in health systems among different countries.

Case of the Faculty of Science

Each Faculty has several international relations which are conducted by researchers, authorities, and teaching staff. For instance, in 2017 the following conferences were organized:

- International Symposium on Mathematical Education, in February 2017.
- International Symposium on Climate Change, in August 2017.
- Symposium on Geophysics, in December 2017.
- International Symposium on Advanced Materials Science and Nanotechnology, in December 2017.

Many researchers receive support to attend international conferences, courses, and academic missions. In this manner, 40 colleagues from the School of Biology, 53 from the School of Physics, 15 from the School of Geology, 47 from the School of Mathematics, and 36 from the School of Chemistry, participated in such activities in 2017, making a total of 198 participants in the year.

These trips were almost all around the world: 60 colleagues went to North American countries, 49 to Europe, 48 to South America, 25 to Central America, 5 to the Caribbean, 3 to Asia, and one to Africa.

Conclusion

The University of Costa Rica is going to face several challenges in the future. As it has been previously exposed, maintaining and improving academic excellence is probably the most important of all, since it requires permanent training of faculties, updating curricula and programs, and supporting research. Yet, all these actions require not only correct academic decisions, but also an effective management of the university budget.

The generation of interdisciplinary knowledge needs to be enhanced in all fields, building horizontal communication between different study programs. This way, study programs would share not only courses but also the same aca-

demic physical space, allocating students and teachers of different fields in the same classroom.

Strengthening the transfer and exchange of knowledge generated between university and society is a priority as well. It is essential to develop entrepreneurship skills and to support graduates in becoming entrepreneurs by applying in the different courses systems which are being already implemented by foreign universities.

Moreover, the knowledge production of the university should be showcased. Research projects should thus end not only with an article or publication for an academic audience, but with products which could be disseminated to broad audiences as well (such as brochures, radio programs, seminars, and so on).

It is also important to reinforce the university's incorporation to international academic networks and to promote the mobility of teachers, students, and administrative staff. As parameters of international quality, comparing our performances with high-profile universities is encouraged, as well as to improve our programs in research and teaching. International relations are very important for keeping the positive influence and leadership of the University of Costa Rica in the Central American and the Caribbean region.

Yet, the university faces questioning from external actors, from the media, politicians, and from part of the general public. The existence of some hidden interests, such as those that support private education, cannot be excluded. Nevertheless, this pressure needs to be turned into an opportunity for improving the use of resources by simplifying formalities, reducing time in administrative procedures, and limiting some expenses. If decisive and clear actions are taken in these directions, the visualization of the crucial roles of the university in the society (teaching, research, and social action) will be highlighted.

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MARIAN HERNÁNDEZ COLINA AND ARBELIO PENTÓN MADRIGAL

Introduction to the Cuban Higher Education System

Abstract

This article briefly presents Cuba's Higher Education system, highlighting the most important components that define it and emphasizing the University of Havana and its role within the system. Aspects such as industry-university relations, human resources management, quality management and accreditation, funding and financial management, research publishing, and internationalization are presented in a very particular context for our country, considering the Latin American and international realities. Furthermore, the present text describes the most important processes that determine the activities carried out by Cuban universities, the current policies, and the challenges that define the upcoming trends and development for the next years.

Keywords: Cuban Higher Education System, Economy, Management, Science, Society, University.

Introduction

In Cuba, all education is provided by the State and organized by the Higher Education Ministry, founded in 1976. In the case of medical education, it is completely structured by the Public Health Ministry. Art universities are included in the Ministry of Culture. Pedagogical universities were under the direction of the Ministry of Education until 2015. In this year, a process of integration unified Higher Education institutions (HEIs), including pedagogical ones, in one single university in each province, except for medical sciences. In Havana, though, there is a different situation, with five universities: Technical University of Havana, Informatics Sciences University, Sport Sciences University, University of Pedagogical Sciences, and University of Havana (UH).

The student population in Cuban HEIs amounts to approximately 246,000 students distributed over 22 universities. The process of admission to Cuban universities consists of a rigorous system of exams in general subjects, averaged with the student's performance in previous education, and is completely free of charge, as it is state financed. For students that come from a different province, a student's residence is also provided for free. In the UH, there is also distant education and special grade courses for workers in several specialties. The degrees offered in several universities of the country are based on the same programs and then directed by a designated university which is responsible for the curricula adjustments of the particular grade through a national commission. The UH is in charge of most of the degrees that are offered. Since 2016 most of the degree programs have been adjusted to a four-year study period, according to a Ministry policy.

Each Higher Education Institution is evaluated by the National Accreditation Board, either institutionally or through its programs. The Board defines a pattern of quality in all HEIs of the country, thus making programs attractive to Cuban and foreign students.

The university staff receives training over the years. Usually, just after graduation, students are selected to stay as part of the staff. From the very first moment, teaching and research are combined as an indispensable part for the completion of the educational process. Another way to become new university staff members is to recruit professionals from the industry or service sectors, and then train them from their experience. Although a PhD degree is still not a pre-requisite to work at the institution, it is expected to become so in the future, so that all faculty members or researchers are required to complete a PhD and contribute to their students' education during the process. Moreover, Cuban universities recognize four different teaching categories, whereby the category

of "Profesor Titular"—Professor— is considered to be the most important one. These teaching categories are obtained through specific practical exams ruled by the Ministry of Higher Education.

Traditionally, no national rankings have been conducted to rate Cuban universities. Nevertheless, the UH has a noticeable high prestige in Cuba and foreign countries and is the most cited academic institution in Cuba. The UH is responsible for about 30% of the National Academy of Sciences annual awards and for about 40% of the papers published in specialized journals. Other universities, such as the Central University Las Villas "Martha Abreu," have outstanding scientific results in the country and are internationally recognized.

Nowadays, the most important challenge for Cuban universities is to obtain financial resources to improve their infrastructure, as the mechanisms to transfer benefits from scientific results to the university are still unsatisfactory.

Industry-University Relations

The relationship between university and industry in Cuba is one of the strategic priorities for the development of the country in order to meet the needs of the Cuban society. However, this relationship has not reached the level required by the country to meet the demands yet. On the one hand, this is due to an insufficient culture of cooperation between universities and the productive sector. On the other hand, this happens because each side pursues different goals, making it difficult to introduce the scientific results revealed by universities and their research centers into the production process.

Currently, institutions and mechanisms are created to guarantee the resolution of this problem and, at the same time, to manage the resources necessary to sustain the development of science.

Implemented Models

The creation of the so-called "scientific pole" in the biotechnology sector in 1991 is a successful experience of integration of research-production commercialization. In the scientific pole, the research conducted by universities and research centers, together with associated companies (i.e. BioCubaFarma), place high value products in the national and international market. At the same time, the associated companies reinvest parts of their budgets in supporting the universities.

In the case of the University of Havana (UH), agreements and contracts have been signed in order to legally protect research projects conducted with

the Center of Molecular Immunology, the Center for Genetic Engineering and Biotechnology, and the National Neurosciences Center.

Another experience that should be mentioned with regard to the university-industry relationship models is the one between the University of Computer Science—Universidad de las Ciencias Informáticas (UCI)—and several national and international productive sectors—companies that market UCI products.

At the University of Havana, another model is developed to strengthen the university-industry relationship: the creation of an incubator—InCuba UHHU project with DAAD funding (InCuba, n.d.). In this project, entrepreneurship, and innovation workshops (both virtual and face-to-face) for professors, researchers and students of UH are conducted successfully by international specialists. InCuba has achieved international visibility through cooperation agreements, i.e. with the Axel-Springer Plug and Play incubator in Berlin (UH, 2017).

Furthermore, the role of companies offering internships as part of the training strategies included in undergraduate and graduate study programs should be highlighted as well. The implemented models must be flexible and able to adapt to the changes that occur in strategic and very dynamic sectors.

Intellectual Property Regulations

In the university-industry relationship, aspects such as intellectual property (IP) and technology transfer play an important role. For example, in the case of the University of Havana, the IP is regulated through a rectoral resolution that considers the organization and procedures for the management of intellectual property in our institution. This resolution is governed, in turn, by a more general one of the Ministry of Science Technology and Environment—Ministerio de Ciencia, Tecnología y Medio Ambiente (CITMA).

The intellectual property activity in the UH is managed by the Office for the Transfer of Research Outcomes—Oficina de Transferencia de los Resultados de Investigación (OTRI). Confidentiality agreements are signed between the involved parties: professors, researchers, undergraduate and graduate students, and actors of the productive sector. These contracts establish which part has the ownership of the IP for both foreign and national parties, and regulate whether research outcomes can be published.

When the contractual relationship between researchers and the university comes to an end, researchers are not able to make use of the patent or any IP rights registered by the institution anymore. No researcher may hold an IP right abroad derived from joint investigations conducted between UH and foreign

institutions. Ultimately, authors and inventors have the right to participate in the benefits obtained from the exploitation of a patent.

Challenges Faced

The following challenges are to be faced:

- To include optional or elective subjects in the study plans on innovation, management and protection of intellectual property in study courses that merit it.
- To boost research results and innovation, and to secure processes intended to increase the impact on economy and society.
- To foster public awareness on the need to ensure the intellectual protection of research results.
- To strengthen the business culture among professors, students and professionals, and to enhance the impact of knowledge in Cuban economy and society.

Human Resources Management

Structure/Organization of the University of Havana

Higher Education in Cuba is state financed and thus many of the universities share a similar model in their structure. The UH does not differ from this model. Vice-rectors are assigned to particular processes which are sub classified in the following fields: academic, educational, postgraduate and research, human resources, information, economics, and administration. There are 16 faculties and three independent institutes at the UH. A total of 22 boards control processes that are transversal to faculties, institutes, and to the twelve research centers (see Figure 1). Deans and the directors of institutes or centers are the ones in charge of all processes taking place in their respective areas.

Financial and material resources are centralized and distributed among faculties and centers. Institutes, on the other hand, manage their own financial and administrative issues independently.

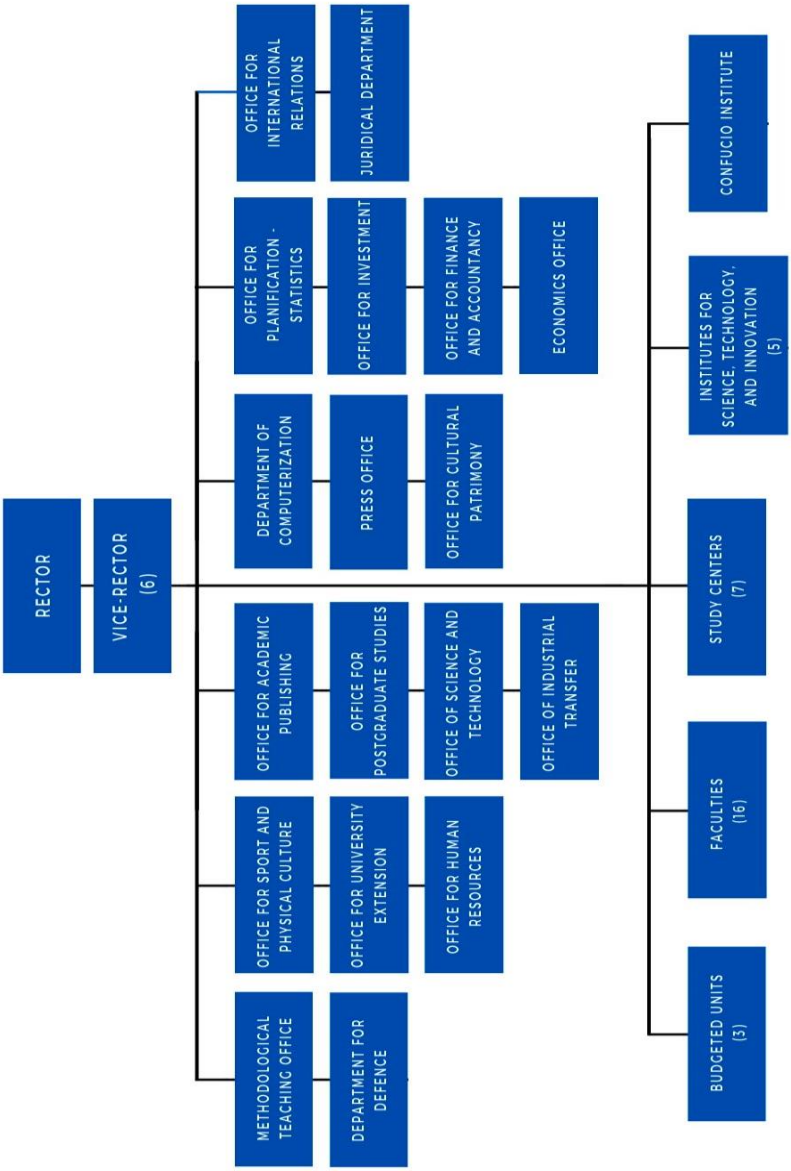

Fig. 1: Organizational chart of the University of Havana[22]

[22] Source: UH, n.d.

Decision Making in Human Resources

The management of human resources in Cuban higher institutions, as in all institutions, is based on the Work Code, a law issued in 2013. According to this document, the recruitment of administrative and academic staff shall be proposed by the representatives of each interested area and approved by an expert committee which submits the proposals to the Rector or Institute Director on a monthly basis. When the final decision is issued, new staff members are hired for a six-month probationary period. After that period, the responsible of the particular area submits a proposal to give the person concerned a permanent contract. The evaluation procedure for the hiring of staff is outlined in the abovementioned Work Code, which contemplates the deployment of disciplinary measures if necessary.

Deans in Human Resources Management

A dean is responsible for the academic and administrative management of the faculty. The staff should be competent enough to deal with all processes and achieve institutional goals. With regard to the hiring process, even though the final decision is to be taken by the Rector, the human resources' selection process is profoundly based on the dean's assessment, as he or she is responsible for the faculty. The organization of particular tasks and subjects lies in the full competence of the dean, who shall set up a team that fulfills all the requirements to the best possible accomplishment of faculty mission and programs.

Organizational Culture at the University of Havana

The organizational culture at the UH is characterized by a long tradition of over 290 years of existence. As the oldest university in Cuba, the UH is the leader in terms of processes regarding organizational culture. Institutional identity and compromise with patriotic values are defended, and quality is recognized as a characteristic associated to the UH brand. New UH members feel as part of the community, which is even extended to students, who are proud of being part of the institution.

Quality Management and Accreditation

Higher Education Quality Assurance in Cuba

The Cuban national education system is conceived as a group of organically articulated subsystems in all types and levels of education. Higher Education is one of these subsystems.

The scheme for quality assurance of Higher Education was designed after the creation of the Ministry of Higher Education, with the first institutional evaluation of a university in Latin America. This new evaluation process started as a way to collect and provide information to the society about Higher Education institutions and to ensure the accomplishment of regulations and procedures. Over time, however, institutional evaluation became a mechanism to promote the continuous improvement of education based on a rational use of human and material resources. It should be noted, however, that although medical, military, and arts universities are not regulated by the Ministry of Higher Education, they are included in the quality assurance scheme for the educational system as well.

After a series of regulations and system designs for quality assurance in Higher Education, the National Accreditation Board was founded in 2000. The objective of this state agency is to foster the quality improvement of Higher Education through the development and application of an evaluation and accreditation system. The purposes and goals of the National Accreditation Board are identified by the Cuban government education policy and aim at meeting the demands of the national labor market. This agency represents Cuban Higher Education with regard to quality, evaluation, and accreditation in front of regional or international institutions responsible for this matter. In the regional context, it represents Cuba in the Ibero-American Network for Quality Assurance in Higher Education—RIACES, acronym for the Spanish name—(Cabal and Rodríguez, 2015; Congreso Universidad, n.d.).

Accreditation of Institutions and Processes of Higher Education

Accreditation is understood as a tool to ensure the continuous improvement of quality, taking as reference international standards as well. Evaluation processes are aimed at HEIs and programs such as master's degrees, bachelor's degrees, PhD degrees, and postgraduate specialties. The National Accreditation Board is composed of experts from Higher Education institutions from all over the country, and from state administration institutions related to Higher Education.

The main aspect of the quality pattern proposed by the National Accreditation Board is that it takes self-evaluation as a starting point, considering the institutional context, human resources management, professional education, social interaction, infrastructure, and social impact. Currently, the Board is re-evaluating its indicators, and defining an updated policy for all categories.

The criteria established by the National Accreditation Board define the quality assurance indicators of the HEIs and include approaches to accomplish those indicators as part of the institutional annual goals and strategic planning.

Quality Assurance at the University of Havana

The Ministry of Higher Education of Cuba defines annual goals in four fundamental areas: undergraduate education, postgraduate education, human resources management, and science, technology, and innovation. Based on the strategic goals of the Ministry, the UH focuses its work on annual goals and on strategic goals for five-year periods. The strategic plan for the 2017-2021 period includes quality management as one of the main goals of the UH. It focuses on consolidating a quality management system based on the integration of processes. The plan follows a transversal approach through different methods and thus it is not implemented in the form of an office, but as a unit that integrates all main goals and processes. This group also ensures permanent training in quality management for all areas of the UH, and monitors UH's position in international rankings.

Results of Accreditation at the University of Havana

The UH has been awarded with the category of excellence (maximum classification) by the National Accreditation Board of Cuba since 2015 and until 2023, time in which it shall be re-evaluated. As part of the strategic goals, the institution aims to keep or improve the indicators. More than 80% of the postgraduate programs have been evaluated as excellent, and every year more than ten programs at the UH are object of evaluation. Currently, the excellence category lasts in effect for eight years, but certificated programs are reevaluated after six years, which implies a constant self-evaluation of all processes.

International Accreditations

The internationalization process develops gradually and implies a strong interest in achieving international recognition. However, the main challenge is to obtain an accreditation from international organisms to verify the relevance and pertinence of the programs offered. In Latin America, a regional accreditation board has been established within the RIACES network (Cabal and Rodríguez,

2015; Congreso Universidad, n.d.). The Ibero-American University Association for Postgraduate Studies—Asociación Universitaria Iberoamericana de Postgrado (AUIP)—is one of the referential organizations for accreditation in the region.

International referees from the AUIP have evaluated several programs of the University of Havana and encouraging results have been obtained. As many of the aspects of the evaluation are in line with the indicators proposed by the National Accreditation Board, most of the programs are in optimal condition to be presented to the AUIP.

Funding and Financial Management

Higher Education institutions in Cuba are financed by the State. Most of the budget is dedicated to guarantee the academic training of the students and a smaller part of the resources is dedicated to R&D activities.

The budget for R&D activities has not increased in recent years (Cabal Mirabal and Rodríguez Castellanos, 2015). Yet, a deficit in funding for science does not only have a negative influence on the production of scientific knowledge and the creation of scientific services and products of high added value (which is necessary for society), but also on the training of students, particularly in the natural and exact sciences sector. Figure 2 shows how the budget dedicated to Higher Education has developed in recent years. At present this budget corresponds to more than 20% of GDP, while that of science does not exceed 0.5% on average.

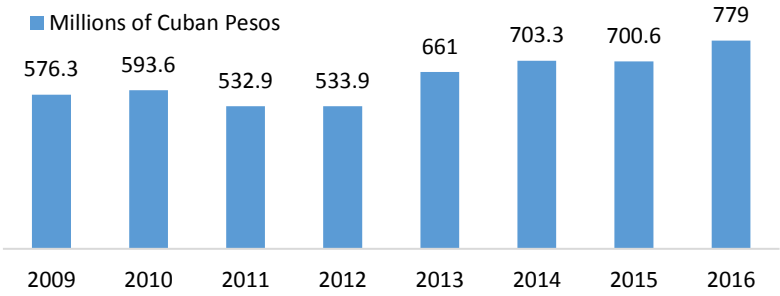

Fig.2: Annual budget of the Ministry of Higher Education in millions of Cuban Pesos[23]

[23] Source: UH, n.d.

Forms of Financing

Cuban universities must promote existing means of funding and find new ways to increase financing, diversification and a more homogeneous distribution among the different areas of scientific knowledge. The recent transformations of the Cuban economy will allow companies to invest in the general research that is carried out in universities, although it is known that companies prioritize innovation and applied research. Also, a reordering of the resources currently assigned by the Cuban State to scientific activity must occur, and priority must be given to investment in scientific infrastructure. Finally, universities must continue to manage part of the funds allocated to science through international projects coordinated by the Cuban side. To a lesser extent, the financing of science occurs through donations from natural or legal persons; who may be national or foreign; public, private, or mixed.

At the moment, HEIs in Cuba do not have any research/transfer activities with the private sector, as the private sector does not exist yet on a large scale in the country. The private sector appeared recently in Cuba, but only in the fields of basic services and very small companies in the production sector. However, the expected number of private companies and "cooperatives" (and other types of properties) shall rise quickly over the next few years. Sectors as agriculture are strategic. Cooperatives, a kind of collective property, are very active in agriculture.

Parts of the research projects are supported by funding from the government while others are supported by funding provided by international agencies (cf. section "Research and Publishing"). Nevertheless, it is not excluded that the non-State (private) sector may soon contribute to the budget of science in specific areas of knowledge.

Funding at the University of Havana

Funding for teaching and academic activities at the University of Havana (UH) comes entirely from the State budget assigned by the Ministry of Higher Education—Ministerio de Educación Superior (MES). However, even more financing is required to encourage the use of new technologies in the teaching processes and to improve access to the Internet.

The financing of science at the UH takes place mainly through resources assigned to projects associated with "National Programs," research networks, and resources that come from projects financed by international agencies—the latter mainly for mobility expenses (cf. section "Research and Publishing"). The creation of a national laboratory "LUCES" at the University of Havana to support the research at a national level is a successful experience on how the

State can support science in universities. However, funding for the development and sustainability of science in HEIs in Cuba is still insufficient.

The Office of Science and Technology of the University of Havana, together with the Vice-Rectory for Research, are in charge of managing and allocating the funds to the projects associated with the "National Programs," particularly those coordinated by the UH. They are also responsible for allocating other funds to support postgraduate training and other science-related activities.

Challenges Faced

The following challenges are to be faced:

- To identify strategic sectors for resource investment and to find the most appropriate ways to allocate such resources.
- To diversify funding sources, with emphasis on international funds.
- To increase the financing allocated to science in universities and associated research centers to a percentage of GDP not less than 1.0%, and with a growing participation of companies in financing.

Research and Publishing

Situation and Importance of the Research at the University of Havana

The University of Havana (UH) develops research lines of great importance for the country. These lines are framed in a structure of national and international projects with a high social impact.

Research conducted at the UH covers areas of natural and exact sciences, social sciences and humanities, economics, and accounting. All research activities include thematic lines of national priority such as: renewable energy, biomaterials, biotechnology, biomedicine, food security and nutrition, environment, local development, economic and social policies, basic sciences, society and family, growth and sustainable development, public administration, and defense.

Organization by Projects and Thematic Networks

The organization of research at the UH materialize through projects and thematic networks. This project structure includes, for example, the "National Programs" (Figure 3) in different areas of knowledge: the UH coordinates four National Programs (basic sciences, economics, social sciences, and computerization), projects known as "Projects Not Associated to National Programs"

(business projects), and, ultimately, institutional (international) projects. Special emphasis is placed on the development of the university-industry relationship through business projects. The leading projects are currently being developed with Cuban Biotechnological and Pharmaceutical Companies, as well as with the Ministry of Energy and Mines. The multidisciplinary nature of the scientific research is expressed through scientific university networks, including several national and international institutions.

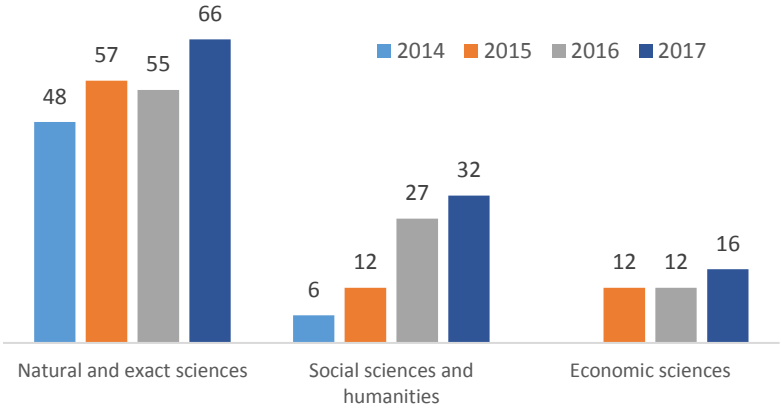

Fig. 3: Projects in National Programs by area of knowledge 2014-2017[24].

Indicators to Measure the Impact of Research Results

Several scientific events and workshops take place every year in the country. There, the current status of joint R&D projects can be assessed and new actions of mutual interest can be explored, particularly within the business sector. Recent activities include:

- University-industry research laboratories are created to support scientific activity.
- The development of new highly specialized products and services, as well as patents, is an indicator of scientific activity quality.
- A university incubator model is implemented to promote innovation projects.
- A large number of master's and doctorate's presentations, as well as national and international awards, reflect the quality of the research as well.

[24] Source: UH, 2017.

The publications of books and scientific journals indexed in databases does not only measure the relevance of science at the UH (Figure 4), but also raises its international visibility. Special attention is paid to the positioning of Cuban research journals in international databases: Scielo, Scopus, WoS. The University of Havana has a total of 18 journals, 8 of which are digital and 17 are in printed version (UH, 2017).

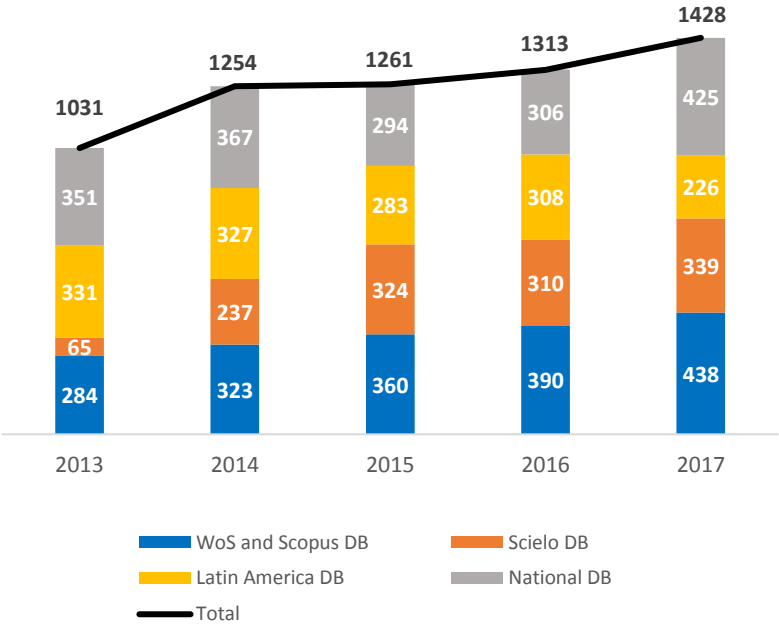

Fig. 4: Number of publications at the University of Havana, period 2014-2017[25].

A Research Culture

The implementation and development of a strategy for the promotion of the scientific activity at the UH reflects a research culture of many years. This research culture is aimed at enhancing the impact of knowledge in Cuban economy and society. The joint interaction of professors, researchers, students, and professionals in the framework of research projects allows converting ideas and scientific results into marketable projects positioned on the national and international market.

[25] Source: UH, 2017.

Challenges Faced

The following challenges are to be faced:

- Accelerated progress in the organization of the innovation activity to increase its impact on the economy and society.
- Enhancement of multidisciplinary research through scientific networks and national programs.
- Increase of the university-industry relationship.

Internationalization

Situation and Current State at Cuban Higher Education Institutions

The strategy of internationalization in Cuban universities is an important element in the process of integration of the Higher Education system that is taking place in many parts of the world. The current trends in the Higher Education systems in the world, and particularly in Cuba, are characterized by the mobility of students, professors, researchers, and authorities, as well as by research models based on cooperation, networking, and open systems for knowledge management. Given that the fundamental problems that both modern societies and science community are facing can no longer be assigned to individual disciplines, transdisciplinary approaches are now required. Under these circumstances, Cuban universities see a chance to promote innovative research topics and contribute to new degree programs.

Strategies

The University of Havana bases its own internationalization strategy on those of its faculties and research centers, which have been developed taking into account the countries of greatest interest, the experiences in cooperation affairs accumulated by Cuban institutions, and the future needs of the country.

It is through academic exchange that institutions of Higher Education can join and share scientific and cultural potentials in order to analyze and propose solutions to crucial problems. The solutions for current problems, at national and international levels, depend on the realization of common efforts between Higher Education institutions and states. Academic institutions serve as strategic partners for the governments, as they work actively to overcome the strong asymmetries that prevail among the different regions of the world. Indeed, the internationalization of Higher Education is a global phenomenon taking place in all regions at the same time.

Types of Actions

The promotion of advanced study and exchange programs for undergraduate and postgraduate students aims at stimulating synergy effects in the scientific and educational development of knowledge in different fields. Modern ways of teaching shall be developed in different study phases in order to promote new educational tools across the disciplines.

The implementation of academic exchange programs between Cuban and foreign institutions would create a common space for the recognition of cultural diversity. Moreover, it would help to confront a scenario with an everchanging reality where the training and development of human resources and innovation are essential elements.

Cooperation would allow the involved institutions to interact more easily between them and the academic communities. Furthermore, it would foster a more efficient deployment of the available capabilities in order to enhance individual strengths and would facilitate new forms of integration and coordination.

Results of the Internationalization Strategy at the University of Havana

Each year, undergraduate and postgraduate students from over 80 countries, attend the University of Havana. The study of the Spanish language is among the most requested options by foreign students who visit the UH. The University of Havana currently holds more than 400 agreements for collaboration and academic exchange programs with important universities around the world. Postgraduate training is supported, in a high percentage, by scholarship programs or mobility projects offered annually by different Western European countries (i.e. Spain, Germany, United Kingdom, and France), or by programs of the European Union such as ERASMUS+, and H2020, among others.

Particularly, the German Academic Exchange Office (DAAD), based at UH's Foreign Language Faculty, takes an active part in the institution's internationalization process. Through its *Lektorin*, the DAAD office at the UH has played an important role in promoting academic and cultural relations between the two countries, serving at the same time as a facilitator of collaborations with other countries of the European Union.

The activity with international organizations has increased lately. The UH cooperates with 27 international organizations, among which UNESCO stands out. The biannual scientific event "University" that takes place in Havana, is perhaps the clearest example of the promotion of the internationalization and integration of Higher Education in our country (Congreso Universidad, n.d.).

Importance of Promoting Internationalization at Cuban Higher Education Institutions

The gradual character of the internationalization process, and of international cooperation in Higher Education in particular, is a reality and should be treated as a priority. In the near future, the development of academic exchanges will become increasingly important to address the growing demands of knowledge.

Internationalization allows to develop and promote a culture of cooperation and integration among its members in order to create an atmosphere of support which facilitates the sharing of knowledge and good ideas, fosters the transition from a custom institutional structure of knowledge to a more collective structure. Working together also allows the involved institutions to have a long-term vision of the exchanges (new projects, programs, etc.), considering geographical and cultural diversity.

Challenges Faced

The following challenges are to be faced:

- Improvement of the internationalization strategies.
- Enhancement of the international projects and services management.
- Increase of the mobility of undergraduate students.

Conclusion

As this article has shown, the system of Higher Education in Cuba is characterized by six dimensions: industry-university relations, quality management and accreditation, human resources management, funding and financial management, internationalization, and research and publishing. Special emphasis is placed on the situation of the University of Havana, the oldest university in Cuba.

Cuban universities play a part in the world scenario through the processes of internationalization in Higher Education. Cuban universities also take on the new global challenges to find solutions to local and international problems. Inspired in the humanistic teaching of Cuban national hero José Martí, Cuban students achieve a professional and integral training at the service of society. The periodical renewal and implementation of the curricula ensures the continuous updating of contents, especially in sectors or branches of knowledge with accelerated development; and takes into account the growing demands of a modern society. The development of joint postgraduate programs with foreign

universities constitutes a strategic line of work. The excellence of undergraduate and postgraduate study programs is guaranteed through periodic accreditation processes led by the National Accreditation Board.

The management of human resources guarantees a rigorous selection process for academics and managers in the Higher Education sector, where the dean of the institution plays a decisive role.

As has been shown, one of the most fundamental challenges is the promotion of the university-industry relationship as a way of obtaining the necessary funds for the development of science and, consequently, of the economy and society. Closely related to the above is the diversification of funding sources, which also represents an important element that contributes to the promotion of scientific research. Scientific research in Cuban universities is excellent despite the economic blockade imposed for more than 50 years. The results obtained in strategic sectors such as biotechnology, renewable energy, and information technology are clear signs of the willingness of the Cuban state for the promotion of scientific results.

In summary, the mission of the Higher Education system in Cuba aims at contributing to economic, social, cultural, and political development. This could be achieved through processes of continuous training of integral professionals, science, technology, innovation, and university extension. Cuban universities strive for academic excellence, social relevance, and effective and efficient management of university processes, supported by a strong national and international image. They are distinguished by the relevant place they occupy in national science and culture, and by their highly qualified and prestigious faculties, which, together with students and other workers, express their firm commitment to society, contributing to sustainability and prosperity.

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MÓNICA ALATORRE, VICENTE ALBORNOZ, AND CYNTHIA BORJA

Overview of Ecuador's Higher Education System

Abstract

This chapter gives an overview of the Higher Education system in Ecuador, with an emphasis on the Universidad de las Americas in Quito (UDLA). We provide general data on the Higher Education system in Ecuador and on research made in higher institutions and analyze the relationship between industry and universities. This is followed by a discussion on the management of human resources in Ecuadorian universities, using the UDLA as an example.

The UDLA is the only internationally accredited university in Ecuador, accredited by WASC since 2016. This allows us to compare the characteristics of national and international quality management, and accreditation procedures. Finally, we provide an overview of the financing sources in Ecuadorian universities and present the research and publishing landscape in the country.

Keywords: Ecuador, Higher Education Institutions, Higher Education System, Human Resources, Quality Assessment, Research, UDLA, Universities.

Introduction

The types of Higher Education institutions (HEIs) that exist in Ecuador are:

- Private and self-financed (private), with the UDLA being one of them.
- Private and co-financed (mixed) that receive State allowances and raise student's fees as well.
- Public institutions.

In Ecuador, the Higher Education system is divided into universities, polytechnic schools, and technical, technological, and conservatory institutes. According to the data provided by the Secretary of Education, Science, Technology and Innovation—Secretaría de Educación Superior, Ciencia, Tecnología e Innovación (SENESCYT)—, there are 59 universities and polytechnic schools and 236 institutes, amounting to a total of 295 institutions of Higher Education nationwide. Of this total, 43.4% are private, 5.4% are mixed (co-financed), and 51.2% are public. In other words, there are 128 private, 16 mixed, and 151 public institutions.

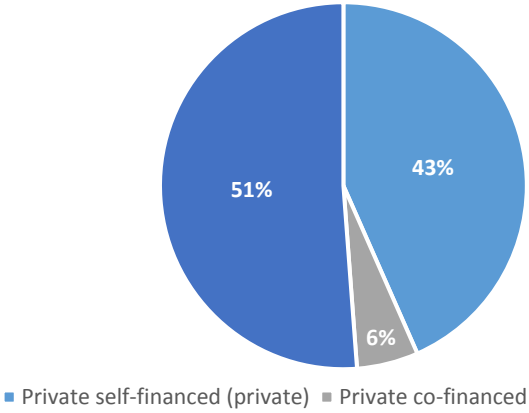

Fig. 1: Percentage of universities, polytechnic schools and technical, technological, and conservatory institutes of Ecuador[26]

[26] Source: SENESCYT, 2018.

Data on Student Population

The data on the student population of Ecuador from 2012 to 2015 is presented by SENESCYT through its Geo Portal. For 2012, the number of enrolled students in the universities and polytechnic schools was 555,413, of which 246,596 were men and 308,817 women. For 2013 and 2014, the number of enrollees increased to 558,725 and 562,473 respectively. Finally, for the year 2015 there were 276,714 men and 311,085 women enrolled, reaching a total of 587,799. According to this information, the number of enrolments has increased year after year and, in all cases, the number of female enrolments exceeds the number of male enrolments.

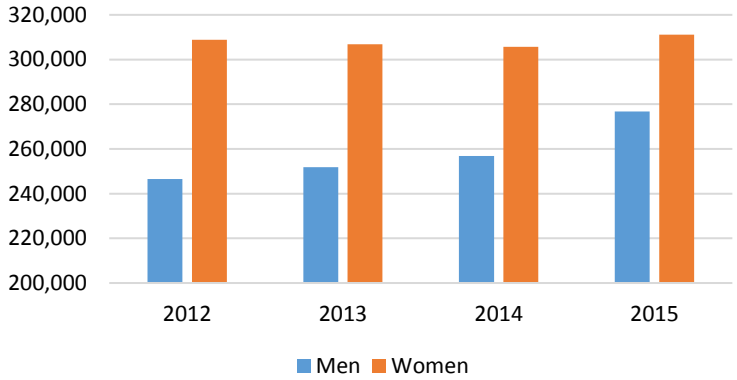

Fig. 2: Number of students enrolled in the universities and polytechnic schools of Ecuador by gender (2012-2015)[27]

Regulation

The Higher Education System in Ecuador is governed and regulated by public bodies such as the Council of Higher Education (CES), SENESCYT, and the Council for Evaluation, Accreditation, and Quality Assurance of Higher Education (CEAACES)[28]. CES is responsible for issuing regulations for Higher Education, CEAACES accredits careers and universities, and SENESCYT evaluates the correct performance of CES and CEAACES.

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27 Source: SENESCYT, 2018.

28 It must be noted that this governmental agency has been restructured after recent legislative changes in Ecuador.

The laws and regulations that govern Higher Education in Ecuador are the Organic Law of Higher Education (LOES) and the Regulation of Academic Regime, issued by CES. The LOES regulates the Higher Education system, and the organizations and institutions that are part of it. It establishes the rights, duties, and obligations of natural and legal persons, as well as sanctions for non-compliance with the provisions. Its objective is to guarantee the right to quality Higher Education and universal access without any discrimination (PR, 2016).

In the same framework, the Regulation of Academic Regime is applied to public and private HEIs. Its objectives are, among others, to ensure high quality education; regulate academic-formative management at all levels of training and learning modalities; create an adequate frame for academic and professional education, scientific, technological, and social research, as well as links with the community; and stimulate the national and international mobility of professors, researchers, professionals, and students (CES, 2017b).

Requirements for University Researchers

The necessary conditions that academic research staff must fulfill are defined in the Regulation of Career and Promotion Ladder of the Professor and Researcher of the System of Higher Education, issued by the Higher Education Council CES (CES, 2017a). The requirements are the following:[29]

- A doctoral degree (PhD or equivalent) in a field of knowledge linked to their teaching and research activities, recognized and registered by the SENESCYT as "PhD title valid for teaching, research and management in Higher Education."
- At least four years of experience as academic staff in Higher Education institutions or prestigious research institutions.
- Creation, publication, or patents of twelve relevant works, indexed articles, or research results in the field of knowledge linked to their teaching or research activities.
- Achievement of at least 75% of the score of the performance evaluation in their last two academic periods.
- Completion of 192 hours of training and professional continuous education, of which 90 hours should be in learning and research methodologies, and the rest in a field of knowledge linked to their teaching or research activities.

[29] Source: CES, 2017a.

- Participation in one or more research projects with a duration of at least twelve months each, for a total minimum of six years, and the direction or co-direction of at least two research projects.
- Direction or co-direction of at least two doctoral theses or five research master's theses.
- Sufficient knowledge in a different language from the native language.
- Success in the corresponding public merit-based contest or incorporation solely for research activities.
- Further conditions determined by the institution of Higher Education that must be in accordance with the constitutional and legal norms and guarantee the rights established in article 6 of the Organic Law of Higher Education.
- CEAACES shall evaluate the fulfillment of the indicated conditions.

National Accreditation Processes for Institutions

From 2012, CEAACES has been the responsible body for the creation and application of the Institutional Evaluation Model of Universities and Polytechnics at a national level. The model for 2018 has 24 qualitative and 13 quantitative indicators that consider aspects of planning, execution of substantive processes, academic efficiency, and quality of teachers, among others (CEAACES, 2018). Table 1 shows these 37 indicators:

Indicator			Qualitative	Quantitative
1.	**ORGANIZATION**		**9**	**0**
1.1	Mission, vision, and institutional planning		2	0
	1.1.1	Strategic planning	1	-
	1.1.2	Operational planning	1	-
1.2	Management		5	0
	1.2.1	Affirmative action policies	1	-
	1.2.2	Management of the academic offer	1	-
	1.2.3	Management of university faculty	1	-
	1.2.4	Quality management system	1	-
	1.2.5	Policies on internationalization	1	-

Indicator			Qualitative	Quantitative
1.3	Ethical control and transparency		2	0
	1.3.1	Promotion and ethical control	1	-
	1.3.2	Transparency and dissemination	1	-
2.	**FACULTY OF TEACHERS**		**2**	**8**
2.1	Doctoral training		0	3
	2.1.1	PhD/Doctor	-	1
	2.1.2	Full-time PhD/Doctor	-	1
	2.1.3	PhD/Doctor in training	-	1
2.2	Sufficiency and dedication		1	2
	2.2.1	Students per full-time teacher	-	1
	2.2.2	Full time ownership	-	1
	2.2.3	Temporary distribution of activities	1	-
2.3	Teacher's career		1	3
	2.3.1	Ownership	-	1
	2.3.2	Teacher evaluation	1	-
	2.3.3	Teaching women	-	1
	2.3.4	Women in high administrative positions	-	1
3.	**RESEARCH**		**3**	**2**
3.1	Institutionalization		2	0
	3.1.1	Organization and planning of scientific research	1	-
	3.1.2	Resource management for research	1	-
3.2	Results		1	2
	3.2.1	Scientific production in journals of global impact	-	1
	3.2.2	Scientific production in journals of regional impact	-	1
	3.2.3	Production of works	1	-
4.	**LINKS WITH SOCIETY**		**3**	**0**
4.1	Institutionalization		2	0
	4.1.1	Organization and planning of links with society	1	-

Indicator			Qualitative	Quantitative
	4.1.2	Execution of social link activities	1	-
4.2	Results		1	0
	4.2.1	Social linkage programs and their impact	1	-
5.	RESOURCES AND INFRASTRUCTURE		**4**	**0**
5.1	Infrastructure		3	0
	5.1.1	Conditions of academic activities	1	-
	5.1.2	Wellness spaces	1	-
	5.1.3	Information systems	1	-
5.3	Libraries		1	0
	5.2.1	Libraries	1	-
6.	**STUDENTS**		**3**	**3**
6.1	Admission and monitoring		3	0
	6.1.1	Admission and leveling processes to degree courses	1	-
	6.1.2	Postgraduate admission processes	1	-
	6.1.3	Relationship with graduates	1	-
6.2	Admission and monitoring results		0	3
	6.2.1	Retention rate	-	1
	6.2.2	Undergraduate graduation rate	-	1
	6.2.3	Postgraduate graduation rate	-	1
TOTAL			**24**	**13**

Table 1: Evaluation indicators[30]

[30] Source: CEAACES, 2018.

International Accreditation

In Ecuador, there is neither a general international regulation for universities, polytechnic schools, and technical, technological, and conservatory institutes, nor an organism that regulates these accreditations. Each public or private institution can choose to be accredited internationally according to the different accrediting institutions established worldwide. The UDLA, is the only internationally accredited university in Ecuador—by WASC since 2016. The accreditation process is described in detail in the section "Quality Management and Accreditation."

Industry-University Relations

Contrary to the situation in many other Latin American countries, leading private universities in Ecuador have not been founded by industry leaders but rather by visionaries, scientists, the Catholic Church, and politicians who saw the need for an alternative system of public and co-financed institutions. Therefore, the relationship with industry has not been fostered or considered as a key element for the development of Ecuadorian universities. However, most universities do have strong bonds with local and international NGOs both for community involvement and joint research. Nevertheless, in the last 5 to 10 years, the need to work hand in hand with industry has been considered and prioritized to produce applied research, consulting, and internship programs.

For perspective, at present the UDLA has around 20 community involvement projects with NGOs and over 380 agreements with companies and institutions that encompass research collaboration, continuing education, training, product development, and student internships as their main areas.

Furthermore, managers from some of those companies also partake in university or faculty advisory boards, where they provide feedback regarding existing and proposed programs that meet the ever-changing needs of the industry both at the national and international levels.

The challenge remains to strengthen bonds with industry to foster further collaboration, to ensure that graduates are well suited to compete in their related job market and to ensure that most of the produced research is of practical nature and can be applied to increase Ecuador's competitiveness.

Human Resources Management

Organizational Structure of the University

The university is structured in such a way that here are several checks and balances in decision and planning processes. Decisions are made with the participation of several departments, committees, and actors. An organizational chart is presented in Figure 3 for greater detail and clarity.

Although the structure might vary slightly in each university, the checks and balances, and the involvement of different departments are standard practices in HEIs due to national quality assurance and accreditation standards.

The highest institutional authority is the Supreme Council, a collegiate unit composed of the Rector, the Academic Vice-Rector, the deans of the faculties, the academic faculty representatives, the student and alumni representatives, and the employee and worker representatives.

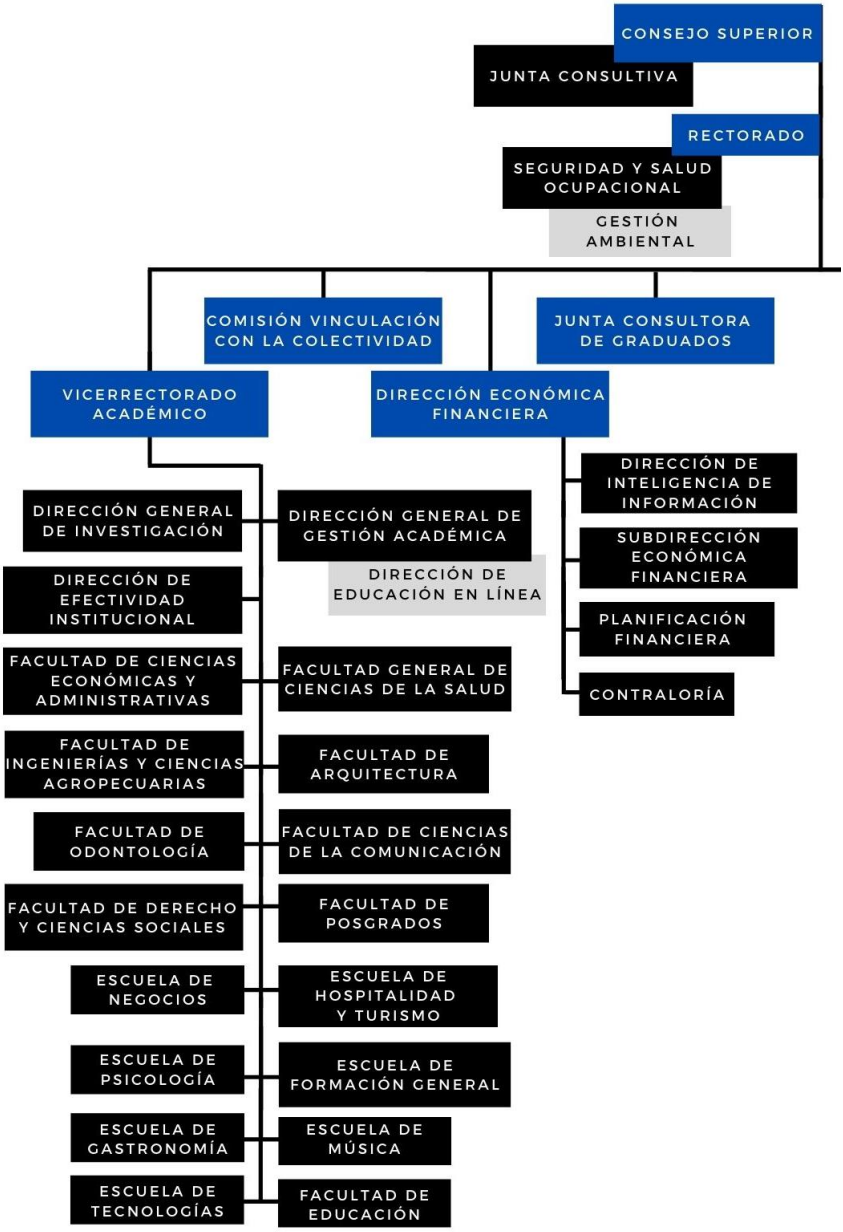
Within the organizational structure, the Rector is subordinated to the Superior Council. The Rector responds directly to the abovementioned collegiate body and the decisions that are made within this board.

With regard to formal administrative and academic departments, which are at the core of the organizational structure of the University, the institution has the instances of the Academic Vice-Rector, the Economic/Financial Directorate, the General Operations Directorate, and the General Planning Directorate, which respond directly to the Rector and work separately but in coordination with each other.

Finally, all academic units (e.g. faculties and schools) and their highest authorities (i.e. deans) respond to the Academic Vice-Rector but work with the rest of Directorates within the Rector's office. In turn, all faculty and staff within an academic unit (e.g. directors, coordinators, administrative assistants, and teachers) respond to the dean of the school/faculty.

Governance Policies at the University

The representation organs ensure the fulfillment of the institutional mission and the academic principles determined by the university's educational model. The university government is regulated by the principles established in the Ecuadorian Constitution, which means that the university is subject to the principles of academic, administrative, financial, and organic autonomy. As such, while the university government remains within the norms established by the legislation in Ecuador, the management of the institution is shared between different community actors, including authorities (e.g. deans and directors), faculty, students, alumni, employees, and workers of the university.


CONSEJO SUPERIOR
JUNTA CONSULTIVA
RECTORADO
SEGURIDAD Y SALUD OCUPACIONAL
GESTIÓN AMBIENTAL
COMISIÓN VINCULACIÓN CON LA COLECTIVIDAD
JUNTA CONSULTORA DE GRADUADOS
VICERRECTORADO ACADÉMICO
DIRECCIÓN ECONÓMICA FINANCIERA
DIRECCIÓN DE INTELIGENCIA DE INFORMACIÓN
SUBDIRECCIÓN ECONÓMICA FINANCIERA
PLANIFICACIÓN FINANCIERA
CONTRALORÍA
DIRECCIÓN GENERAL DE INVESTIGACIÓN
DIRECCIÓN GENERAL DE GESTIÓN ACADÉMICA
DIRECCIÓN DE EDUCACIÓN EN LÍNEA
DIRECCIÓN DE EFECTIVIDAD INSTITUCIONAL
FACULTAD DE CIENCIAS ECONÓMICAS Y ADMINISTRATIVAS
FACULTAD GENERAL DE CIENCIAS DE LA SALUD
FACULTAD DE INGENIERÍAS Y CIENCIAS AGROPECUARIAS
FACULTAD DE ARQUITECTURA
FACULTAD DE ODONTOLOGÍA
FACULTAD DE CIENCIAS DE LA COMUNICACIÓN
FACULTAD DE DERECHO Y CIENCIAS SOCIALES
FACULTAD DE POSGRADOS
ESCUELA DE NEGOCIOS
ESCUELA DE HOSPITALIDAD Y TURISMO
ESCUELA DE PSICOLOGÍA
ESCUELA DE FORMACIÓN GENERAL
ESCUELA DE GASTRONOMÍA
ESCUELA DE MÚSICA
ESCUELA DE TECNOLOGÍAS
FACULTAD DE EDUCACIÓN

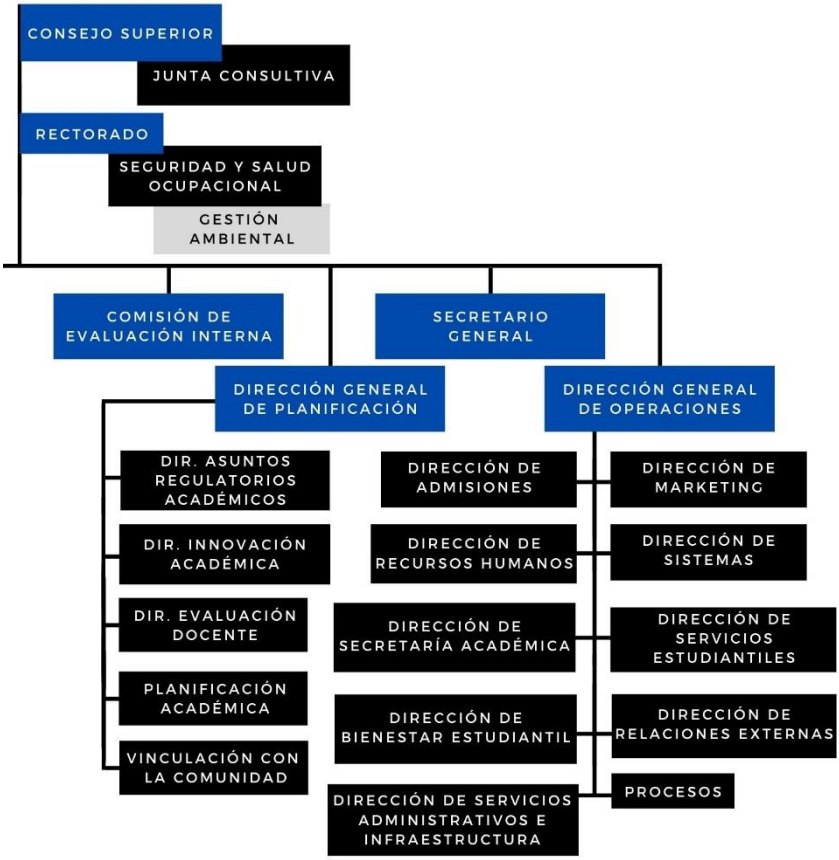


Fig. 3: Organizational chart at the UDLA[31]

At the UDLA, decision-making processes regarding human resources take place with the participation of several actors and are always backed by adequate arguments and evidence. For example, in a particular faculty, decisions regarding Human Resources (HR) and HR management within said faculty are made, firstly, by the academic and/or administrative individuals in charge of the faculty's management. These decisions must be coherent with internal norms and

[31] Source: UDLA, n.d.

procedures and need to be justified and approved, firstly, by the Academic Management General Directorate—Dirección General de Gestión Académica (DGGA)—and, secondly, based on the recommendation and decision of the DGGA, by the Academic Vice-Rector.

When the decision being made has legal implications (e.g. in the case of hiring or separating individuals from the institution), the process then goes to the Human Resources Directorate. The HR Directorate then works with each of the four main areas of the University to ensure that HR decisions are made appropriately (e.g. within the Ecuadorian legal framework, or without bias or prejudice).

Although there are regulations that somewhat standardize practices and policies with regard to human resource management and practices—such as the Labor Law and the Regulation of Career and Promotion Ladder of the Professor and Researcher of the System of Higher Education—, each university in Ecuador manages human resources according to their particular policies. Unfortunately, these policies are not usually open to the public and are often guarded zealously by individuals in each university instead. This subsequently hampers the possibility to cover the human resource management tendencies at further Ecuadorian Higher Education institutions in this chapter.

Authority of a Dean to Manage Human Resources at the Universidad de Las Américas

A dean's authority to manage human resources within their faculty varies depending on the situation and implications of the decisions being made. This authority, however, is always framed within and limited by larger institutional policies and norms, which regulate what a dean can and cannot do and decide upon. When making decisions concerning HR, deans must also collaborate closely with the Academic Vice-Rector and, particularly, the DGGA. Although institutional norms are very clear with regard to HR management, it should be noted that, if necessary, and with adequate argumentation, even decisions that go beyond regular practices can be presented to the DGGA and the Academic Vice-Rector for their consideration and approval.

For instance, it is part of the dean's responsibility to determine the number of class hours that their faculty members have to teach. Despite the fact that there is an institutional standard and range of class hours that each teacher must be in charge of per semester, deans have the duty to work with other departments to adapt the number of hours a faculty member must cover so that the assignment of further activities to this individual is facilitated.

Indeed, this is the situation that faculty members with research responsibilities must confront. When applicable, the dean, the General Research Management Direction, and the DGGA can decide jointly whether the number of class hours to be covered by the faculty member should be reduced in order to increase the number of research hours assigned to said person.

Another illustrative situation is the management of the faculty members' vacation time. Deans have the authority to approve vacation requests from their faculty and staff within a particular set of rules (e.g. the number of days requested must be within the number of days available for each person according to the HR Director; no vacation days can be approved during the semester; people must take a minimum of seven vacation days at a time, among others). In the event of a vacation request not being within said rules, the faculty member should complete a request form which is then reviewed by the dean. The dean should then write a recommendation (i.e. to approve or not to approve) and include it in the form, before the request is passed on to the authority who shall take the final decision: the HR Committee in the DGGA.

It is important to highlight, however, that although deans have power of decision with regard to some HR management elements, deans' often do feel "limited" by norms, procedures, and policies; and that the limits set forth by said norms are not always conducive to adequate management and motivation of the institutional human capital. For example, deans cannot decide (and do not have the financial power to decide) on the assignment of financial incentives to their faculty. Similarly, deans are not capable of giving other types of incentives to their faculty (such as more vacation days, or having the institution cover the cost of a professional development activity).

Currently, there is also great variation within each faculty with regard to the way in which the deans manage HR in the more "informal" (non-regulated) areas. Some faculties, for example, are characterized by giving their faculty and staff more freedom with regard to their schedules and physical presence in the university. Similarly, some deans focus more on professional development of their faculty and staff than others, while others place greater emphasis on research or community outreach program development. Finally, each dean has their own style of managing their academic unit's faculty and staff, with some deans having a more periodic scheduling of meetings with the unit's academic body and others having meetings only when necessary.

Organizational Culture at the Universidad de Las Américas

The UDLA is a fairly "young" university with a recently accelerated expansion and, hence, the formalization of processes (the organizational culture) in the university has not been defined from a Human Resources perspective yet.

At present, no formal survey of information regarding the organizational culture of the university has been created. What is known, however, according to the HR Direction, is that the current culture is driven by the philosophical foundations of the university, the institutional mission and vision, and, particularly, by the institutional values of academic rigor, ethical conduct, and innovation. These values, which are defined as essential institutional values, are part of the day-to-day work of institutional leaders, such that they trickle down to all different levels in the university.

Finally, although the age of collaborators is fairly balanced at the UDLA, there has been an influx of younger professionals who have been recruited to join the university in the last decade. This positively influences the organizational culture by making the institution more dynamic and creating a forward-thinking culture with great adaptability to changes.

Human Resources Management at Ecuadorian Universities

Just as with any organization, each university in Ecuador has its particular way of managing HR. Some universities, for example, are well-known for being more "restrictive" and "controlling" regarding their faculty and staff, and require, for instance, the registration of the arrival and departure time from the university facilities.

On the other hand, others are known for being restrictive on their administrative staff, but managing their academic faculty with absolute freedom, demanding no control on faculty whereabouts on a daily basis and focusing more on the establishment and achievement of goals instead.

Similarly, while some institutions have a very clear focus on HR management from an entrepreneurial perspective, others follow a more "academic" perspective with less formal HR structures and procedures. All universities, however, are limited by a series of norms which have been established by the government. Such norms require, for example, the distinction between faculty members based on a "level" and "type" approach. Such structure determines and defines the faculty's remuneration according to the person's academic and experience-based qualifications.

Quality Management and Accreditation

National System for Education Quality Assurance and its Impact on Higher Education Institutions

Ecuador has two national bodies that govern and regulate both quality assurance and accreditation in Higher Education: the Higher Education Council, which governs and regulates through the creation of regulations; and the Council for Evaluation, Accreditation, and Quality Assurance in Higher Education (CEAACES), which measures and monitors quality.

The mission of the CEAACES is to "exercise the stewardship of public policy for the assurance of the quality of Higher Education in Ecuador through evaluation, accreditation, and categorization processes in Higher Education institutions" (CEAACES, n.d.). Given its many responsibilities regarding evaluation, accreditation, and quality assurance, the CEAACES has a considerable impact on the performance of Higher Education institutions in the country. To name a few examples and to clarify this point, some of the many functions of the CEAACES[32] are presented below:

- To carry out evaluation, accreditation, academic classification, and quality assurance processes.
- To approve regulations for the processes of evaluation, accreditation, academic classification, and quality assurance of HEIs and programs according to their different modalities of study.
- To approve regulations for the institutional self-evaluation processes and for the programs in the Higher Education system.
- To ensure that internal and external evaluation processes are carried out in line with the standards and procedures established for that purpose; and to guarantee that the results are independent, impartial, and reflect ethical practices for all performed work.
- To grant certificates of institutional and programmatic accreditation to academic units and Higher Education institutions that have complied with all requirements. This accreditation certificate will be valid for five years and cannot be modified.
- To proportionally determine the suspension of funds to HEIs, in the event of one or more programs not meeting the established standards; and to inform the Higher Education Council of the reasons for suspension.

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[32] Source: Higher Education Law, 2010.

- To establish a system of categorization of institutions and academic programs.
- To broadly disseminate the results of the processes of external evaluation, accreditation, and academic classification with the purpose of orienting the society as to the quality and characteristics of institutions and programs within the Higher Education system.

Quality Assurance and Accreditation at the Universidad de Las Américas

The Direction of Regulatory Affairs and the Direction of Institutional Effectiveness are the offices responsible for the quality assurance and accreditation processes at the UDLA. Even though both of them have diverse responsibilities which have varied during the past five years, the directors of said offices indicate that their main role and function is to guide the university and its academic units in self-evaluation, accreditation, and ongoing quality assurance processes.

Considering that the UDLA is continually engaged in both national and international accreditation processes, these offices work together with flexible and varying roles and functions. In order to adapt to different models of accreditation and standards (which bring with them different quality assurance processes), the UDLA has opted for the development and application of a Quality Assurance Model which focuses on quality itself rather than on a given outcome such as accreditation.

Accreditation becomes thus a factor which is secondary to quality assurance. This means that being able to achieve accreditation with a particular organization, be it national (i.e. CEAACES in Ecuador) or international (e.g. WSCUC in the U.S.), is an additional result of assuring the quality of the institution as well as an indicator of institutional quality. In other words, the goal is to assure institutional quality rather than to achieve a particular accreditation.

With this model in mind, both offices work together in all accreditation and quality assurance processes. Within their scope of supporting the university and academic units in quality assurance processes, these offices have several institutional instances in which they are involved (e.g. the Curriculum Committee and the Student Success Committee).

The UDLA model conceives quality assurance as the "bigger picture" that encompasses and informs the processes required to promote continuous improvement based on institutional learning. Within this larger, all-encompassing circle of quality assurance, there are different areas that are important at the UDLA: organization, governance, and leadership; resources and infrastructure for learning; research and extension; and teaching and learning. Last but not least, students are at the core of this model. Figure 4 is presented to clarify the quality assurance model mentioned above:

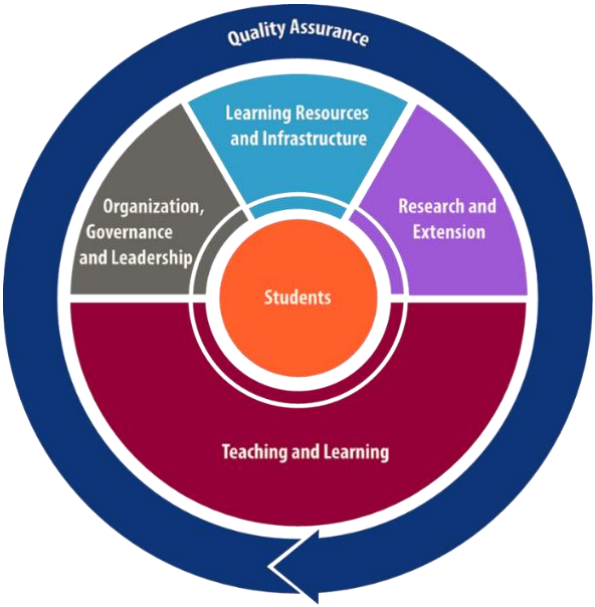

Fig. 4: Representation of the quality assurance model at the UDLA

Results of the Quality Assurance and Accreditation Processes at the Universidad de Las Américas

The quality assurance and accreditation processes at the UDLA require an institutional commitment to quality and shall lead to results facing continuous improvements in overall institutional quality. As noted above, accreditation processes contribute to the assurance of institutional quality by providing clear standards and criteria. Moreover, as the presented model suggests, quality assurance processes require the involvement and commitment of all institutional areas.

Similarly, it is important to note that quality assurance and accreditation processes involve all institutional areas and, hence, require the participation and contribution of a large percentage of stakeholders, from internal groups, such as employees, faculty, and students; to the larger university community, including graduates and employers. Another important result of the quality assurance and accreditation processes at the UDLA is that the institutional vision of quality and its assurance has expanded to the entire institutional community.

Interest in International Accreditations

As mentioned above, there is an interest, both at the UDLA and at other universities in Ecuador, in achieving international accreditation because of the benefits that it might bring.

Given the political instability of Ecuador and considering the dramatic changes in the legal framework for the Higher Education system, including the complete overhaul of quality assurance and accreditation norms and policies, a number of universities have opted to pursue international accreditations. Seeking accreditation with international organizations offers Ecuadorian HEIs a solid process with well-established standards in line with the requirements of the accrediting entity, which gives the university a clear path to follow. Standards remain consistent over time, thus allowing a sufficiently long period to conduct self-study processes, to implement improvement plans, and to actually follow up on these plans.

International accreditation is seen as an accurate indicator and thus affords greater prestige to the university than the national one. Conversely, the national accreditation is not viewed as a proven indicator of quality because of its fairly recent implementation, the changes in the national process, and the perceived political bias behind it.

Similarly, having one or more international accreditations may increase student mobility between countries in the region and countries where the university has been accredited. In the case of United States-based or Europe-based accrediting organizations, the view is that student mobility will increase around the world (Knight, 2010).

The UDLA is the only university in Ecuador with institutional US regional accreditation, accredited by WSCUC since 2016. It is hard to understand why, given the abovementioned situation, no other universities have international institutional accreditations. One can only presume the reasons for this lack of international institutional accreditation in Ecuadorian HEIs. Nevertheless, it is possible that universities choose not to seek international institutional accreditation due to the complexities of the accreditation processes, as they do not

always align with national accreditation criteria and, hence, require additional work. It could also be the case that universities focus on national institutional accreditation, which is a complicated process that offers the only means to operate legally in Ecuador. An international accreditation, on the other hand, serves merely as an indicator of quality but with no legal implications in the Ecuadorian Higher Education environment.

Funding and Financial Management

Funding in Higher Education Institutions

According to the Law of Higher Education (LOES), the resources allocated annually by the government to public Higher Education institutions shall be distributed according to criteria of quality, relevance, efficiency, equity, justice, and academic excellence. In addition, the allocations and rents of the government in favor of private universities and polytechnic schools shall be received if these institutions fulfill every one of the following obligations:[33]

- Remain in the Higher Education system of the country as accredited in accordance with the Organic Law of Higher Education.
- Be subject to the administrative control of the Contraloría General del Estado (Ecuador's auditing entity) in the use of public funds in relation to the use of public resources.
- Allocate the received resources to the granting of full or partial scholarships to students with limited economic resources.
- Exempt students enrolled with full scholarship of any fee and tuition payment.
- Students enrolled with partial scholarships will pay a maximum difference between the value of the total scholarship and the partial scholarship.
- Do not exceed the remunerative scales of the authorities of public universities and polytechnic schools. This shall be defined by the higher academic collegiate body according to the scale of remuneration of the higher hierarchical level of the public sector, in accordance with the Regulation issued by the CES.

The CES shall establish annually the percentage of pre-assignments and other public resources in favor of private institutions. These assignments shall be distributed according to the value and amount of total and partial scholarships

[33] Source: CES, 2017a.

for third level studies, awarded to students with limited economic resources from the beginning of their academic career. Additionally, public and private universities and polytechnic schools shall compulsorily assign budgets to carry out research projects, acquire technological infrastructure, publish in high-impact indexed journals, grant doctoral scholarships to their professors, and pay for patents (PR, 2016).

As reported by the SENESCYT, the Annual Liquidated Budget in 2016 reached a total of $13,320,288. This budget was allocated to the development, implementation, administration, and strengthening of scholarships; research projects; and equipment for universities and institutes.

Figure 5 shows the amount assigned to each group:

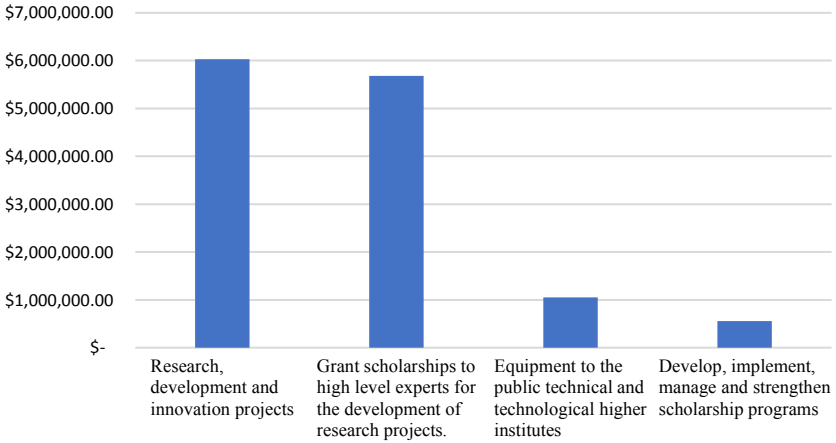

Fig. 5: 2016 Annual Liquidated Budget[34]

Research and Publishing

Situation and Importance of Research in Higher Education Institutions

Only since legal changes regarding Higher Education in Ecuador took place with the LOES in 2010 has there been a stronger focus on research at universities and in the country in general. Although some universities were already involved in research processes, projects, and initiatives, research at universities has been boosted by said reforms in the legal framework. The nationwide re-

[34] Source: SENESCYT, 2017b.

envisioning on the importance of research has led to profound institutional changes both at the UDLA and at other universities.

At the UDLA, the importance of research has grown tremendously in the past decade. The institutional transformation includes (but is not limited to) a greater emphasis on the recruitment and hiring of individuals with demonstrated research skills, the creation of a position directly in charge of research management, an increase in the institutional funding invested in research, and a greater planning of institutional research groups.

Research Culture at National and International Levels

Given that the UDLA is still a young university, its culture of research is currently facing a development process. For example, in the past, a research group or a lab would very likely have responded directly to the dean of a particular academic unit. In some cases, the research group was completely independent and responded directly to the Rector. It was not until fairly recently in our institutional history that the General Directorate of Research Management was created. Since the creation of this directorate, it has been possible to set in motion processes to define the institutional research structure, including the establishment of formal research groups and the definition of "researcher."

However, it is also important to note that, although research has become more formalized and structured at an institution-wide level, the "culture" of research in and of itself has not penetrated all levels of the university yet. According to the General Director of Research Management, many individuals have yet to understand and realize the importance of research within the university, as well as the impact that research might have in society.

The research culture varies depending on each Higher Education Institution. Some universities, especially those that have existed for several decades, have a better developed and established research culture than others. Each university has different views on the importance of research, assigns different percentages of funding to research, hires a different number of PhDs for research purposes, etc.

Some universities use research as part of their day to day functioning and have established formative research systems. These systems are very successful in including students in research processes and using research as part of the academic and professional training of their students to facilitate the creation of larger and more stable and impactful research groups. Whereas most universities have only a handful of national and international collaborations with other universities, some are particularly interested in such alliances. While some focus mostly on regional cooperation, others aim for partnerships with countries

outside the region. Lastly, some universities focus their research efforts on publishing, while others demonstrate a greater interest on product development.

Research Projects and Initiatives

Just as research culture varies depending on the institution, so do the existing research projects and initiatives. With regard to research projects, for example, some universities focus mostly on projects in one particular field, while others have a great variety of projects.

Most universities have different types of initiatives to attract and recruit human resources that might help in the development of research in said institution: some universities focus more on local and regional human resource recruitment, and others concentrate on global initiatives. Until recently, particularly government-financed (public) universities had programs with very large financial endowments to recruit and hire foreign scholars and researchers, making it hard for private universities to compete with regard to salary offerings. Lastly, many universities, including the UDLA, have focused on projects and initiatives regarding publishing efforts, including the development and creation of academic journals.

There are numerous challenges regarding research in the country, some of which are related to academia and HEIs, while some others relate to the reality of the country itself.

In the first place, society does not yet view universities and researchers within universities as creators of knowledge and true contributors to society. Given this general view of society, another challenge that researchers and universities are facing is that many individuals, some of whom are even involved in university management, have a "publish or perish" view of researchers. In this light, society cannot recognize the importance of research and researchers as their mission is considered to be the sole fulfillment of national evaluation and accreditation requirements. Along the same lines, in Ecuador, even within some universities, research is seen as something "far away" and researchers as someone distinct and distant from everyone else—a view which is not conducive to adequate research management and to true collaboration.

The Ecuadorian society does not yet have a focus and vision of its citizens being regional and global innovators. Another challenge to universities and researchers is therefore to help society move towards a vision of becoming innovators, which would then lead to a greater emphasis being placed on research initiatives. With this new vision, it would also be important to position universities as the source of innovation, a role which is currently often attributed to non-academic organizations. Similarly, it would be important for the society to

have a more positive view of the human resources within a university. Currently a prominent view is that the best professionals are employed in the private, non-educational sector rather than working in universities.

In Ecuador we also face many challenges with regard to research resources. For example, for researchers in the different biological fields, it might be necessary to purchase instruments which are extremely expensive because of import costs. In this sense, sometimes it is costlier to purchase said instrument and run tests in Ecuador than to send samples to other countries, such as the United States, for testing. Furthermore, when an instrument can be bought or the cost to purchase it is manageable, import processes often delay research projects and initiatives for months. Even the acquisition of rather economic technology can become thus costly due to delays in research and because of the people and hours involved in solving import problems. Another challenge originates from the remarkably high costs of raw material in Ecuador, making it more complex and costly to perform certain kinds of research.

Finally, it should be noted that challenges related to students are to be faced in Ecuador as well. Most students graduating from high school have not developed competencies in research and many have not even been introduced to research. This makes research very complex at the Higher Education level because students do not view research as important to their professional training. This view is often shared by society, including the students' parents who are, in most cases, those paying for the student's education.

Universities face the challenge of helping students and society understand the importance of research in the academic training of future professionals, and the importance of being guided by a science-practitioner model. Universities also face the challenge of helping K-12 education place a greater emphasis on research, such that students, their families, and, hence, society in general, might start seeing the importance of research; and that students might start developing research competencies prior to enrolment in universities. This however entails a further challenge, as neither the country, society, nor Higher Education institutions have a clear idea of what research competences are, what researchers should be able to do, and what the role of a researcher and, essentially, research is in society.

Internationalization

Situation and Current State in Higher Education Institutions

Internationalization has become a top priority for self-financed (private) and private co-financed (mixed) Higher Education institutions, with the UDLA being one of the self-financed ones. Internationalization has evolved from a nice-to-have to a must-have objective in every institutional strategic plan. Public institutions are following suit regarding the international efforts of private universities.

At the state policy level, internationalization has been a top priority in the agenda of the Ecuadorian government for the last ten years, where fostering professional development to construct a society of knowledge is considered a pillar of a structured process of social transformation. This can be corroborated in the evolution of international scholarships granted to Ecuadorian students at the undergraduate and postgraduate levels in international Higher Education institutions, as shown in Figure 6.

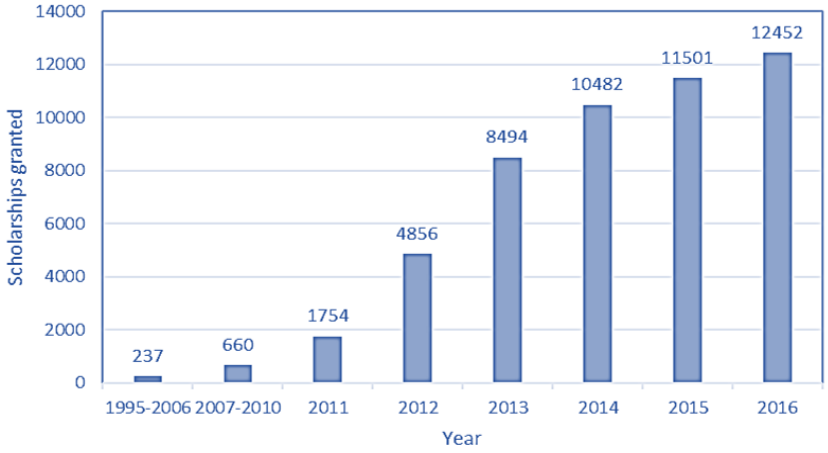

Fig. 6: Cumulative number of international scholarships granted by both at bachelor's and graduate level (1995 - 2016)[35]

In the eleven-year period from 1995 to 2006, only 237 international scholarships had been granted to Ecuadorian students; however, by the end of 2016, the total number of scholarships had grown to 12,452. By March 2017, Ecua-

[35] Source: SENESCYT, 2017a.

dor's SENESCYT had granted 20,000 scholarships, investing a total of 567 million US dollars for scholarship in international HEIs. Recipients of these scholarships are expected to return to Ecuador and work for at least a period that doubles the number of years spent studying abroad. If this criterion is not met, the student or his/her guarantor must return the entire amount granted to SENESCYT.

Percentage of Students and Staff Mobility

Regarding internationalization, the UDLA has over forty international partner institutions worldwide which foster joint research and exchange programs for students and faculty members for yearly and semester exchanges, as well as for short courses.

The preferred countries for outgoing students are Spain and the US due to language constraints, unless programs in other countries are taught in English or Spanish. Nevertheless, it is important to note that to date less than 1% of the total UDLA student body undertake a semester or year abroad, although the number of outgoing UDLA students is four times higher than that of incomings.

Fostering internationalization further is thus part of the UDLA's five-year strategic plan. To put this into context, other private institutions have up to 2% of their student population studying abroad as part of an exchange program. However, short summer and winter courses are a good start for UDLA students as a mean of getting out of their comfort zone and undergoing a study-abroad experience.

Over the last three years, the number of short courses abroad offered to UDLA students has grown tenfold, as shown in Figure 7, and almost 3% of UDLA students have taken part in them. Likewise, the number of international students attending short courses at the UDLA in Ecuador has increased significantly in the last 3 years.

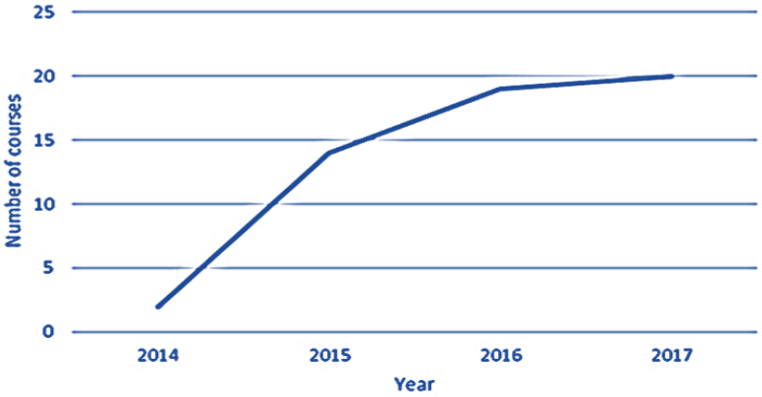

Fig. 7: International short courses per year at the UDLA[36]

Similarly, the UDLA encourages the participation of its faculty members in short courses abroad and in receiving groups of international students at the institution. International faculty members are also invited to teach short courses at the UDLA. This activity has been growing steadily over the last five years.

Regarding joint research projects with international institutions, in 2017 over 70% of all UDLA research publications were produced in collaboration with international institutions. Mobility is achieved via own funding and with the funds provided by two Erasmus Plus programs for students, faculty and staff members.

Importance of Encouraging Internationalization in Higher Education institutions in Ecuador

As mentioned above, internationalization both at the state and institutional level is a key factor in the development and growth not only of Ecuador's Higher Educational system, including private, semi-private and public institutions; but also as a pillar for the much-needed social and economic transformation.

The main challenge that Ecuador is facing regarding the enhancement of the internationalization efforts carried out by its Higher Educational institutions is the lack of a solid English as Second Language (ESL) system at school level. Most universities have to provide courses for enrolled high school graduates to make sure that they reach a B2 level of English language proficiency according to the English Language Testing System (IELTS). This is an issue not only for first-year students, but also for some faculty and staff members, subsequently

[36] Source: UDLA's International Exchange Coordinator, International Affairs Office.

hindering a more fluid exchange and partnership with institutions from non-Spanish speaking countries. Hence, English proficiency testing and courses are provided for students as well as for faculty and staff members at the UDLA.

Conclusion

Ecuador's Higher Education system has experienced a period of significant challenges in the last ten years due to political instability, economic slowdown, and a changing legal framework. These challenges and changes have ranged from requisites to operate and hire academic personnel, the re-envisioning of the importance of research and regulations for the financial and tax management of educational institutions, to quality assurance and accreditation norms and policies.

Furthermore, funding for Higher Education reforms, governing bodies, and international scholarships for Ecuadorian scholars (which was abundant ten years ago and was primarily assigned to the creation of new institutions) has now become scarce, leaving Ecuador's Higher Education system with many open areas to be resolved and covered. To put this in context, the approval of many programs of which the CES required a revision is still pending. Part of the permanent staff of educational regulatory entities was replaced by *ad-honorem* services provided by personnel and staff who are part of the many Higher Education intuitions in Ecuador.

Lastly, the growing importance of research, internationalization, and industry-university relations for Higher Education poses stronger structural and economic challenges which should be met and solved in the near future to ensure the continuing provision of an internationally competitive Higher Education for the Ecuadorian population.

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Roberto Antonio Morán Argueta, Óscar Picardo Joao, and Mario Rafael Ruiz Vargas

The Situation of Public and Private Higher Education in El Salvador

Abstract

The purpose of this paper is to discuss the current state of the Salvadoran Higher Education system, considering its historic roots and the changes it has experienced throughout the way. Every section of this paper presents information from official sources to provide some context and mixes this information with some observations from the authors about the challenges in six areas: industry-university relations, human resources, academic quality, financials, research, and internationalization.

Originally comprised of a single public university, the Salvadoran Higher Education system has grown and undergone deep transformations during the course of its 177 years of history, and has nowadays 41 institutions, most of which are private universities. The majority of these transformations have been driven by legal reforms, such as the enactment of the Private Universities Act and the Higher Education Act, and both of them are examined in detail, including the current legal requirements for universities and opportunities for improvement.

This paper provides information about the operation of Salvadoran Higher Education institutions in general and, particularly, of Francisco Gavidia University, including the typical organizational structure of HEIs and their policies for financial management, with a special focus on the research and development activities that are (or should be) carried out by all HEIs.

Innovation models, such as the triple helix, indicate that universities are among the most innovative institutions. Consequently, they must honor their debt to society, not only by showing their commitment to academic excellence but also by becoming socioeconomic agents that enable, through research, the development, innovation, progress, and well-being of society.

Keywords: Accreditation Processes, El Salvador, Higher Education Policy, Innovation, Research, Student Demographics, University Governance.

Introduction

The history of the Salvadoran Higher Education system begins in 1841 with the foundation of the first public university of the country: the University of El Salvador (UES). This university was the only one until 1965 when the Private Universities Act was enacted. This act allowed, for the first time, to establish private universities to meet the growing education demand (MINED, 2007, p. 36).

Since then, and in a relatively short period, the system has experienced deep transformations, resulting in a university mix where private institutions are the majority and the University of El Salvador is the only public participant. However, the UES is also the largest university, with an enrolment of 46,279 students in 2016—27.5% of the university population (MINED, 2017, p. 14). Among private universities, Francisco Gavidia University (UFG) has the second highest enrolment: 11,983 students in 2016; just behind the Technological University of El Salvador (UTEC) with 21,008. Private universities are considered, by law, public-benefit non-profit corporations, meaning that they must reinvest their profits in research, faculty quality, infrastructure and social projection (ALRE, 2009, art. 28).

Besides universities, the Salvadoran Law (ALRE, 2009, art. 22) recognizes two other categories of Higher Education institutions (HEIs): technological institutes and specialized institutes. Technological institutes can only offer short-term degrees; however, this is not a restriction on the other two categories. Yet, most of the student population attend universities. A summary of these categories of Higher Education institutions and degrees offered is shown in Table 1.

Category	Professional profile	Academic degrees offered
Universities 24 institutions 93% of students	Academic training with a multidisciplinary focus on science, art, and technology.	*Undergraduate:* - Technician (2 years) - Teacher (3 years) - Technologist (4 years) - Engineer, and Architect (5 years) - Doctor of Medicine (MD, 7 years) *Graduate:* - Master (2 years) - PhD Philosophy (3.5 years) - Specialist (3 years, for MDs only)
Specialized institutes 11 institutions 6% of students	Professionals in a field of sciences, technology or art.	
Technological institutes 6 institutions 1% of students	Technicians and technologists in different scientific, artistic and humanistic specialties.	*Undergraduate:* - Technician (2 years) - Technologist (4 years)

Table 1: Categories of Higher Education institutions in El Salvador[37]

Coverage and Distribution by Gender

According to the Ministry of Education, in 2016, 13.07% of the population between 19 and 23 years old had access to Higher Education. This access was higher for women (14.52%) than for men (11.63%) (MINED, 2017, p. 99). Women also represented a higher percentage of the total student population in 2016. The total was 180,955 students: 83,680 male (46.2%), and 97,275 female (53.8%) student population (MINED, 2017, p. 19).

An analysis by area of training reveals the three main fields of study: Economics, Health, and Technology. Whereas women represent the majority group in the first two fields, in Technology they are a small group. This situation thus presents opportunities to increase their involvement in STEM-related degrees (see Table 2).

[37] Source: ALRE, 2009, Arts. 5, 8-14, 22; and MINED, 2017, pp. 14–15.

Area of training	Male	Female	Total
Economics, Management, and Commerce	19,591	26,592	46,183
Health	10,418	26,242	36,660
Technology	27,035	7,694	34,729
Law	6,523	8,919	15,442
Education	4,018	8,178	12,196
Humanities	4,538	6,437	10,975
Social Sciences	3,641	5,802	9,443
Art and Architecture	4,056	4,171	8,227
Agriculture and environment	2,401	1,464	3,865
Sciences	1,459	1,776	3,235
Total	**83,680**	**97,275**	**180,955**

Table 2: Student enrollment by area of training and gender[38]

Out of the total student population, only 2% of the students are in postgraduate school. The remaining 98% is undertaking undergraduate degrees: 86% pursuing longer degrees (of 4 or more years), and 12%, shorter degrees (MINED, 2017, p. 114).

Laws and Regulations

The 1965 Private Universities Act allowed the establishment of the first private institutions. However, this legislation was too flexible and, during the 80s, the foundation of a large number of universities with low or non-existent academic quality standards was inadvertently encouraged, driven exclusively by the desire to obtain economic gains.

To overcome this untenable situation, a new Higher Education Act was enacted in 1995. This Act was the first attempt to factually regulate HEIs: the law established stricter requirements for operation, created a Higher Education Board for ease of consultation to the Ministry of Education, and outlined an evaluation system for institutions. As a positive outcome, many pseudo-universities, also known as "garage universities," were forced to close their doors (MINED, 2007, p. 46–47).

[38] Source: MINED, 2017, p. 109.

After more than eight years, the previous law was replaced by the current Higher Education Act, enacted in 2004, and complemented with a Higher Education Regulation. The following paragraphs list some of the requirements of the current legislation.

Legal Requirements for Higher Education Institutions

The Higher Education Act establishes minimum operational requirements for HEIs (ALRE, 2009, art. 37). These requirements are presented below:

- An institute must offer at least one degree; a university, at least five.
- HEIs must update their study plans at least once throughout the duration of a degree. For instance, if a degree lasts for five years, its study plan must be updated every five years.
- Faculty members must hold the academic degree that is being offered and have specific knowledge of the courses they teach.
- HEIs must carry out at least one research project every year in the fields of their academic offering.
- Adequate infrastructure, libraries, laboratories, and other resources.
- A minimal ratio of one faculty member per 40 students, among which at least 25% of the faculty members must contracted on a full-time basis.
- Research conduction and student counselling should be carried out, preferably, by full-time faculty members.

Another important aspect of the current legislation is the establishment of a Higher Education Board (ALRE, 2009, arts. 51, 53), which acts as a consulting body to the Ministry of Education to improve the quality of Higher Education, and presents the following structure:

- Two representatives of the Ministry of Education
- One representative of the University of El Salvador
- Two representatives of the private accredited universities
- One representative of the private non-accredited universities
- One representative of the accredited specialized institutes
- One representative of the accredited technological institutes
- One representative from the private sector
- One representative from professional organizations and associations

As this structure shows, the Higher Education Board is comprised mostly of representatives from HEIs, with a very small participation of the private sector, professional organizations, and associations.

One of the tasks that the Higher Education Board must do is to designate the members of the Accreditation Commission, an independent body of seven professionals who make sure that Higher Education institutions meet specific quality standards (ALRE, 2009, art. 46). Yet, accreditation is a "voluntary process undergone by Higher Education institutions that publicly and formally recognize their commitment to the continuous improvement of their academic quality" (CACES, n.d.).

Opportunities for Improvement

There should be more representatives from the private sector in the Higher Education Board. After all, most of the future professionals are going to be somehow part of this sector. Consequently, HEIs must know the needs of the private sector to prepare their students for life at work.

The law is rather vague regarding both what is considered research and the requirements to become a university faculty member or researcher. As a result, over 50% of the national faculty members only hold an undergraduate degree and, occasionally, they even lack professional working experience outside the academy. Figure 1 shows the distribution of the national faculty by academic degree:

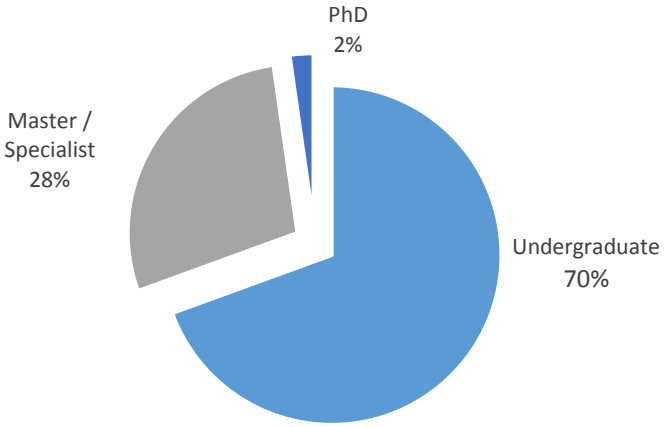

Fig. 1: Academic degrees held by faculty in El Salvador[39]

[39] Source: MINED, 2017, p. 125.

Yet, Francisco Gavidia University has gone beyond the minimum legal requirements. For instance, for research faculty candidates, it has taken into account criteria such as work stability throughout time, teaching and professional working experience, the number of previously published papers, and prior knowledge of research methodologies. Moreover, the institution also encourages existent faculty members to obtain at least a master's degree, which is one of the goals of its institutional strategic plan.

Accreditation

As previously stated, accreditation in El Salvador is a voluntary process. Accreditations may be granted either by the Ministry of Education or by international accreditation agencies. Based on the level of accreditations obtained by an institution, it can be classified in one or more of the following three groups:

- HEIs that only meet basic requirements to operate
- Nationally accredited HEIs (accredited by the Ministry of Education)
- Internationally accredited HEIs (accredited by international agencies)

Every institution is required to belong to the first group, but no more than certain institutions pursue either international or national accreditations, and solely the most committed institutions (including the UFG) pursue the three of them.

The national accreditation is valid for a period of five years. To renew it, the Higher Education institution needs to follow the same steps as for the initial accreditation. On this regard, two types of accreditation are possible: institutional accreditation and accreditation of specific degrees being offered (CACES, n.d.).

Some examples of international accreditations are the ones from the Central American Agency for Accreditation of Architecture and Engineering Programs (ACAAI). This agency has signed memorandums of understanding with other accreditation bodies, such as the National Architecture Accrediting Board (NAAB) and ABET, both from the United States, among others (ACAAI, n.d.).

Research

The National Board of Science and Technology, abbreviated as CONACYT, formulates and implements national policy in matters of scientific development, technology, and innovation. This board periodically publishes the report "Research Capabilities of Higher Education Institutions and Government." The

report's 2017 edition includes a collection of 36 research projects from 36 different Higher Education institutions (the most relevant research project for every institution). Table 3 summarizes the outstanding projects from that list.

Institution	Project title	Field of study
"José Simeón Cañas" Central American University (UCA)	Strengthening of technical and scientific capabilities in the energy field of the metal-mechanic industry specialized in manufacturing cooking griddles.	Energy
Santa Ana Autonomous University (UNASA)	Molecular assessment of the presence of AHPND/EMS in Penaeus Vannamei, water and soil quality of shrimp ponds in Jiquilisco Bay, El Salvador	Agriculture
Don Bosco University (UDB)	Development of a system for quality control of sugar using computer vision	Technology
University of El Salvador (UES)	Dihydro-beta-agarofuran sesquiterpenes from Celastraceae species as anti-tumor-promoting agents: structure-activity relationship.	Healthcare
Francisco Gavidia University (UFG)	Research of plasmonic materials based on carbon, as accelerants for solar distillation of saline or polluted water.	Natural Sciences

Table 3: Research projects in Salvadoran universities[40]

Most of the research projects conducted by Salvadoran researchers are related to social studies. The previous table contains a few outstanding examples of research projects in science and technology that can have a positive impact on economic growth and the development of the country.

Industry-University Relations

Science and Technology in El Salvador cannot be developed beyond their "limited" current state without a deep and sincere dialogue between the three main actors: universities, businesses, and the government. The search for consensus and the management of dissent are fundamental to carry out reforms. In the same way, the integration of all the key players guarantees a long-term

[40] Source: CONACYT, 2017, pp. 43–50.

vision for constructing state policies that transcend and surpass the short-term vision of the five-year government policies.

The dialogue's main purpose would be to foster the creation of the optimal conditions to strengthen the virtuous triangle or dynamic model of development of the technical, scientific, and productive capabilities. By expanding these capabilities, the economic growth conditions would improve. This would in turn drive forward a fiscal improvement by which the government would be positively affected. The actors identified for the dialogue and reforms are rectors, businessmen, guilds, the media, and the government; and the main challenge would be to recover or build trust between them. This model, exposed in Sabato's Triangle or the Triple Helix of Etzkowitz, was later presented with some improvements by Farinha and Ferreira (2013). The new triple helix model is presented in Figure 2.

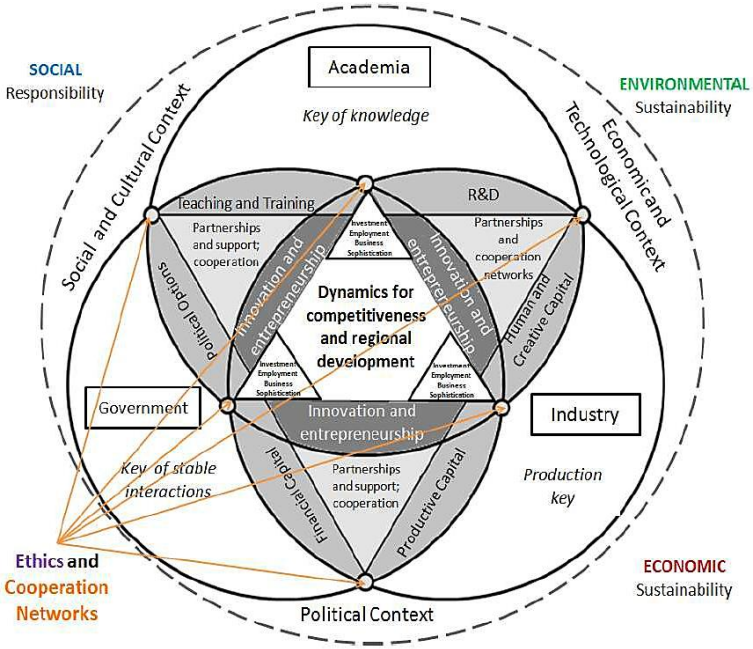

Fig. 2: New triple helix model[41]

41 Source: Farinha and Ferreira, 2013, p. 20.

The guidelines for dialogue based on the challenges and opportunities at the third level are:

- Accreditation of academic degrees by accreditation agencies
- University-industry linkages
- Applied research and use of efficiency indicators (number of patents, registrations, indexed journals, etc.)
- Legal frameworks and the need for reforms
- Curricular structure of programs and credits
- Increase of the performance and efficiency levels of teachers
- Internationalization of Higher Education (exchanges, agreements, internships, etc.)
- New academic degrees, to meet the needs of strategic sectors of the country such as Professional Science Masters (PSM) and PhDs
- A more prominent role of the parastatal organisms: CES, CdA, DNES

In short, the idea is to create intellectual clusters that enable the transfer of knowledge and technology. These clusters would be local or regional industrial conglomerates whose success is determined by the success of their member companies and the scientific contribution of the universities. Hence, the transfer of both technology and accurate intellectual content will be critical for the growth and successful performance of all the above-mentioned actors within such clusters.

On the Success

In this line of thought, in June 2014, USAID launched its project "Higher Education for Economic Growth"—US $ 22,000,000. The project was executed by RTI under the hypothesis that if the Salvadoran Higher Education system is strengthened and aligned with the private sector's output priorities, this alignment will improve competitiveness and productivity, contributing in the long term to increase the country's economic growth rates (USAID, 2014).

To strengthen El Salvador's Higher Education system, the project was divided into three parts: improving the qualified human capital, improving the relevance and quality of the curricula and research, and enhancing the institutional capacity and effectiveness. After a thorough study, and aiming to achieve its goals, the project established four "clusters" or alliances between industry and Higher Education for selected sectors, as shown in Table 4.

These clusters are composed of government actors, productive sectors, and associated universities. The project did not include other sectors that are not

aligned with this strategy of collaboration between the private sector and HEIs (such as Textiles, Pharmaceutical Companies, Aeronautics, Tourism, Health, and Plastic). However, the USAID-RTI model is a relevant operation that will teach important lessons and good practices that might be useful for similar initiatives in the future.

Sector	"Anchor" university	Private actors
Light Manufacturing	"José Simeón Cañas" Central American University (UCA)	***ASI*** Salvadoran Association of Industrialists
Energy and Energy Efficiency	Don Bosco University (UDB)	***AES El Salvador*** Salvadoran energy conglomerate
Information and Communications Technologies	Francisco Gavidia University (UFG)	***CASATIC*** Salvadoran Chamber of Information and Communications Technologies
Agroindustry and Food Processing	Catholic University of El Salvador (UNICAES)	***CAMAGRO*** Agricultural and Agroindustrial Chamber of El Salvador

Table 4: Identified clusters for the "Higher Education for Economic Growth" project[42]

CONACYT's comparative study on the link between HEIs and the socioeconomic environment (comparing 2015 with 2016) presents the following scenarios:

- The number of spin-offs created five or more years ago that are currently operating has decreased by 37.5%, but they have improved the income and the number of jobs. More spin-offs were created in 2016 than in 2015.
- The number of entrepreneurship training has almost doubled. Similarly, the number of projects to start new businesses has grown substantially: 364 in 2015 versus 842 in 2016. The number of initiatives with seed capital went from 24 in 2015 to 47 in 2016.

42 Source: Navarro, Barbarasa and Thakkar, 2017, p.12; and USAID, 2014, p. 1.

Human Resources Management

The University's highest authority is the Rector. In most universities, this person oversees all academic and administrative matters at the highest level.

In most cases, the Rector is appointed by a managing board. The responsibilities of the Rector usually include appointing deans for the different schools (also known as faculties), and the chief officers for offices and departments, such as administration, operations, finances, research, technology, and others that support the core activity of Higher Education provision.

Structure/Organization

Schools, in addition to having a dean, have a group of coordinators that oversee the activities related to the teaching and learning process, ensuring compliance with both the norms established by the Salvadoran Ministry of Education and the regulations within each university; and the fulfillment of the ISO 9001 standards or any other baseline considered by the institution. Given that offices are divided into units, each unit has its own coordinator to oversee those activities.

Figure 3 shows the organization chart of Francisco Gavidia. The majority of offices and schools report directly to the Rector, who has a wide span of control:

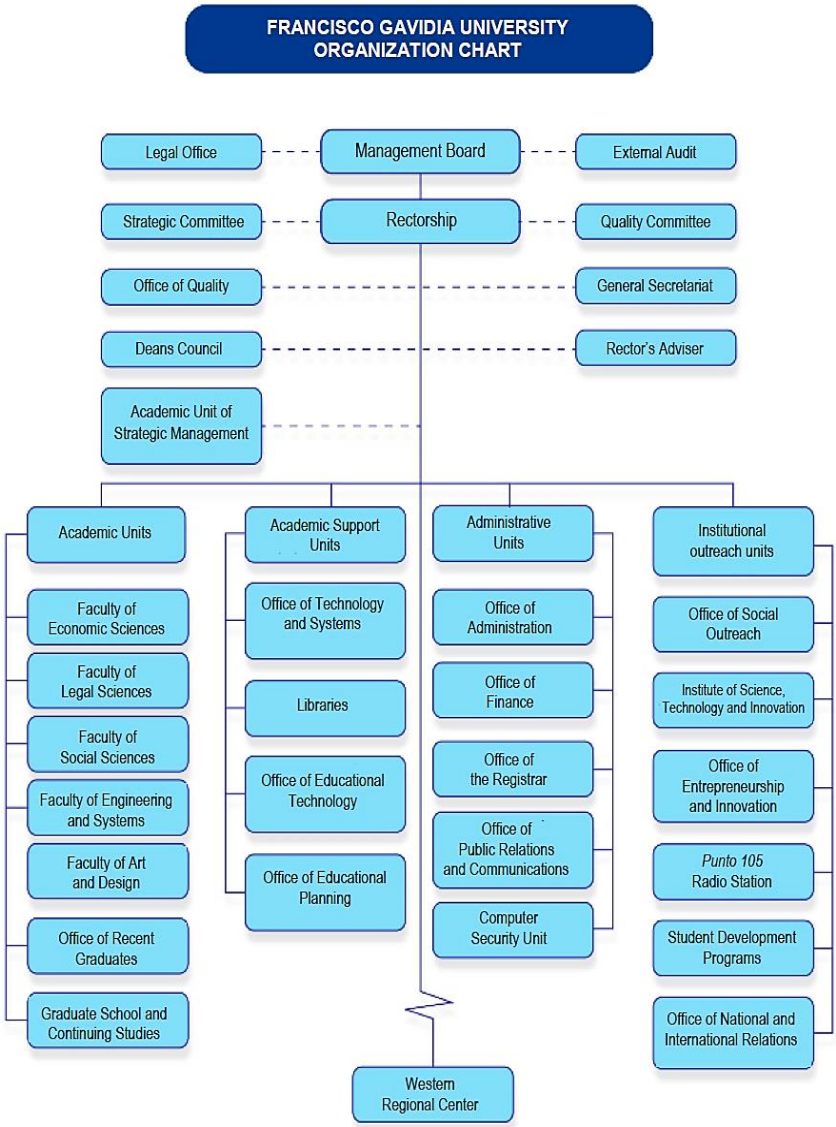

Fig. 3: Francisco Gavidia University's Organization Chart[43]

[43] Source: UFG, n.d.

Governance

El Salvador has only one public University (the University of El Salvador) and the remaining universities and most of the institutions in other categories of HEIs are privately managed. Governance is applied following a set of rules, procedures, and regulations linked to the Higher Education Act. At the same time, each university defines a mission and vision statement, its values, and a strategic plan from which the guidelines for each school, faculty, coordination, and unit are derived.

Every year, faculties, units, and offices are required to prepare an Annual Operations Plan, which will lastly become a single document for planning the activities for the following year. Such activities must be aligned with the strategic plan, mission and vision statements, norms, procedures, and regulations that are applicable to the institution.

For decision making processes there are multidisciplinary groups named Action and Management Committees. These Committees can be integrated by different directors, deans, coordinators, professors, researchers and so on, depending on the project to consider. Such committees are considered a functional way to nurture cooperation and teamwork, and are held accountable for the success of specific projects. In matters of education, the Deans Council conducts regular meetings in order to collaborate and ensure everyone's alignment with the strategy.

Deans' Competencies

Each School must oversee the teaching-learning process and its development under prevailing norms and quality standards. To do so, it is required to select the right human resources for faculty staff, professors, researchers, laboratory assistants, etc. In most of the cases, there are specific requirements that are explicitly declared in the procedures followed by the institution. The human resources department carries out the recruitment of candidates based on the requirements defined by the dean, but it is the dean's responsibility to perform evaluations of the candidates to verify that such requirements are fulfilled.

After the dean has evaluated the candidates and has discussed their profiles and performance with the coordinators of the units that the new employee will belong to, a process to formally enroll the selected candidate will begin. The human resources department performs the procedures required by law, like signing a contract, registering the employee in the Salvadoran Institute of Social Services, etc. To complete the previous tasks, the Dean delegates some of their authority to Coordinators, which also oversee and evaluate current faculty members, program activities, and conduct meetings.

Organizational Culture

Like most of Latin American organizations, there is an inherent tradition passed on by the Spanish culture whereby people are expected to follow a formal dress code. Given the high percentage of working students, the work schedule is flexible so they can continue their formation.

The predominant mindset is that education will grant better opportunities. Therefore, employees from the academia and the administration are constantly being trained by their institutions and taking classes independently, pursuing master's degrees but rarely having the opportunity of applying for a PhD. This is also true for universities that provide some benefits to employees that continue with their studies.

There is a link between the strategy determined by the Rector, the managing board, the deans' council, and the activities performed daily by everyone in the organization. Metrics and KPI's are usually recorded and analyzed at the beginning of each semester in order to identify and discuss the opportunities for improvement.

Human Resources Management

Generally, there is a single department of human resources that collaborates in aspects related to legal compliance, and performs the search for and recruitment of candidates through different channels. Candidates are handed to the corresponding units and schools to present the evaluations required for each unit depending on the position they are being considered for. Once the best candidate has been identified and negotiations in terms of salary have been settled, the human resources' department is responsible for writing a contract according to further requirements from the Salvadoran Law. Despite some minor differences regarding, for instance, the negotiation and evaluation of candidates, most Higher Education institutions follow similar human resources procedures.

Quality Management and Accreditation

The legal reforms of 1995-1997 created the subsystems of Evaluation, Information, Statistics, and Accreditation, which generated a cultural transformation in the educational system. The legal framework in force at the time was weak and allowed an exponential growth of universities, many of them called "garage universities" because of their low-quality standards. The new Higher Education Act, enacted in 1995 and formalized in 1997, reduced the number of HEIs from 64 to 38, operating under much better conditions; and accredited 12 of them (Amaya and Eunice, 2010, pp. 12–17). The national Accreditation Sys-

tem was created by the Higher Education Act, on its Chapter VI and Article 46, which established a Commission for Accreditation of Quality of Higher Education (CdA) as an entity attached to the Ministry of Education (MINED).

The CdA is composed of members are scholars of notorious ability and honesty. These members do not represent any institution and are appointed by the MINED and the Higher Education Board (CES) by mutual agreement, for a period of four years. The integration and operation of the Commission and the accreditation standards are regulated in the Manual for Accreditation of Educational Institutions of El Salvador. The current version of this manual was published in 2009.

There are two forms of accreditation according to the Higher Education Act (ALRE, 2009, art. 47): accreditation of HEIs as a whole and accreditation of individual degrees. Regardless of the accreditation type, the institution will undergo an evaluation process to prove whether they meet the requirements. Accreditation is voluntary and the CdA decides if a Higher Education institution deserves accreditation in accordance with the law and related regulations.

The standards and quality standards that have been defined by the CdA are contained in the "Reference Framework for the Accreditation of Higher Education Institutions: Categories of Analysis," which contains ten categories of analysis, grouped around the HEI's three major organizational and operational areas—General Management, Academic Management, and Administrative Management; 68 criteria that refer to the core aspects of a HEI's work; and their respective indicators (a total of 202 have been defined), which specify the information or evidence that can be presented in support of compliance with the criteria (CACES, 2009, p. 3). The categories of analysis by area are listed in Table 5.

The accreditation process consists of an evaluation based on previously established criteria and quality standards, carried out by an external body that seeks to guarantee the quality of a degree or educational program. As a voluntary process, it begins with a written request from the University or Higher Education Institution and has a maximum duration of two hundred business days counted since the admission of the application, except in the case of fortuitous events or force majeure.

No.	Categories of Analysis	No. of Criteria	No. of Indicators
	Directorate General		
1	Institutional administration and governance	9	34
2	Institutional integrity	6	8
3	Social outreach	4	11
	Academic Management		
4	Students	11	31
5	Scholars	7	22
6	Degrees and other academic programs	6	14
7	Research	5	16
8	Educational resources	11	36
	Administrative Management		
9	Financial management	6	19
10	Physical infrastructure	3	10
TOTAL		**68**	**201**

Table 5: Categories of Analysis for Government-Issued Accreditations[44]

The accreditation process in El Salvador is developed according to the "Standards and Procedures for the Accreditation of Higher Education Institutions" (CACES, 2009, art. 11) and can be summarized in the following stages:

- *Self-evaluation*: consists of a study of the institution or degree that is organized and conducted by members of the applicant in accordance with the categories of analysis of the Commission. It must take place within the twelve months prior to the submission of the accreditation application. The self-assessment process must have characteristics that attest to its formality and technical rigor, and the information obtained must be valid, reliable, and verifiable (ALRCR, 2002, pp. 15–18).
- *On-site visit*: aimed at verifying what was described in the self-assessment report presented by the University. A team of peer evaluators appointed by the Commission of Accreditation analyses the self-evaluation report and all the documentation presented by the HEI. Then the team prepares a visit which will be notified in advance by the Executive Directorate.

44 Source: CACES, 2009, pp. 3–23.

- *Resolution*: After receiving the written report from the team of peer evaluators, the Commission holds one of its members responsible for an in-depth analysis of the case with the objective to get familiar with it and to be able provide input to the other members on the matter. This process ends with a confidential report, which must be known by all members of the Commission and the Executive Directorate.

The Commission celebrates the so-called "Accreditation Session" (CACES, 2009, arts. 50, 51). Members of the Commission will deliberate privately and then cast their vote, in accordance with the provisions of the Special Regulations and the Internal Rules of the Commission. As a result, a final resolution will be issued and later signed by the attendees. The certification thereof will be signed jointly or separately by the President and/or Secretary of the Commission of Accreditation and will not admit any resource. This resolution is communicated in writing to the Ministry of Education and to the requesting institution within three days of its decision. There are three possible outcomes for the final resolution issued by the Commission:

- *Accredited institution*: if it meets all the accreditation requirements. The institutional accreditation will be valid for five years.
- *Candidate institution*: if it does not meet all the requirements to be accredited, but if it has a high probability of meeting them within a certain period of time.
- *Denied institution*: in this case, the requesting HEI will not be able to present a new application for accreditation until the next call to the Commission, two years after the negative resolution.

In addition to the state agency described above, two independent accreditation agencies operate in the region: The Central American Agency for the Accreditation of Architecture and Engineering Programs—Agencia Centroamericana de Acreditación de Programas de Arquitectura e Ingeniería (ACAAI)—, and the Central American Agency for Postgraduate Programs—Agencia Centroamericana de Acreditación de Posgrados (ACAP)—.

Francisco Gavidia University was reaccredited by the CdA in 2017 and the Faculty of Engineering and Systems is aiming to apply for the accreditation of the degree "Engineering in Computer Science" with ACAAI. The university has also a certified quality system under the ISO 9001:2000 standards.

Although accreditations are institutional achievements, some units are more involved in the process. For instance, the Academic Unit of Strategic Management is usually involved in the national accreditation processes and has deep knowledge of the legal requirements set by the Ministry of Education; the

quality system is managed by the Office of Quality; and every faculty takes responsibility for the accreditation of specific degrees or programs.

The desire to keep the existing accreditations and apply for new ones has set in place a series of mechanisms that contribute to the periodical evaluation of the faculty members, employees, and processes; a set of key performance indicators; and the continuous improvement of the teaching-learning processes and academic quality.

Funding and Financial Management

In El Salvador, the lack of resources generates problems to increase the coverage of Higher Education. The country spends much less on Higher Education than most countries in the region; indeed, it represented 7.9% of the public total spending in 2015.

Public and private education are funded differently. Public Higher Education poses major demands to the national budget, with the private sector and international donors assuming a small fraction of the spending. Public HEIs are financed mainly through taxes and are highly dependent on the central government to obtain their financial resources. Students pay a symbolic amount for their studies in public HEIs and attempt to increase these fees face severe resistance.

In El Salvador, a very small percentage (approximately 7.5% of the bilateral development funds) is allocated to support educational programs. Only a handful of these programs are geared towards Higher Education. Nearly half of the development funds contributed by the ten largest donors are allocated to infrastructure and economic development programs.

In addition to being underfunded, public HEIs in El Salvador lack the authority to make key academic, financial, and personnel decisions, which contributes to their slowness in transferring responsibility to their departments for decision-making processes. Despite great efforts, poor governance reduces the ability of HEIs to adequately spend their available financial resources (USAID, 2016).

Private universities, on the other hand, get most of their revenues from tuition and fees that are charged directly to the students. Grants and international donations are alternative sources of income. These revenues are used to cover basic operative expenses (e.g., faculty salaries, maintenance, utilities, and other services), conduct research, acquire fixed assets, and execute projects. HEIs enjoy financial autonomy, within the limits of their own internal financial policies. The only legal restriction, and maybe the most important one to keep the

system afloat, is that universities are not allowed to pay dividends since they are legally considered non-profit public benefit corporations.

Many universities (UFG among them) have an Office of Finance to manage their resources. In line with the institutional strategic plan, every year during the second semester all units prepare their budgets for the following year, explaining how the resources requested are going to contribute to achieving the goals of this plan. Then the university's individual budget is submitted to the Office of Finance, where it is either consolidated or returned with observations. Once the institutional budget is complete, it is submitted for approval to the executive levels of the university.

All funding requirements regarding the operations of the different units must be channeled through the Office of Finance. This centralization has the advantage of better financial control and works smoothly for recurrent activities. However, for non-recurrent activities (for example, special projects) the response time is usually longer, and this circumstance should be taken into account while planning such projects.

Challenges and Opportunities

For public institutions, low internal efficiency is a problem that is reflected in the spending of Salvadoran Higher Education. Private education also has conundrums: for most of the population, tuition and fees costs act as a barrier that restricts access to Higher Education only to those that can afford it. This is a problem in a country where a big percentage of the population earns a minimal wage. Both scenarios result in low coverage and high dropout rates: the gross enrolment rate in El Salvador is 27%, but in 2016 the graduation rate was only 7.9% (The World Bank, 2015). Finding a satisfactory solution to this problem could alleviate budget constraints and provide the basis for improving quality and increasing coverage.

Successful experiences in terms of financing Higher Education in countries such as Colombia and Chile offer good policy alternatives for El Salvador. These countries are among the Latin American countries that allocate the lowest public spending to Higher Education relative to GDP, and both countries supplement public subsidies with private contributions. In addition to increasing investment, private contributions have the potential to make the Higher Education system less vulnerable to fluctuations in the public sector's ability to invest in education.

Relying financially on the government means that funding levels are unstable and unsustainable because they fluctuate with the rise and fall of state resources. In many Central American countries, Higher Education budgets are

set constitutionally as a percentage of public spending. While this is intended to depoliticize funding, in practice it weakens the incentives for good performance and creates a broad perception that Higher Education receives an unfair share of the national budget (Eriksson, Kreimer, and Arnold, 2000). Hence, the lack of sustainable financing continues to limit the growth of enrolment rates and skews Higher Education towards low-cost and low-quality programs. Traditional ways of financing HEIs, therefore, require changes to a flexible system that appeals to both public and private financing sources.

Research and Publishing

The Vice-Ministry of Science and Technology, through the National Council of Science and Technology (CONACYT), publishes important statistical reports with updated information about the state of research in El Salvador. Here are some from those reports, addressing 39 HEIs:

- In 2016, $12 million (4.10% of the budget) was spent in research and development activities.
- Approximately 65% of the R&D expenses are operating expenses and the difference corresponds to capital expenditures.
- The three fields of study with the highest investments are, in that order: social sciences, medical sciences, and engineering and technology.
- In terms of socioeconomic objectives, universities have invested mainly in social structures and relationships (41.6%), then protection and improvement of health (28.5%), and lastly industrial manufacturing and technology (13.5%).
- In 2016, the statistical report identified 108 full-time researchers (73 male and 35 female), and 682 part-time researchers or research faculty (395 male and 287 female).
- Most of the researchers only have a bachelor's degree.
- At university level, a total of 504 projects were identified.
- Scientific publications in 2016: 94 bulletins or magazines with ISSN, 49 of them from social sciences; and a total of 106 books, being 50 of social sciences and humanities, 29 of engineering, 11 of exact sciences, 15 of medical sciences, and 1 of agricultural sciences.
- Regarding patents, in 2016, 25 were requested and three were approved, achieving a coefficient of invention 0.38, self-sufficiency rate 0.11, and dependence rate of 7.84.

The current state of R&D activities within universities is not impressive. The budget for research comes mostly from the universities' budget plus some donations from cooperation agencies, NGOs, and government grants; but this is only a small percentage of the total. Nevertheless, the scientific and research culture in the country has been evolving from a theoretical model focused on social studies, towards a new model of applied research in the sciences and in new lines of research.

Francisco Gavidia University promotes research in two ways: first, it has created an Institute of Science, Technology, and Innovation (ICTI) that has full-time researchers in approximately 17 lines of work related to social sciences, natural sciences, exact sciences, and technology. The ICTI also edits and publishes an institutional magazine: *"Realidad y Reflexión" ("Reality and Reflection")*. Secondly, it has recently created a Research Center, specialized in Information and Communications Technologies.

However, there is an outstanding issue for the whole Higher Education system: research is not a part of the organizational culture. Plagiarism is a serious issue in academic papers delivered by students, and many of them do not even include proper citations. Part of the goals of the Research Center previously mentioned is to help students and faculty members to develop skills for the analysis and synthesis of information and academic writing.

A timid intellectual property system is another of the weaknesses. If the results of a research project are not going to be appropriately protected, then the motivation to invest time and resources to produce new knowledge/technology is insufficient.

Internationalization

El Salvador is facing interesting changes to reach a knowledge-based economy, as it needs of the collaboration between governments, the productive sector, and universities in order to influence the public good (Pasque et al., 2005). Higher Education institutions in El Salvador have an important opportunity for improvement in terms of the enrolment of international students, universities' ranking, the attendance of international congresses, the participation in professional associations, the collaboration with universities abroad, and the publications record on journals with a considerable impact factor tied to the publication on languages different than Spanish.

The ways to provide education and to get educated are changing. This is particularly true in the Salvadoran context, in which a significant number of students usually have a full-time job. Having some other young students living in areas surrounded by crime and danger, the opportunity to provide online

education has proven to be an appropriate course of action. At the same time, Salvadoran young folks that emigrate to other countries occasionally are interested in finishing their studies and thus ask about options to study remotely. The pursuit of Higher Education in El Salvador is therefore inevitably linked to the family economy: a good number of students are also working, limiting the time they can invest in their education, undermining the intentions to get a graduate degree. However, there is a number of Salvadoran students pursuing degrees abroad (Saunders et al., 2012).

Salvadoran Students Abroad

The Directorate for External Cooperation of the Ministry of Foreign Affairs of El Salvador revealed that a total of 3,452 students were granted some form of scholarship to study abroad in the period comprised from 2014 to 2016.

The granting of scholarships to Salvadoran students is performed through international cooperation in different ways. The main sponsors for such programs are international bodies, international aid agencies, and governments from "friend" countries such as Japan, Korea, Israel, India, and Mexico, which provide the largest number of scholarships.

Most doctoral studies are performed abroad due to both the limited offer or the low quality of local doctoral programs, and the perception of higher academic quality offered by institutions abroad, especially due to the low level of development of techniques, methodologies, and theory in El Salvador.

International Students

According to the data published by the Ministry of Education of El Salvador and gathered in the Indicators of Human Resources in Science and Technology of El Salvador, for the period between 2004 to 2015, a total of 8,454 international students were enrolled in Salvadoran HEIs.

Most international students enrolled in the Salvadoran Higher Education system come from other Central American countries, Mexico, and the United States of America. These students undertake mainly undergraduate programs in the fields of Medicine, Theology, Business Administration, and Orthosis and Prosthesis (Orantes, 2011).

Publications

The publishing process is facilitated by international databases and journals such as the Science Citation Index (SCI), Scopus, Pascal, INSPEC, and Compendex, among others. In the period that goes from 2008 to 2016, a total of 501 publications with their respective ISSN were produced. However, nearly all

publications are in Spanish, reducing the impact that such publications can reach; and the number of publications in peer-reviewed high impact journals remains unclear.

The number of Salvadoran professionals hired abroad has not been determined yet, making it difficult to identify not only the demand for Salvadoran professionals outside of the country, but also the opinion that the international community has about them. In order to attract international students and to become international providers, HEIs in El Salvador have the opportunity to broaden their course offer in alignment with international standards, accreditations, and certifications.

The establishment of alliances between universities, technical institutions, and the productive sector is fundamental to facilitate a sustainable growth and to perform research and development more efficiently. This could have a real impact in the improvement of production processes and the development of innovative products, both nationally and internationally.

Salvadoran universities are thus facing a new challenge: to prepare themselves for a new culture of internationalization and its demands. For instance, in terms of languages, Spanish is still perceived as the most appropriate language for publishing papers. Indeed, many faculty and students reject the use of primary sources that have not been translated into Spanish, limiting themselves to the acquisition of updated knowledge and the latest discoveries in many scientific fields.

Cooperation and standardization among Salvadoran HEIs are essential for internationalization as well. There is still room for improvement in terms of performing research in collaboration with universities around the globe. To do so, universities should improve the quality of their professionals (modifying the current paradigms and mindsets regarding research and the production of PhDs) in order to be at par with those graduated abroad.

Conclusion

For the most part of the previous two centuries, the Salvadoran Higher Education system was comprised of a single institution: the University of El Salvador. With the enactment of the Private Universities Act in 1965, new actors joined the landscape to meet the unsatisfied demand for Higher Education and the number of institutions grew exponentially. Nonetheless, this "university explosion" led to the emergence of new challenges due to the flexibility of the legal framework and, 30 years later, a new law was enacted in an attempt to fix some of these problems.

Since then, academic quality has improved dramatically and many pseudo universities that were not able to meet the requirements of the new Higher Education Act were forced to close their doors. However, as the existing laws only outline minimum requirements for operation, regulations are not sufficient to achieve academic excellence. Salvadoran universities must look beyond the law and apply for national and international accreditations, aiming to standardize their curricula and to prepare their students to compete for a position in the workforce on an international scale.

Despite the improvements, the Salvadoran Higher Education system still needs to face important challenges such as:

- Promoting collaboration between academia and industry. New professionals are going to apply for a job either in the private sector or in the government, unless they become entrepreneurs or stay in the university as scholars. Universities need to know the needs of these actors to prepare their students for their lives as part of the workforce. Additionally, collaboration could lead to discovering new opportunities for applied research.
- Designing and implementing a model that increases Higher Education coverage and reduces dropout rates, making Higher Education accessible for the majorities.
- Reforming the existing legislation to include new requirements which help enforce the improvement of the quality of Higher Education institutions and their academic programs.
- Increasing the investment in research and development activities, and including other participants (such as private investors) in this effort. Businessmen are willing to support research activities provided that there is a chance that a new product or service that meets their needs will be developed as a result. Although not all projects will be successful, the creation of this kind of relationships will certainly contribute to developing ties that will benefit Salvadoran society.
- Building human capital for research and development activities. This entails providing opportunities for existing faculty members to pursue graduate studies and PhDs, and training students on academic writing and the use of primary sources written in English to compose their papers. Furthermore, research activities need infrastructure and an adequate environment that triggers creativity and innovation.

Internationalization is one of the major mandatory components of the management and policy of Higher Education institutions. It can take the form of institutional, student, or academic mobility; yet, it is a dynamic that goes further

and is placed in the very philosophical constitution of the universities. The creation of comparative curricula, articulation agreements, double degrees, etc., make up a structuring system that is associated with a system of global education (in construction) in which the Higher Education institutions of El Salvador must strengthen their financing and ensure their sustainability. Some important steps have been taken, but the journey towards excellence continues.

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Alan Chacón

Higher Education in Honduras

Abstract

The present text briefly evaluates the Honduran Higher Education system, stressing some fundamental aspects such as the advances that have been made in this field. To draw conclusions on this regard, this analysis has considered the structure of the system, the academic offer, and the impact that this progress has had nationally. Furthermore, this text acknowledges other aspects such as the administration practices of local human and financial resources, the quality of education, the development of research projects, and the universities' management tendencies which help stablish the linkages among society.

The main findings not only help comprehend the development of the Higher Education system of the country, but also display the need to foster improvements in the field at a faster pace in accordance with the significant educational demands and the need to promote change in the Honduran society.

Keywords: Higher Education Institutions, Higher Education System, Honduras, Human Resources, Quality Assessment, Research.

Introduction

Evaluating the educational rates in a country helps determine the degree of development that such country has experienced. In Honduras, this rate has been steadily growing at a slow pace. Evidence of this is the slight increase in the schooling rates at the different educational levels of the population, which can be observed in Figure 1.

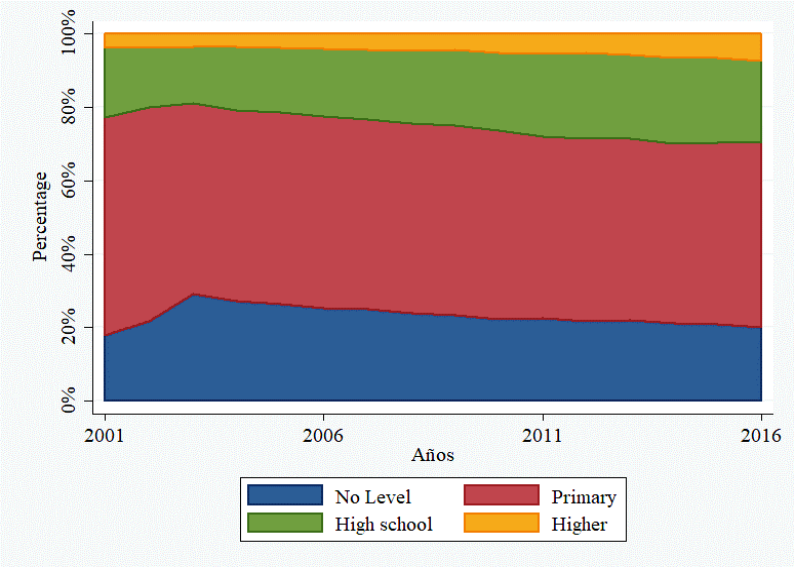

Fig. 1: Educational level of the Honduran population from 2001 to 2016[45]

According to the data acquired from several permanent surveys carried out at multipurpose homes—Encuesta Permanente de Hogares de Propósitos Múltiples (EPHPM)—and prepared by the National Institute of Statistics (INE), the educational level of the Honduran population developed particularly between 2001 and 2016. There are two conclusions to be drawn from this: firstly, there has been an scarce increase in the scholastic strata and a limited decrease of the non-schooled population; and secondly, public policy should foster the increase of the schooling rates, particularly at secondary and Higher Education levels.

[45] Source: INE, n.d.

Moreover, as the enrolment of Hondurans in Higher Education is quite low, it can be argued that educating the population of the country at such level tends to present a greater challenge. This results from the limited access of the local population to educational centers where the transition from a primary to a secondary level education could take place. Indeed, this is further aggravated by the fact that students undertaking secondary education and willing to access tertiary education are not always able to access Higher Education centers.

Some indicators show the progressive development of population's schooling rates. An example of this is the Gini coefficient measured for years of schooling, through the Socioeconomic Database for Latin America and the Caribbean (SEDLAC). Figure 2 shows the evolution of this coefficient in the period 1990-2016.

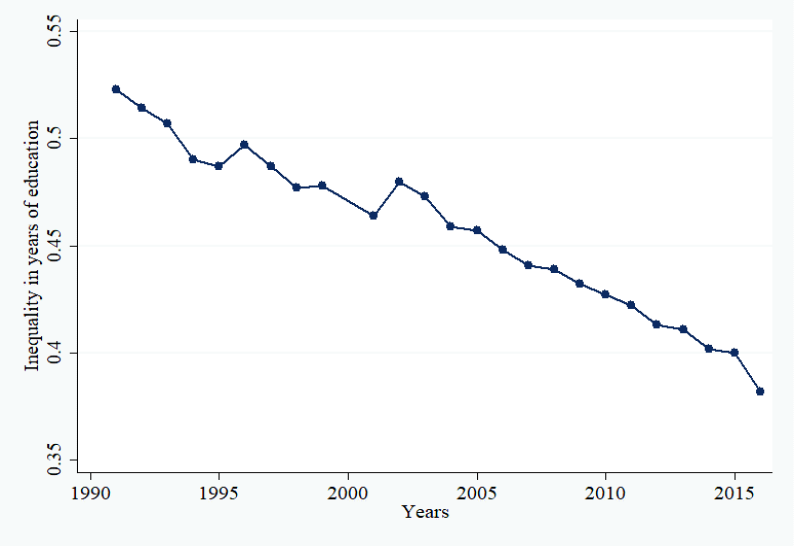

Fig. 2: Inequality in the years of education in the period 1990-2016[46]

It can be observed that the Gini coefficient in Honduras has been reduced in years of education, which can be explained by the slight increase of the population with secondary and Higher Education. Also, this can be attributed to the fact that the gap of years of education in Honduras has not been so wide.

46 Source: SEDLAC, 2018.

Considering part of the context of the education system, it is necessary to outline that the most influential institutions in terms of education in the country are the Secretary of Education and the National Autonomous University of Honduras—Universidad Nacional Autónoma de Honduras (UNAH). For this purpose, it has been determined by legislative decree that "[e]ducation at all levels of the formal education system, except the higher level, will be authorized, organized, directed, and supervised exclusively by the Executive Branch through the Secretary of State in the Office of Education" (SEP, 2012).

Based on the previous decree of the law, it has been established that "[t]he National Autonomous University of Honduras [...] is exclusively in charge of the organization, management and development of higher and professional education" (UNAH, 1994, Art. 2). Therefore, it is expected that the good performance of the country's education policy will depend to a large extent on the way both institutions complement their decisions, so that a single educational model is followed under the same logic at all levels of education.

Given that this document focuses on the analysis of Higher Education, emphasis will only be on the actions that have already been taken to contribute to the growth of such educational level's rates. It should therefore be noted that the process by which the UNAH authorizes, organizes, directs, and supervises education at the higher level is carried out by four agencies of this institution: Full Senate, Higher Education Council, Technical Council and Higher Education Directorate (UNESCO, 2007).

The main body in charge of decision-making processes and the management of the Higher Education system is the Higher Education Council—Consejo de Educación Superior (CES). It is within its competence to create new policies, authorize the creation of public or private Higher Education centers, and approve the opening, operation, merger, or suppression of schools, faculties, careers, institutes, or scientific research centers (UNESCO, 2007).

Currently, there are 20 Higher Education centers in Honduras, 6 of which are public and 14 private, preparing the students in the undergraduate degree, university technicians, specialties, subspecialties, and master's and doctorate's degrees (DES, 2017).

Nationwide, the UNAH is the university Center performing the largest academic offer at undergraduate and postgraduate level, reporting 147 study programs in 2017 (DES, 2017). Special mention deserves the Central American Technological University as well, with an academic offer that amounts to 60 undergraduate and postgraduate study programs. Figure 3 shows each of the Higher Education centers in Honduras, which have been classified according to their importance in terms of their undergraduate and postgraduate academic programs.

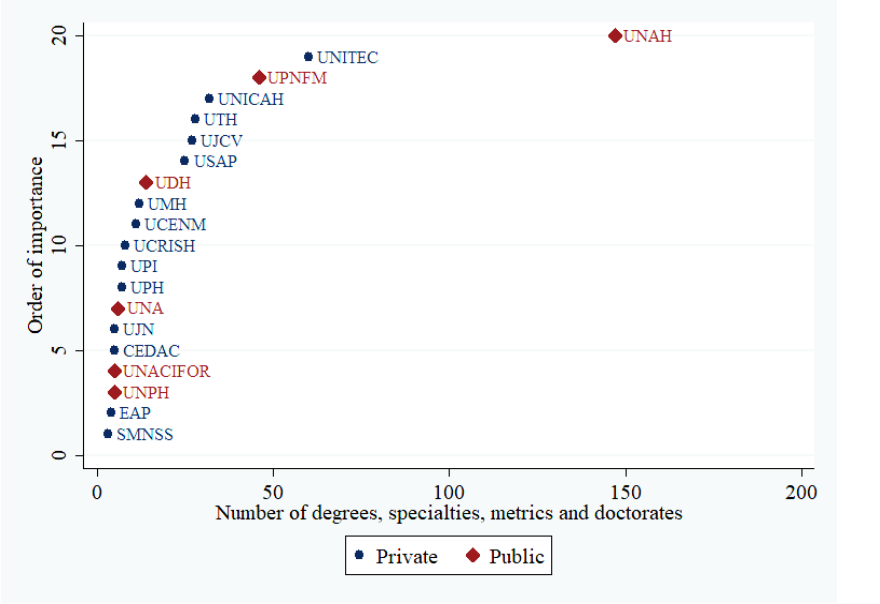

Fig. 3: Academic offer of the university centers of Honduras to the year 2017[47]

These university centers have presence in the country through face-to-face and distance education modalities. In 2015, the country registered a total of 79 educational centers derived from the 20 Higher Education institutions (HEIs) operating throughout the 18 Honduran departmental divisions, also known as departments (UNAH, 2015). Figure 4 shows the distribution of university centers by departmental divisions.

47 Source: DES, 2017.

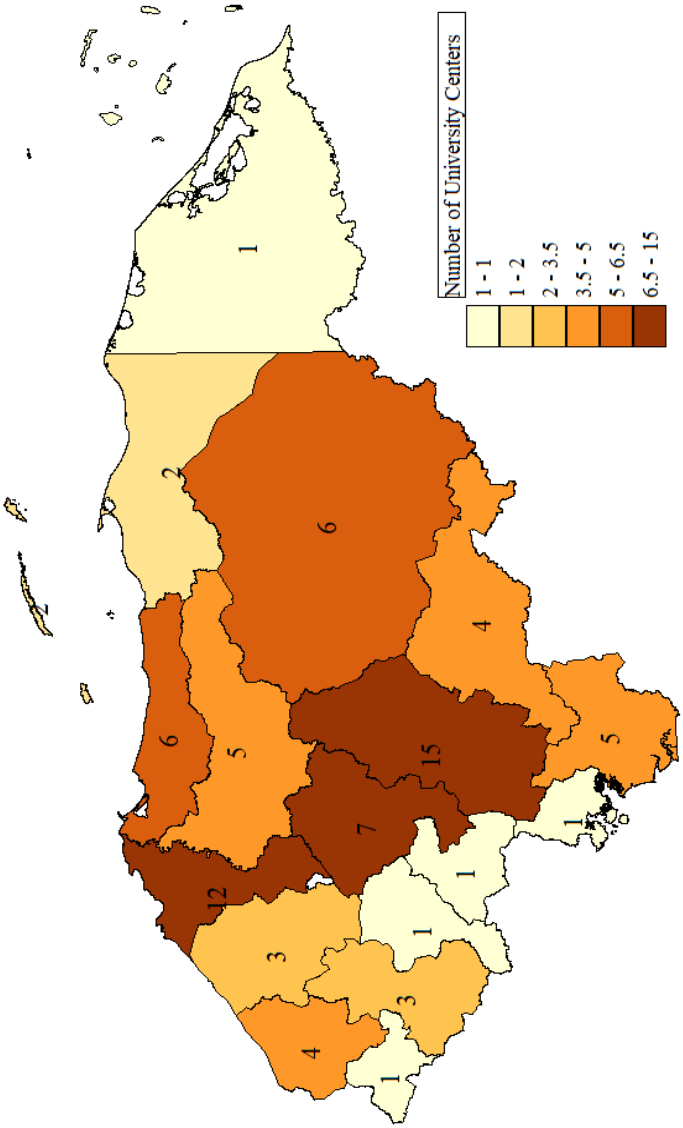

Fig. 4: Amount of Higher Education centers distributed by departments[48]

[48] Source: UNAH, 2015.

The current distribution of university centers by departments is largely due to the demand generated in the different geographical areas. Nevertheless, this can also be associated with each area's socioeconomic development. It should indeed be noted that in the less developed regions there is a certain level of demand that is not being addressed due to the low educational offer available. This hinders access to Higher Education mainly in rural areas, since young people who have finished high school and wish to obtain a university degree may have a budget restriction that stops them from further investing in their education.

In fact, university education in rural areas might imply higher costs than in urban areas. Along with the fact that 65.82% of the university centers distributed throughout the country are private, which per se implies significant economic costs in order to join any university program, extra housing and transportation expenditures should be considered (UNAH, 2015).

Given the low educational offer in the country, the coverage rate for potential students at Higher Education levels observed in Table 1 falls well short of being satisfactory. In this table, population between 18 and 24 years old is analyzed in order to compare enrolment rates in the Higher Education system. During 2016, such rates remained below 20% (DES, 2018).

Years	Estimated population between 18 and 24 years	Enrolment in Higher Education Centers	Coverage rate
2007	1,017,974	144,504	14.2%
2008	1,036,141	150,083	14.5%
2009	1,065,278	159,631	15.1%
2010	1,078,855	169,878	15.7%
2011	1,103,726	172,811	15.7%
2012	1,130,578	174,837	15.5%
2013	1,158,837	183,626	15.8%
2014	1,187,766	185,876	15.6%
2015	1,208,791	195,265	16.2%
2016	1,223,043	201,821	16.5%

Table 1: Coverage of Higher Education centers in Honduras 2007-2016[49]

[49] Source: DES, 2018, p. 66.

Due to a greater demand on Higher Education Services and a low supply, the information observed in Table 1 presents the potential problem that Higher Education in Honduras may be experiencing in relation to the shortage on tertiary education services. To solve this, the National Autonomous University of Honduras has established a strategic action plan that, among other actions, intends to increase the current supply of Higher Education services. By offering greater access to tertiary education in the country, society's labor needs would be better covered. This would subsequently help balance tertiary education coverage in Latin America in line with Honduras' development priorities (DES, 2014).

Industry-University Relations

Through linkage programs, Honduran Higher Education centers are fulfilling their role in disseminating scientific knowledge to the community (DES, 2018). The link or relationship that exists between university institutions and society helps overcome certain problems and cover social demands, paying special attention to the specific needs of the most vulnerable sectors of society.

The development of these linkages has been discussed previously and is considered one of the greatest challenges that HEIs in Honduras are facing. Accordingly, Salomón (2011) refers to these challenges indicating that there should be a connection between universities, the State, and both private and social organizations. The author also stresses the importance of developing a sense of social responsibility beyond the exclusive pursue of the welfare state, as the transfer of knowledge consists of a joint work in coordination with any actor willing to promote social change (Salomón, 2011, p. 5).

Likewise, Calderón Padilla (2011) argues that Honduran universities have neither assumed nor developed the task of establishing links as one essential activity at their institutions yet. This unfortunately places Higher Education at a comparative disadvantage regarding the universities of the Central American and Latin American regions. Therefore, it is necessary to address this essential task and highlight that the relationships established between universities and society can contribute to promote scientific knowledge, opening up the possibility of achieving a greater economic and social growth in the country.

Currently, Higher Education centers in Honduras have established multiple agreements to foster the reinforcement of links and collaborations. The main actors taking part in these agreements are the State, private companies, non-governmental organizations, international organizations, civil society and universities. Indeed, as stated by the Higher Education Directorate, by 2016, already 17 universities had 395 agreements with different institutions to develop

link activities (DES, 2018, pp. 41–45). Some of the activities that these new collaborations have endorsed are the following:

- The UNAH has now established an ongoing dialogue with civil society to cover topics regarding potential areas of development in the country, such as health, education, security, and reduction of inequalities (DES, 2018, p. 62).
- The National Pedagogical University Francisco Morazán—Universidad Pedagógica Nacional Francisco Morazán (UPNFM)—is carrying out networking activities with different international educational institutions in Europe and Latin America, where both students and teachers are able to participate (Ibid.).
- The University of Forestry Sciences—Universidad Nacional de Ciencias Forestales (UNACIFOR)—has developed and maintained links with agroforestry companies in the country through courses and training. Such educational activities are suitable to trust and water boards, mainly focusing on issues directly related to governance, management of hydrographic watersheds, nursery, and forestry and agroforestry plantations (DES, 2018, p. 62).
- The Technological Central American University—Universidad Tecnológica Centroamericana (UNITEC)—has come to an agreement with different civil society organizations, cooperating in infrastructure projects and feasibility studies (Ibid. p. 42).
- The Catholic University of Honduras—Universidad Católica de Honduras (UNICAH)—has established connections through agreements with the civil society on issues related to human rights and different aspects of international development (DES, 2018, p. 62).

Table 2 shows those organizations collaborating with the different Higher Education centers in Honduras. Although linkages between universities and society are progressively increasing over the years, it is necessary to indicate that there is still a lot of work to be done in order to solve the socioeconomic problems which the country is facing.

Higher Education center	Number of agreements	Collaborating institutions
Autonomous University of Honduras (UNAH)	107	Private companies Civil society Commonwealth International Cooperation Agencies (ICA): NGOs, United Nations program for development (PNUD), USAID, European Union
National Pedagogical University Francisco Morazan (UPNFM)	31	Private companies Civil society Commonwealth: municipalities International Cooperation Agencies (ICA): Care, Childfound, German cooperation (GIZ), World Vision
Jose Cecilio del Valle University (UJCV)	12	Private companies Civil society: National Anticorruption Council, Association of Municipalities of Honduras, Sustainable Development Network International Cooperation Agencies (ICA): GIZ, European Union
Central America Technological University (UNITEC)	11	Private companies Civil society: Association of Municipalities of Honduras
Technological University of Honduras (UTH)	5	Private companies Civil society International Cooperation Agencies (ICA): German cooperation GIZ,
Catholic University of Honduras (UNICAH)	25	Private companies International organizations: Human rights and development International Federation of Catholic Universities

Higher Education center	Number of agreements	Collaborating institutions
University of Design in Honduras (CEDAC)	9	Private companies International Cooperation Agencies (ICA): Inter-American Development Bank (IDB), United Nations program for development (PNUD), European Union Commonwealth: Mayor of Tegucigalpa and Siguatepeque.
New Evangelical Christian Evangelical University (UCENM)	8	Private companies: Association of Aviculturists University of Distance Education, Spain
National Agricultural University (UNA)	6	Private companies Civil Society Commonwealth: 18 departments and 100 municipalities
Christian University of Honduras (UCRISH)	3	-
Polytechnic University of Honduras (UPH)	-	-
Jesus of Nazareth University (UJN)	2	Private companies Civil Society
University of San Pedro Sula (USAP)	5	Private companies: Chamber of Commerce and Industries of Cortés Civil society
National Defense University (UDH)	1	Private companies: National Association of Industrialists of Honduras
Pan-American Agricultural College (EAP)	14	Social Project Student Bag Private companies Civil Society

Higher Education center	Number of agreements	Collaborating institutions
National University of Forestry Sciences (UNACIFOR)	25	Private company: sugar refineries, water purifiers, forestry, banking, energy Commonwealth: Association of Municipalities of Honduras International Cooperation Agencies (ICA): German cooperation GIZ, Central American Bank for Economic Integration (BCIE), Spanish Cooperation
National University of the Honduran Police (UNPH)	3	International Cooperation Agencies (ICA): United Nations program for development (PNUD)
Metropolitan University of Honduras (UMH)	128	Private companies: International Freight and Logistics Agencies Civil society: governance and public administration Commonwealth: local development International organizations: tourism, business and social communication

Table 2: Agreements and organizations involved in the work of linkages between Higher Education centers[50]

Furthermore, within Higher Education in Honduras, all activities carried out jointly with member universities of the National Council of Higher Education (CNE) help create educational models intended to establish parameters which will facilitate the development of the community.

The current educational models strengthen university-society relations, which gives an opportunity to reflect on both the production of knowledge according to the needs and expectations of the labor market. Moreover, these models increase the satisfaction of society in general by facilitating the training of future professionals capable of facing the different challenges of modern education in an integrated manner, in line with the demands of a globalized world.

[50] Source: DES, 2018, pp. 41–45.

The creation of the educational models must consider the competitive employment of universities (where knowledge is developed) within and outside the region. As a result, the importance of the highest levels of knowledge and the various technological innovations would be emphasized. Such emphasis would subsequently lay the foundations for the success of universities within the educational sector as well as for the expansion of scientific research, strengthening the linkages between universities and the different sectors of society.

As part of the challenges faced by Higher Education systems, it is important to consider the different changes that education is facing over time due to both scientific and technological advances. By paying attention to such changes, it will be easier to create study programs in line with the interests and needs of younger generations.

> The most important changes in the way universities define their functions are determined by relevant social events. Examples of this would be the industrial revolution in Great Britain, the Napoleonic era in France, and the establishment of socialism in many countries, mainly in the Soviet Union (Bojalil, 2008, pp. 11–12).

Education today requires the development of skills that lead to the strengthening of research capabilities and the construction of new concepts, emphasizing the development of critical thinking through reasoning in order to produce greater knowledge (Núñez-López, Ávila-Palet, and Olivares-Olivares, p. 86). Therefore, it is necessary to foster Higher Education for the preparation of professionals and technicians capable of meeting upcoming economic, scientific, and technological demands which are essential for the growth of the whole nation.

Bearing in mind that the population capable of attending university presents the lowest levels of access to Higher Education, universities must undertake measures within the educational system in order to increase the amount of population attending tertiary education. This way, it would be easier to guarantee a society with a broader level of scientific and technological knowledge.

Human Resources Management

The data presented by the Higher Education Directorate in 2016 shows the available number of lecturers per university in the country. The registered number results primarily from the academic offer available at each institution. Some university institutions apply different criteria to employ teaching staff and classify them according to their work schedule. By means of Table 3 it can be

observed that in some universities the definition of teaching staff is classified as an employee who works by hour, part-time and full-time.

Institution	Full-time	Part-time	Per hour
National Autonomous University of Honduras (UNAH)	3,066	0	707
National Pedagogical University Francisco Morazán (UPNFM)	394	26	7
National University of Agriculture (UNA)	170	0	0
National University of Forestry Sciences (UNCF)	33	0	0
National University of the Honduran Police (UNP)	0	0	32
University of Defense of Honduras (UDH)	44	0	44
José Cecilio del Valle University (UJCV)	4	1	220
San Pedro Sula University (USAP)	0	0	257
Technological Central American University (UNITEC)	299	1,345	0
Major Seminary Our Lady of Suyapa (SMNSS)	8	0	28
Technological University of Honduras (UTH)	16	0	676
Pan-American Agricultural School (EAP)	105	0	0
Catholic University of Honduras Our Lady Queen of Peace (UNICAH)	669	0	409
Center for Design, Art and Construction	2	0	39
New Evangelical Christian Evangelical University	0	0	511
Universidad Metropolitana de Honduras	0	0	291
Christian University of Honduras	0	0	192
Jesus of Nazareth University	3	1	40
Polytechnic University of Honduras	0	0	114
Polytechnic University of Engineering	2	0	33

Table 3: Number of academic employees at university centers in 2015[51]

[51] Source: DES, 2018, p. 57.

In a similar way, these classifications can be subdivided into other categories that further distinguish between different types of employees. Such is the case of the UNAH, which subclassifies those employees who have achieved a higher academic level or have specialized according to the courses and degrees they have completed. In this manner, employees are promoted to a higher category, which simultaneously translates into a higher salary while giving them the opportunity to present their candidacy for other positions at the university. For instance, such positions could entail new coordination tasks as head of department, research institute, master's program, or doctorate's degree.

Such categorization applied by the UNAH is similarly performed by some other universities. Yet, in this case, those lecturers willing to increase their wages are expected to undertake a compulsory training provided by the institution to which they work for.

Alternatively, other universities may apply the conventional employment standards to recruit the necessary human resources. In this scenario, as is the case of UPNFM, UJCV, UNITEC, and UJN; the part-time figure is considered.

Quality Management and Accreditation

Honduras lacks a national system that guarantees the quality of education itself. Each institution manages its own internal policies to ensure the best education for their students based on the data provided either by the Secretary of Education of Honduras (in the case of elementary and secondary education) or by the Board of Superior Education (in the case of tertiary education).

Thus, the UNAH, UPNFM, and UNA have decided to become members of the Central American University Superior Council (CSUCA), an institution created in order to enhance the quality of Higher Education in Central America (DES, 2018, p. 59). In pursuing this goal, CSUCA has created the Central American System of Evaluation and Accreditation of Higher Education (SICEVAES), as well as some regional agencies intended to evaluate specific areas of undergraduate and postgraduate education, such as the Central American Agency for Accreditation of the Agrifood Sector and Natural Resources (ACESAR), the Central American Agency for Accreditation of Architecture and Engineering (ACAAI), the Central American Agency for the Accreditation of Postgraduate Studies (ACAP), and the Central American Council for the Accreditation of Higher Education (CCA) (DES, 2018, p. 60). Lastly, in order to conduct the accreditation procedures of some private universities, the Association of Private Universities of Central America (AUPRICA) was created (Ibid.).

Nevertheless, out of the three universities that belong to the CSUCA, only the UPNFM has been fully accredited under the SICEVAES model. Indeed, by applying the same model, the UNAH had only completed the evaluation of 62 of its university study programs and the accreditation of one postgraduate course with the ACAP (DES, 2018, p. 60). For its part, 14 private universities have opted to obtain the accreditation provided by the AUPRICA (which is also recognized by international organizations), and UNITEC has developed quality accreditation processes with different organizations, both in the Central American region and beyond (Ibid.).

Otherwise, the Catholic University of Honduras (UNICAH) has been recognized as an institution that meets the standards of quality through the International Standards of Quality Management ISO 9000 (DES, 2018, p. 61). Aiming to increase its competitiveness, the UNICAH and other universities have shown a particular interest in carrying out international accreditations. Through internationalization, further alliances and better-quality standards in education can be developed in order to provide professionals with new skills according to work demands.

Funding and Financial Management

The financial management of an institution is not simple. Indeed, several challenges must be overcome to ensure that the institution can operate properly. The main challenge that HEIs are currently facing is the progressive increase of enrolment rates. Accordingly, universities are taking action within high schools (the target market of tertiary education institutions) to promote themselves.

Private universities' main source of income corresponds to monthly payments coming from students' tuition fees. These funding sources allow them to cover the costs associated with service provision. The Catholic University of Honduras, for example, finances itself through the collection of monthly payments that vary according to the field of study and its corresponding educational level (e.g. graduate, postgraduate or doctorate degree). These tuition fees have an annual increase of 5%, according to the fluctuations of the country's macroeconomic indexes.

The funds that this private institution receives are administered by each campus under the supervision of the Administrative Vice-Presidency. Each Campus Director, together with the Administrator, proposes an annual budget which is later reviewed by the Administrative Vice-Rector. Once the Administrative Vice-Rector makes the appropriate adjustments, the annual budget proposal is presented to the President of the University for review, adjustment and

approval. Once approved, the management of the budget itself corresponds to each campus, where an entity responsible of the proper administration of the funds, in accordance with the budgeted figures, is to be found.

In contrast, public universities are financed not only by government revenues, but also by tuition fees and services such as building lease to provide restaurant and administrative services to students. Furthermore, public universities can receive funding allocations to foster research. These funding allocations may come from cooperating countries and non-governmental organizations, among others. For instance, the UNAH's overall budget comes mainly from the state, followed by funding from private and international sources (see Table 4).

Source of Funding	Honduran Lempira (HNL)
Direct payments from the central government	2,041,021,720.00
Direct payments from local government	0.00
(A) Total public sources	**2,041,021,720.00**
Direct payments from home	674,230,522.99
Direct payments from other private entities	0.00
(B) Total funds from private sources	**674,230,522.99**
Direct payments from international sources	4.805.789,07
(C) Total funds from international sources	**4,805,789.07**
Total funds from all sources (A + B + C)	**2,720,058,032.06**

Table 4: Breakdown of the UNAH's funding sources in 2011[52]

Regarding the provision of scholarships, it is important to note that only officially enrolled students can receive external funds in order to attend Higher Education. Such funding may come from scholarships granted by the State or from private institutions.

The state is able to grant scholarships to students through institutions such as Educredito. Currently, the most relevant financial assistance is the 20/20 Plan Scholarship for both undergraduate and postgraduate studies. The requirements to apply for this scholarship, as well as the granted amount, vary between undergraduate and postgraduate programs. However, it should be noted that each student is expected to offer a social compensation to their country upon completion of their studies. This compensation would consist in working or

[52] Source: UNAH, 2011.

offering volunteer service to a public or private national institution in the area of their competence for a period of no less than two years. Failure to comply with this requirement would make the person concerned liable to an economic sanction. Such sanction would involve the payment of the scholarship's total amount in monthly installments.

Alternatively, private universities offer special programs that facilitate students' enrollment in Higher Education. The Catholic University, for example, administers the "Loan Grant" program, which may be partial (50%) or total (100%). This loan enables the student to attend university without incurring monthly payments. However, upon graduation and by the beginning of their employment, they must incur monthly payments established by the institution in order to cover the costs of their studies.

Another way to apply for scholarships for Higher Education both in and outside the country is through embassies established in Honduras. There are several scholarship programs promoted by these institutions and, to be eligible for any of these grants, a number of requirements should be met.

Research and Publications

Research is highly relevant for the development of a country and one of the essential academic activities of the Catholic University of Honduras. Its purpose is to generate new scientific knowledge, as well as to adopt or adapt to new technologies.

At present, each institution works individually to offer the best possible contributions in terms of research outcomes. Yet, as the implementation of joint research strategies might be the most efficient way to facilitate the identification and solution of the challenges that the country is currently facing, it would be best to approach research as a collaborative activity among the different academic institutions of the country.

Higher Education

The main purpose of conducting academic research at master's and doctorate's levels is to show the intellectual maturity of the students and their mastery of the scientific method achieved throughout the training process.

Institutions of the Country

In recent years, governments have undertaken cooperative research, development, and innovation activities with private companies. However, the Government of Honduras allocates a scarce amount of resources in research and development.

Teaching Research Integration

The current tendency is for the different undergraduate and postgraduate degree programs to include some subjects intended to impart essential knowledge on institutional research projects. For instance, these study programs include subjects such as Research Methodology and Research Seminar as a general standard, while Applied Research is regarded as mandatory for any technical degree program. The expected outcome of this initiative would therefore be to encompass the integration between teaching and research.

Yet, other public institutions such as the UNAH propose to foster interconnections between undergraduate and postgraduate courses. This could be done by establishing common research units, groups, programs, institutes, laboratories, or networks inside or outside the university. Consequently, all academic departments should reinforce the management and execution of scientific and technological research within or outside this public institution.

Aiming to meet the requirements of the different academic institutions, such Scientific Research System would foster the development of research training programs through diplomas, workshops, conferences, and numerous courses aimed at supporting research.

Other Institutions in the Country

The Honduran Institute of Science, Technology and Innovation (IHCIETI) is a governmental institution with two main purposes. On the one hand, the promotion of a progressive structural change which intends to achieve the proper use of the country's natural and human resources. On the other, the development of technological and innovative scientific capabilities in order to support the socioeconomic well-being of the nation.

As part of its approach, the IHCIETI annually invites students, professionals, and innovators in general to present research projects aimed either at the provision of solutions to general or specific problems in the country, or at the development of knowledge for the cultural and scientific enrichment of the country. Those research projects meeting the criteria are selected for funding.

Observatory of International Migrations in Honduras at UNAH

The creation of the Research Fund (FIOMIH) has been one of among many initiatives promoted by the Observatory of International Migrations in Honduras (OMIH) at UNAH. This fund has been created in order to provide partial or total financing for research projects covering international migration in Honduras. FIOMIH's main objectives are:

- The promotion of research through the observation, monitoring and systematic analysis of the international migratory phenomenon and policies concerning Honduras. This is achieved by partially or totally financing successful research proposals submitted during free competition calls.
- The support to create multidisciplinary and interdisciplinary research groups in the field of international migration. This, in turn, contributes to the formation of researcher networks in the field of international migration, involving those national and international universities, and civil society institutions engaged in research in this field.

Poor Participation

Given the limited participation of governments and private companies in matters related to scientific research, the Honduras Investigates Foundation (Fundación Honduras Investiga) was set up to provide an alternative that offers open spaces for scientific and technological research in the country. This initiative sets up programs and projects in which children, young people, and adults with innovative capacity are able to participate. As a result, this foundation supports the creation of new products capable of contributing to the national development.

Internationalization

Internationalization and its dynamics stand out among the most significant trends in Higher Education. Universities undertake different forms of participation, always maintaining common concerns such as the construction and dissemination of knowledge.

In this sense, Honduras is currently undergoing a rapid process of transition. Individual and collective efforts are supporting the process of formation and transformation of Higher Education by promoting a holistic, inclusive, and participatory vision of human talent. Therefore, the internationalization of Higher Education entails the integration of a global dimension into the teaching and research activities, among other services, provided by Higher Education institutions.

The internationalization of Higher Education is certainly one of the most important factors for the escalation of professional development and benefits both individuals and participative social entities in the same way. Yet, given the ongoing technological changes, the manner in which the construction of knowledge has been traditionally understood should be redefined in order to achieve proper internationalization. This would be facilitated by reinforcing supervision and dialogue dynamics from student or professional representatives of all academic programs.

In Honduras very specific socio-cultural factors are to be extrapolated from the different universities. These, however, are now required to adapt to the demands arising from the new professional skills' dynamics. By adjusting to the requirements of this global society individuals will gain professionalism thus developing human capital.

Nevertheless, to confront the paradigms imposed by the new international order, current university students are expected to be informed and actively participate in as many areas of knowledge as possible. This ought to consolidate the adoption of a global perspective so that their competences remain highly valuable to the different social contexts to the greatest possible extent.

In contemporary society, any Higher Education institution is part of the global academic world, and it cannot withdraw from international relations and academic exchanges abroad. However, when discussing the internationalization of Higher Education, this approach goes far beyond the promotion of international relations or international cooperation. In fact, this perspective covers the new responsibility of contemporary universities, which comes to emphasize the international dimension of their work as opposed to the traditional functions of these institutions.

Internationalization is encouraged through academic networks, twinning agreements between universities, horizontal cooperation, and the creation of expanded academic spaces. Moreover, another key element of this strategic collaboration is the establishment of new programs and agreements aiming to foster exchanges and training of both students and lecturers.

Internationalization Activities Carried Out by the UNICAH

- Meetings and national congresses with priests and international guests
- Training courses abroad
- Participation of foreign lecturers
- Participation in international congresses
- Academic tours
- Joint investigations

- Postgraduate studies abroad (alumni and lecturers)
- Diplomas and links with international entities

International Organizations and Agreements Established by the UNICAH

- Academy of Internal Medical Resident Studies (AMIR)
- Higher Institute of Psychological Studies (ISEP)
- Council of Ministers of Health of Central America and the Dominican Republic (COMISCA)
- Anahuac del Mayab University, support in the law mastery at UNICAH campuses
- Agostino Gemelli Hospital
- University of Salamanca
- Catholic University of Applied Sciences North Rhine-Westphalia
- As a member of the International Federation of Catholic Universities (FIUC), the UNICAH has participated in the completion of diploma courses and research with other member universities through its Research Coordinating Center.
- Konrad Adenauer Foundation has provided training in Social Market Economy, conducting research on migration and human rights issues together with the Irish Cooperation, José Simeón Cañas University of El Salvador (UCA), and PROCOMIN, a dependency of the National Autonomous University of Nicaragua.

It is important for every society to have a Higher Education system which facilitates an integrated process of globalization. This enables the different public and private universities to establish sustainable processes for the transfer of knowledge and the proper development of the international academic field.

Currently, different internationalization processes are being discussed. By the commencement of globalization only international university cooperation regarding students and lecturers was considered. However, the globalization of education itself, among other factors, has been gaining importance, challenging the traditional educational perspectives.

The aforementioned information regarding internationalization presents therefore clear challenges for the present society. In order to overcome these challenges the community should make us of supporting elements such as technological platforms aimed at teaching and learning processes. These platforms are essential for the development of professional skills and identities and are therefore supported by certification and accreditation processes both at a national and an international level.

Conclusion

As exposed in this chapter, it is clear that the Higher Education system in Honduras has managed to experience a certain degree of progress. However, it is necessary to increase the growth of tertiary education both in a quantitative and qualitative manner.

Several administrative and academic reforms thus need to be carried out in the current tertiary education system in order to increase its contributions during economic, political, and social transitions:

- Educational programs should always remain up to date, which means that current study plans ought to be regularly redesigned as a response to labor market demands.
- Teaching staff should receive training so that they can adapt more easily to upcoming changes.
- Scientific research should be promoted and so too the publication of results in high-impact journals, which would subsequently help climb up international rankings.
- Networking and collaborations with a greater scientific approach should be fostered.
- The enrolment in postgraduate and doctorate degrees should be promoted.
- The monitoring and extension of international accreditation processes should be facilitated.
- The current academic offer should be extended according to the real needs of the regions or departments in the country, which could by facilitated by establishing regional centers with a wider range of degree programs.
- New policies ought to be developed to support the participation of women and minority groups in Higher Education.

From a financial perspective, it is necessary to identify mechanisms to increase the revenue of tertiary education institutions (mainly public universities) in order to make effective the transformations of the Higher Education system. In this sense, it is also necessary to strengthen relations between universities and private companies to obtain funds which could then be useful for scholarship granting and the financing of research projects. Indeed, by facilitating the obtaining of scholarships, the international cooperation support would be reinforced. This would subsequently stimulate the enrollment in postgraduate and doctorate programs and would help update the electronic communication systems and the equipment available at the educational facilities, positively affecting both lecturers and students.

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An Overview of Higher Education in Mexico

Abstract

This chapter explores the status of Higher Education in Mexico. A basic description of the types of institutions, their population. and the corresponding legal system is provided. Then, an analysis regarding the collaboration that exists between industry and academic institutions is carried out. The Quality section discusses the institutions that guarantee the quality of education in Mexico and their impact on the development of educational institutions, and describes how these organizations operate (exemplified through the case of the University of Guadalajara). Afterwards, different types of funding are explained taking the University of Puebla as a reference point. An overview of the Mexican research system is given at a later point, including facts and figures about scientific research in the country. Finally, the text addresses the topic of internationalization: a recent practice born in the 1990s and early 2000s and carried out between private and public universities. This internationalization process is explained by means of a case study from the Instituto Politécnico Nacional. The text concludes with a critical analysis of the opportunities and challenges, as well as possible solutions, faced by Higher Education in Mexico.

Keywords: Accreditation, Development, Financial Management, Funding, Higher Education in Mexico, Industry-University Relations, Internationalization, Publishing, Quality Management, Research.

Introduction

At the beginning of 2018, Mexico's population amounted to 23,942,528 inhabitants, of which 49% were male and 51% female (INEGI, 2018). It is important to highlight that almost 10% of the population belongs to a native group better known as "indígenas," while the amount of individuals living in urban areas reaches 76% of the entire population, with more than 24,000,000 people living in Mexico City and its metropolitan area alone.

In 1999, the National Association of Universities and Higher Education Institutions—Asociación Nacional de Universidades e Instituciones de Educación Superior (ANUIES)—developed a classification system for Higher Education institutions (HEIs) that proved to be very useful.

The following classification is also used by the Ministry of Education (Secretaría de Educación Pública, SEP). There are 9 types of HEIs classified as follows:

- *Federal Public Universities*: They form the by far largest category of institutions. Many carry out important research programs and, although most of them are autonomous, they are funded with federal resources.
- *State Public Universities*: Similar to the previous group but funded with public resources.
- *Technological Institutes*: This type of institutes focus on short programs (2 or 3 years). They are located far away from the big cities and their graduates are technicians.
- *Public Polytechnic Universities*: These universities are a variation of the Technological Institutes and are based on different kinds of academic programs.
- *Public Intercultural Universities*: These institutions were established between 2000 and 2006 and are located near rural towns.
- *Private Institutions*: They operate with private resources. Although they are autonomous, they require the validation of the Ministry of Education, which is called Official Validation Studies Register—Registro de Validez Oficial de Estudios (RVOE). There are some public institutions such as the UNAM that can validate this certificate. They serve 29% of the students enrolled at a Higher Education level.
- *Pedagogy Institutions (Normales)*: These are institutions that focus on preparing teachers for elementary and high schools.
- *Public Research Centers*: This group is integrated by research institutions. Some of them offer undergraduate programs.

- *Other Public Institutions*: Some other types of institutions funded by the government.

In the 2016-2017 academic year, the ANUIES reported 2,655,980 students enrolled in public institutions, while 1,106,699 students were attending private institutions (ANUIES, n.d.). This means that 71% of all students in Mexico are attending an institution that is free of charge. Something important to see in the following graphics is that only 6.3% of the students are enrolled in graduate or PhD programs.

	Private Institution	Public Institution
Technical programs	4,074	167,477
Undergraduate programs	983,587	2,368,669
Graduate Programs	111,547	96,632
PHD programs	7,491	23,202
	1,106,699	2,655,980

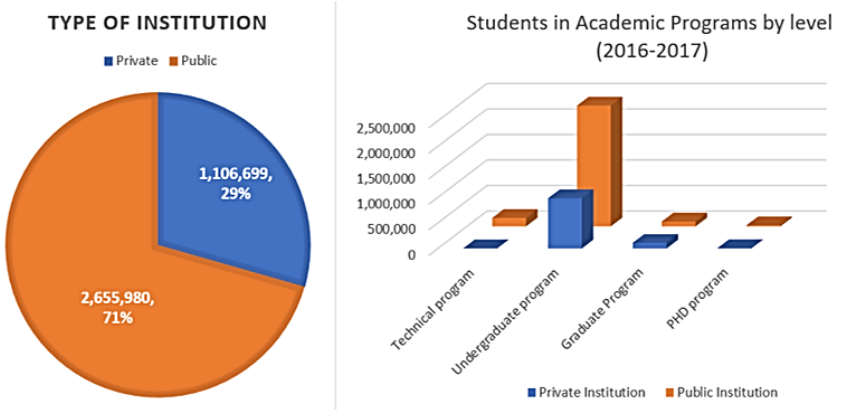

Fig. 1: Students in Higher Education programs by level (2016-2017)[53]

[53] Source: ANUIES, n.d.

Education in Mexico is under the authority of the Ministry of Education (SEP). This institution is directed by a Minister who depends directly on the constitutional president. The SEP manages different education levels and its Higher Education department verifies their correct functioning. It oversees the authorization of new institutions and new academic programs, structures accreditation processes, and issues professional licenses to graduates.

The Higher Education system in Mexico is very complex. It is structured by different governmental areas and is regulated by different laws and regulations that operate at different levels, such as the Political Constitution of the United Mexican States, the General Education Law, Higher Education state laws, decree laws, agreements of the Ministry of Education, and so on.

The Parliament is responsible for refining the National Development Plan (Plan Nacional de Desarrollo), in which the government establishes the time, resources, and strategies required to manage education in Mexico.

In addition, there is a well-consolidated governmental institution named National Council of Science and Technology (CONACYT). CONACYT is dedicated to lead researchers at universities through the best practices of innovation, research, and development techniques. Further information on this topic can be found in the section "Research and Publishing."

Industry-University Relations

The present section aims to analyze the existing collaboration between industry and HEIs in Mexico. This analysis is set from the perspective of the principal subsystems of public and private universities, as well as from technological institutes. According to the terms of the National Development Plan 2013-2018, particularly in the objective of "Quality Education in Mexico," emphasis is placed on the generation of intellectual capital in Mexico, dictating guidelines that generate links between education and socioeconomic needs.

The plan indicates how science, technology, and innovation should be dealt with. Universities play a strategic role in society since they have three main objectives: participate in training and teaching activities, develop research, and link with the socioeconomic environment. Considering that the linkage represents the third main mission of the universities, through which HEIs connect with other public, social, and productive sectors, the aforementioned interaction between universities and the industry benefits knowledge development. These processes follow a problem-solving orientation and aim to generate positive outcomes within the industry (D'Este, Castro, and Molas-Gallart, 2009).

Furthermore, according to the 2010 Encuesta Nacional de Vinculación de las Instituciones de Educación Superior—Sector Productivo (ENAVI), the Public Universities and Technological Institutes are institutions that connect mainly with the industry (SEP and CIDE, 2010). The aim of these connections is to carry out actions related to human resources training. In the case of Polytechnic and Technological Universities, their main activities are closely associated with the productive sector. One of the ways in which the connections between universities and the industrial sector are formalized is through the creation of Social and Liaison Councils, which exist practically in all universities.

Therefore, different productive sectors in every region are represented in these councils, which serve as a space for the inception of the widest range of activities between industry and academia. With regard to the different institutions all over the country, the following exchange methods between academia and industry can be identified:

- *Internships*: This form of interaction with the industry is the most frequent, traditional, and conservative one. Whenever there are opportunities in a certain company, students can make a short stay to implement what they have learned in the classroom. In this way, companies get involved in the academic training of students who are preparing to enter the labor market.
- *Curriculum updates*: This collaborative scheme is paramount to the educational model of the country's polytechnic and technological universities. It is carried out with the participation of the productive sector, which defines educational programs, including the curricular contents and the academic and pedagogical models (SEP, 2015).
- *Continuous educational and technological services*: Through this model, HEIs offer supplementary services, technical consulting, certificates, courses, and diplomas that meet industrial standards. In the field of technological services, universities offer specialized equipment and human resources to provide companies with solutions.
- *Synergy in research, technological development, and innovation projects*: In 2009, the federal government, in agreement with the National Council of Science and Technology (CONACYT), created the Innovation Stimulus Program (PEI) with the objective of providing support to companies investing in research, technological development, and innovation projects. It is also centered on the creation of new products, processes, or services, linking the industry with HEIs and other research centers. This initiative promotes the university-industry-government relationship (known as the "triple helix") to enhance innovation and economic development in a knowledge society. Private investment in research and technological development carried out by the companies themselves is not done naturally

and frequently. Private companies still have low interest in linking with public universities and technological institutes in this area. However, an important collaboration with private universities and with the Technological Institute of Monterrey (Instituto Tecnológico de Monterrey, ITESM) has been observed (Ramírez and Cárdenas, 2013).

- *Creation of companies and technological parks*: In this type of exchange, universities with technology transfer offices provide support for the creation of companies ("spin-offs") linked to the university. From these companies, people are increasingly participating in university communities as professors, administrators, and students. Furthermore, these entities devote themselves to the progress of knowledge generated within the same university. At the same time, they provide spaces within scientific parks that are used by companies to carry out their operations and encourage exchange. In this scheme, there are cases of success in public universities, but also in subsystems of private universities including ITESM. In 2017, a network of incubators for technological and polytechnic universities was formed by 118 universities, each containing their own respective business incubator (Entrepreneur, 2017).

Quality Management and Accreditation

In Mexico, the National Institute for the Evaluation of Education—Instituto Nacional para la Evaluación de la Educación (INEE)—was created in 2002. It was not until 2013 that it became a public, autonomous organism. Its goal is to evaluate the quality, performance, and results of the National Educative System—Sistema Educativo Nacional (SEN)—in preschool (4-6 years old), elementary school (6-12 years old), middle school (12-15 years old), and middle-superior education (15-18 years old). The INEE also coordinates the National Educative Evaluation System—Sistema Nacional de Evaluación Educativa (SNEE)—, an organic, articulated ensemble of institutions, processes, instruments, actions, and other elements that contribute to the fulfillment of its goals. The INEE's contribution to national education is guaranteeing the quality of educative services provided by the State and particular institutions with official validity.

The existence of a national system for education quality assurance does not affect directly the performance of Higher Education institutions. Both systems are still separated. However, there is a direct relationship between the quality of basic and intermediate education, and the quality of HEIs: it is not the system but the low quality of basic education which affects them.

The Program for International Student Assessment (PISA), as well as the National Plan for the Evaluation of Learning—Plan Nacional para la Evaluación de los Aprendizajes (PLANEA)—are intended to assess the extent to which students have acquired the necessary knowledge and skills to fully participate in the Knowledge Society towards the end of compulsory education (elementary and middle school). PISA recognizes those countries that have achieved a good performance and, at the same time, an equitable distribution of learning opportunities, thus helping to set ambitious goals for other countries. The tests of PISA and PLANEA are implemented every three years and examine the performance of students between 10 and 15 years in key thematic areas. These tests also consider a wide range of educational outcomes, among which are the motivation of students to learn, the conception that they have about themselves and their learning strategies (Olvera, 2013, p. 75).

The results of these tests tell us, first and foremost, that students, both at elementary and middle-superior levels, do not have the adequate skills to go through high school and, subsequently, through Higher Education. This, on the other hand, affects the development of Higher Education since students who enter any university lack basic skills such as in Writing and Mathematics (Santibañez, 2015). Thus, when a Higher Education institution wants to be accredited and recognized for its quality, it faces difficulties in aspects of scholar development such as reprobation or desertion rates.

The Higher Education System—Sistema de Educación Superior (SES)—in Mexico has an institutional structure that is eminently public, with a percentage of students of slightly more than 70% of the overall enrolment. Since the end of the 1980s, the community of researchers and specialists, the public opinion, and the government agreed upon giving priority to the quality improvement of Higher Education. In order to achieve this goal, specialized institutions were created dedicated to the evaluation of the successes and shortcomings of Higher Education.

Thereafter, during the 1990s, some policies specifically focused on assessing the quality of the system were implemented. It was at this time that the Interinstitutional Committees for the Evaluation of Higher Education—Comités Interinstitucionales para la Evaluación de la Educación Superior (CIEES)—were created. Since their beginning, their actions have been limited to the appraisal of the educational programs, without being involved in their accreditation.

The National Association of Universities and Institutions of Higher Education (ANUIES), which groups 187 Institutions of Higher Education—Instituciones de Educación Superior (IES)—, agreed upon the creation of a non-governmental organism in charge of regulating the processes of accreditation

through specialized organizations allowed to perform this task. The proposal was implemented in 2000, when the first specialized organization, known as the Council for the Accreditation of Higher Education—Consejo para la Acreditación de la Educación Superior (COPAES)—, was established. This happened mainly because, in 2000, the SEP recognized the COPAES and assigned it the task of accrediting the academic programs of Higher Education in both public and private institutions (ANUIES, 2005).

The CIEES and the COPAES are expected to implement a National System of Evaluation, Accreditation, and Certification of Higher Education (Sistema Nacional de Evaluación, Acreditación y Certificación de la Educación Superior). However, this is still in the planning stage.

In addition to these institutions, there are other organizations that also help ensuring education quality, such as the Federation of Private Institutions of Higher Education—Federación de Instituciones Mexicanas Particulares de Educación Superior (FIMPES)—, whose purpose is to differentiate between the institutions of quality, to improve the quality of educational services, and to raise the prestige and public image of those private institutions having an impact on the consumer market. All of this is to be achieved through accreditation processes. The FIMPES was created in 1981 as a civil association with the only purpose of helping private institutions. However, since 1996, it has helped establish a certification process which is a pre-requisite for any institution demanding the affiliation which gives it the right to be promoted in a Register of Excellence—Registro de Excelencia (Cuevas, 2011, p. 243).

It should be noted that these organizations, which are non-governmental and non-profit, are composed exclusively of academics with renowned reputation and experience in their respective fields, picked from the most diverse institutions of Higher Education throughout the country. Basically, for both private and public institutions, the accreditation process consists of three stages: the self-study or self-evaluation phase, performed by the institution; a validation in situ of the academic program or the institution's conditions performed by the evaluation or accreditation organism; and the deliberation of the academic program or institution's associated committee.

The existence of these organisms and processes affects the performance of the institutions. For public ones, to be accredited represents an opportunity for obtaining more budget; and for private ones, accreditation is an instrument to promote their educational product. Nevertheless, some institutions dedicate a large amount of resources to the accreditation process in order to get the certification (the document, an external certificate) instead of using the resources to get involved in a real process of continuous improvement regarding the quality of education (Miranda and Miranda, 2012).

University of Guadalajara Case Study

There is an Evaluation and Accreditation Office—Unidad de Evaluación y Acreditación—at this university. Still, this office is insufficient since there are nine regional academic centers (throughout the state of Jalisco), six thematic centers (in Guadalajara), one Virtual University System, and a Middle Superior Education System with more than 280,000 students. Therefore, the staff (consisting of four members) working for the Evaluation and Accreditation Office is not enough. The office hence only works as a consulting entity that gives some recommendations to the teams involved in the accreditation process in each academic program. In this regard, these kinds of offices are, aside from insufficient, not prepared in advance to do the job: they have to learn during the process. Considering the growth of the accreditation processes in universities and institutions, a proper training program to help this kind of offices would be of great avail.

The University of Guadalajara is one of the most prestigious HEIs in the country. It has 138 accredited academic programs, in addition to eleven programs with an international accreditation awarded by the Organización Universitaria Iberoamericana (OUI). As part of its growth, the University of Guadalajara seeks to provide its academic community with the opportunity of belonging to an institution that is internationally recognized, as this not only encourages the development of top professionals, but also creates the possibility of participating in academic exchanges with other universities from other countries. However, it has been very difficult to really compete and obtain those international accreditations. In every aspect, Mexican Higher Education institutions have a lot of work to do and must collaborate with institutions of basic education (preschool and elementary) in order to improve the educational level of the country.

Funding and Financial Management

With the Educational Reform of 2013, it was recognized for the first time (in the United Mexican States Political Constitution's third article) that the National Education System (SEN) is not only implemented by institutions, authorities, and autonomous entities decentralized from the State. Students, parents, and teachers must include the programs and curricula, materials, and infrastructure as an input in addition to the Educational Information and Management System (SIGED) and the Educational Evaluation System (standardized tests). Education represents 15.2% of the Annual Federal Expenditure

Budget and has experienced a 29.2% increase over the last ten years. This currently sums up to 5.8% of Mexico's GDP. However, raised public expenditure has not been fully effective in improving equity within SEN, nor in having a significant impact on achievements throughout the different educational levels, meaning that there has been a poor improvement regarding educational quality (CIEP, n.d.).

The Mexican Government is currently experiencing a decrease in its tax revenue. A considerable period of fiscal austerity is discernible for the upcoming years. The expenditure in 2016 was 15,576.8 billion USD, whereas in 2017 it was 13,922.8 billion USD, representing a 10.6% decrease. Moreover, the programmed 2018 expenditure is 12,614.2 billion USD, 9.4% lower than the previous year (SHCP, 2018).

The cuts to the Federal Budget constitute 45.88% of the funds that are assigned to Higher Education. According to the OECD (2017), Mexico spends 7.05 million USD on the educational system's operation. This amount is lower than the average spent by other countries belonging to this organization, which amounts to 11.06 million USD. The education budget is divided to fund different programs, such as the Quality Higher Education program, among others. The latter encourages the improvement and preservation of infrastructure, the professional development of teachers, the strengthening of educational quality, etc. The support through scholarships is also part of the education budget and is managed through the National Scholarship Program, which is funded with 6% of the overall budget.

Every public institution receives a yearly budget from the Federation based on their relative size: the wages of academics, non-academics, and technicians, the student population, the scheduled infrastructural projects, and the quality of the academic programs. Additionally, the Ministry of Education (SEP) has a program called Program for Strengthening Educational Quality (PFCE). This program grants additional financial support in order to develop strategic planning projects, a mechanism which has helped Institutions of Higher Education (IES) implement academic projects oriented to the improvement of management services that are directly related to the quality of their educational programs. Nonetheless, this program has suffered cuts of up to 75% from 2000 to 2018.

University of Puebla Case Study

This University of Puebla (BUAP) belongs to the SEN as a Public Autonomous University. Like other IES, it is financed by the government and it has around 89,000 students and 6,000 academics. The BUAP is the fifth largest university in Mexico. Its approved budget for 2018 ($ 6,280.8 billion Pesos) included funding for research activities, BUAP's High School Education System, as well as its External Academic Units (20 campuses) located across the State of Puebla. The university's funds come from both Federal and State resources distributed as follows: 4,018.6 billion pesos from the former and 1,974.8 billion pesos from the latter. These represent a 4.89% growth ($ 279 million pesos) in the BUAP's budget.

BUAP's Dean and General Treasury Office are in charge of presenting the university's expenditure plan to the Budget Commission of the University's Council. This entity evaluates and approves the annual financial projection proposed by the Dean and General Treasury Office. As it has been previously stated, most of BUAP's funds come from the government and are mostly used to cover the payroll. Other sources of income are student fees, which are normally used to finance student related programs and activities. In addition, approximately $ 1,500 billion pesos are earned from services that the BUAP provides to its community (such as pharmacies, a gas station, and so on).

Resource management in IES undoubtedly faces many challenges. For instance, economic pressures have forced the Mexican Government to cut its expenditure budget slightly over 11% in the last three years. Yet, cuts to the education budget are a serious issue. Furthermore, the persisting corruption that operates in the teachers' labor union (strongly divided members pursuing their own interest) aggravates the situation. Indeed, the complex 2018 political scenario in the country (in which the next president, governors, senators, deputies, and municipal presidents were to be elected) is another challenge that puts the IES in a position to reconsider their role in society, not only as knowledge generators, but also as places in which their collaboration with companies can produce additional sources of income.

Research and Publishing

Science, technology and innovation (SCT&I) in Mexico have been established as key elements for the development of modern societies (FCCYT, n.d.). The National Development Plan 2013–2018 proposed the development of SCT&I as a pillar of sustainable socioeconomic growth (Gobierno de la República, 2013). It also proposed the new Special Program for Science, Technology, and

Innovation 2014–2018, which had been designed to transform Mexico into a knowledge economy, aiming to reach a 1% of GERD/GDP (CONACYT and Gobierno de la República, 2014).

Mexican Research System

During the last 50 years in Mexico many programs and initiatives have been proposed in order to strengthen the national research system. One of these initiatives turned into the creation of the National Council of Science and Technology (CONACYT). This organization was created by the Mexican Congress in December 1970 as a public institution decentralized from the Federal Government. CONACYT is directly responsible for the elaboration of policies regarding science and technology in Mexico. Its main purpose is to consolidate the National System of Science and Technology, which is intended to address the country's primary demands and needs, providing solutions to specific problems and contributing to society's well-being. CONACYT manages 27 public research centers located in several parts of Mexico (CONACYT, 2019). These are usually dedicated to a specific field of science and are classified in three areas: exact and natural sciences (10 centers); social sciences and humanities (8 centers); and technological development and innovation (8 centers). In addition, there is one center dedicated to fund postgraduate studies both in the country and overseas.

CONACYT also manages programs that encourage the involvement of the industry and the private sector in scientific and technological research through the National Registry of Institutions and Businesses in Science and Technology (RENIECYT). This entity funds the development of technological projects, and there are currently more than 10,000 members (both institutions and individuals) registered (CONACYT, 2014). Furthermore, CONACYT created the Innovation Stimulus Program in order to support those companies that invest in research projects, technological development, and innovation oriented to the development of new products, processes, or services. The main objective of this program is to encourage companies to invest in activities related to research, technological development and innovation. This purpose is achieved through economic incentives steered in such way that they have the greatest possible impact on the national economy's competitiveness.

In a similar way, CONACYT leads the National Research System—Sistema Nacional de Investigadores (SNI). The SNI was created in 1984 as an economic stimulus mechanism for researchers facing the economic crisis scenarios in Mexico (SNI, 2014). The purpose of the SNI is to promote and strengthen the quality of research and the innovation throughout the entire country.

The Mexican President's Science Advisory Council—Consejo Consultivo de Ciencias (CCC)—offers the highest level of scientific counseling (CCC, n.d.). This council provides the president with independent opinions and recommendations about the country's national policies and priorities regarding science and technology. The Science and Technology Law, published in June 2002, proposed the creation of the Scientific Advisory and Technological Forum—Foro Consultivo Científico y Tecnológico (FCCYT). This forum acts as the permanent autonomous consulting body of CONACYT's president, aside from providing advice to the Congress as well (FCCYT, n.d.).

In 1996, the Education Ministry created a Professor Development Program—Programa para el Desarrollo Profesional Docente (PRODEP). This program aimed to encourage full-time professors to get involved in research, teaching, technological development, and innovation skills throughout different academic bodies (SEP, 2016).

Some Facts about Scientific Research in Mexico

According to the Report Towards 2030 of the United Nations Educational, Scientific, and Cultural Organization (UNESCO), between 2008 and 2013, the total amount of researchers in Mexico registered in the SNI experienced a 20% increase. Back in 1984, when the SNI was created, there were 1,396 researchers. Nowadays, there are 28,636 researches. Additionally, the UNESCO report indicates that, between 2008 and 2013, the number of patents obtained by Mexican researchers increased from 90 to 217.

In 2016, the Mexican institutions with most scientific publications were the National Autonomous University of Mexico (UNAM)—26.2%, the National Polytechnic Institute (IPN)—17.3%, the Autonomous Metropolitan University (UAM)—5%, the Autonomous University of San Luis Potosí (UASLP)—2.9%, and the Autonomous University of Puebla (BUAP)—2.1% (López, 2016).

Internationalization

The internationalization of Higher Education has been proposed as one of the central policies that the University of the 21st Century must assume and deal with. It must be situated within a globalized environment and aspire to play an important role in the development of the economy and knowledge of society (ANUIES, n.d.).

During the 1990s and early 2000s, Mexican HEIs developed their institutional internationalization processes. This development took place through actions and strategies oriented mainly to student mobility; professors' and researchers' participation in academic networks; and the signing of agreements of academic cooperation for the formation of partnerships and joint investigations. The aforementioned exchanges are mainly motivated by federal education authorities, who introduce this fundamental variable (internationalization) to obtain resources through evaluations of the collective and individual performance of the Higher Education institutions (Ramírez Bonilla, 2017). Today, this practice continues in our country and in the Sectorial Education Program. This program promotes quality education while considering the international dimension, as stated in the line of action 2.3.8:

> Support new models of academic cooperation for the internationalization of Higher Education, which guides the institutional efforts to place Higher Education, science, technology and innovation in the international context (SEP, 2013).

Despite the institutional difficulties faced in the developing of internationalization strategies and policies beyond cooperation and mobility, Higher Education institutions have oriented their processes towards a more comprehensive and transversal internationalization. Some HEIs have successfully consolidated these processes; however, there are still issues and challenges to be addressed in order to develop and establish internationalization policies within the institutions that allow the creation of more comprehensive processes and a national internationalization policy. This will potentially strengthen the Higher Education system in Mexico.

Instituto Politécnica Nacional Case Study

The National Polytechnic Institute (IPN) was founded on January 1, 1936 during the administration of President Lázaro Cárdenas. Today, the institute is organized in around 99 academic units including 19 vocational high schools (which operate as CEC&T); 27 university colleges; 20 scientific and technical research centers; 16 continuous education centers; 4 units for educational support; 3 support units for educational innovation; 8 support units for research, development, and technological, and enterprise promotion; and 2 units affiliated with science, enterprise research, and development. The IPN offers 80 undergraduate programs (composed by four and five-year-based bachelor degrees) and 147 postgraduate programs leading to 32 postgraduate diplomas, 75 master degrees, and 40 PhD programs (IPN, n.d.–a).

As part of its ongoing activities, the IPN acknowledges the necessity to have a constant international presence to meet the improvement objectives regarding teaching and research. This is done through its Academic Cooperation Coordination—Coordinación de Cooperación Académica (CCA)—, a specialized body in charge of developing strategies oriented to generate the conditions required to achieve IPN's academic cooperation and internationalization goals. For instance, financial support has grown in order to increase the mobility of students and faculty abroad (IPN, n.d.–b). In order to achieve the aforementioned international mobility, concrete agreements have been signed with several institutions worldwide. The relevance given to internationalization by the Institute is explicitly stated in its Strategic Networking, Internationalization, and Cooperation Program, as well as in its Social Integration Model.

The Institute expresses what internationalization represents in the document of the Social Integration Model of the IPN, in the Strategic Program of Linking, Internationalization, and Cooperation (Programa Estratégico de Vinculación, Internacionalización y Cooperación).

In the Institute, internationalization is conceived as a process that allows integrating the international perspective into the organizational culture and institutional functions. It is a process that is expressed, mainly, within the Institute and consists of introducing the international dimension into the substantive functions of teaching, research, and extension. For their part, national and international cooperation are instruments that complement and strengthen the Institute capacities (IPN, 2008, p. 7).

As is visualized in Figure 2, the IPN has an important institutional experience regarding international mobility and a solid presence in the global academic network.

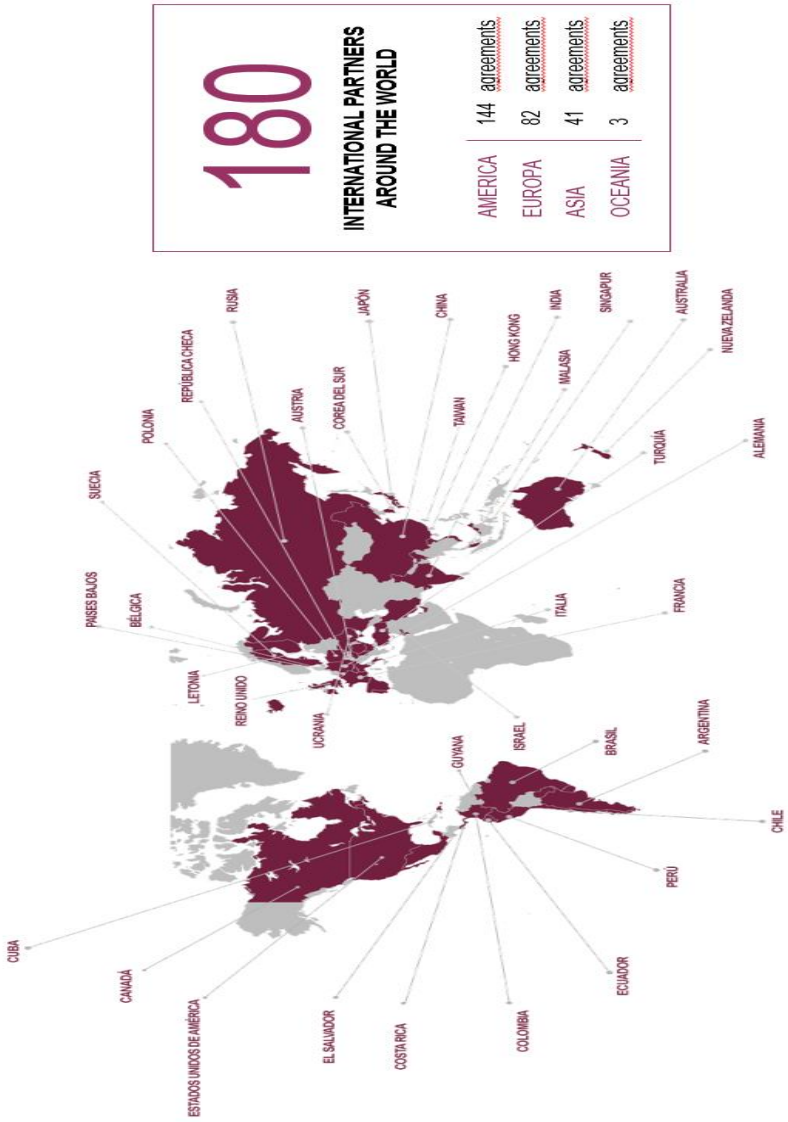

Fig. 2: International Partners of the Instituto Politécnico Nacional[54]

[54] Source: CCA, 2018.

Although the international mobility at the IPN is constantly growing, it should be classified according to its international priorities. Moreover, it is important to highlight that proficiency in foreign languages should also be acknowledged as a priority.

It is necessary to increase the institutional efforts concerning internationalization in order strengthen research, expand the existing international networks, increase knowledge generation, and prioritize academic training in foreign institutions. It should be noted that the IPN is building an institutional culture that facilitates the formulation of policies, strategies, and organizational mechanisms capable of achieving the desired results regarding internationalization. In this sense, strategies to strengthen the institute's international position, extracurricular activities, global network, and academic programs need to be implemented.

Finally, having adequate organizational strategies is essential to ensure that the institute is capable of having an excellent international outreach through policies and administrative systems, aligned with the needs that arise from this matter.

Conclusion

There is no doubt that boosting HEIs in Mexico is a key element for promoting economic development and building political democracy because the country will have better educated citizens. Nonetheless, there are still many challenges for Higher Education in Mexico. Some of the challenges faced by Higher Education are related to the complexity of the governmental structure, its laws, and regulations. The habits, interests, and visions of the involved stakeholders play an important role as well.

Governmental institutions, either at federal or local level, should continue to invest resources in Higher Education. This will ultimately reinforce the operating structure and will prevent politicians and teacher union leaders to use the educational system as a mechanism to serve their interests. In this sense, the SEP should stop authorizing the creation of new private institutions focused solely on economic interests. It is thereby very important to reinforce all the evaluation and accreditation processes developed by the CENEVAL, the FIMPES, and the COPAES in order to assure the quality of academic programs. With this in mind, these institutions should continue to coordinate efforts in order to guarantee access to Higher Education among the different regions and social levels; in other words, to diversify the current academic offer in Mexico. Public institutions should promote their cooperation with the industry in order to access additional funding that optimizes their own operation. This intense

participation should be steered through a well-structured academic network. Well-structured policies will consequently permit internationalization processes to enter different and more sophisticated levels.

Private institutions, on the other hand, should increasingly invest more resources in their research departments, thus contributing directly to the development of science and technology in Mexico and complementing the efforts carried out by public institutions such as the CONACYT. Furthermore, the creation of companies and technological parks is also needed so that science and technology can be properly transferred, and research at universities can be improved.

The participation of deans of different Faculties and Higher Education institutions in global programs such as the International Deans' Course – Latin America from the Dialogue on Innovative Higher Education Strategies (DIES) generates important links between distinct universities, encouraging new exchange programs for students, professors, and researchers, while strengthening the development of Higher Education in Latin America.

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MÓNICA BONIFAZ CHIRINOS AND NORKA PATRICIA STUART

Current Situation and Challenges in Peruvian Universities

Abstract

In Peru there are more than 130 universities, about half of which were created in the last 20 years as a result of a process of liberalization of Higher Education and a decrease in public investment in the tertiary education system. The actual Peruvian university offer is made up of public, private non-profit (associative) and private for-profit (business) universities. This report describes the current situation and challenges of Peruvian Higher Education, specifically in the areas of human resources, research and innovation capabilities, financing challenges, and the role of the accreditation processes and systems. The report highlights, from a dean's perspective, the need to strengthen managerial skills to ensure resources for the development of the academic career and greater access to doctoral programs that stimulate improvements in research capabilities, as well as the need to improve financing strategies for universities given the low level of support offered by the State.

Keywords: Higher Education Institutions, Higher Education System, Human Resources, Innovation Capabilities, Peru, Quality Assessment, Research.

Introduction

This report presents the main dynamics and challenges faced by Peruvian universities after a period of liberalization and deregulated expansion, and after the introduction of a recent Higher Education policy based on quality assurance, aiming to guarantee access to university education, committed to individual and social development, sustainability and competitiveness of the country.

The report has been organized in a way that exposes, from a dean's perspective, the current conditions in terms of industry-university relationships, human resources management, quality management and accreditation, financial resources, research and academic production, and internationalization.

To have a better understanding of the main characteristics and problems faced by university Higher Education in Peru, it is necessary to know the three main periods the Peruvian system has gone through.

The first period began in 1551 with the foundation of the first university in Latin America, Universidad Mayor de San Marcos, and ended four centuries later in 1960 with the existence of ten universities, of which nine are publicly financed by the State and one confessional (Sagasti and Málaga, 2017).

The second period began in 1961, the year in which the Law No. 13417 was enacted, authorizing the creation of private universities. In this second period, which lasted until 1996, 46 universities were created, 27 of which were private non-profit ones, including Catholic universities.

The third period from 1996 to 2014 began with the promulgation of the Legislative Decree (DL) No. 882 during the government of President Fujimori. This decree authorized the creation of private for-profit universities, also called enterprise universities. In this period, Higher Education provision in Peru went from 61 universities with 700,000 students to 132 universities with more than 1 million students (Távara, 2016). In only 18 years, 86 universities were created, of which more than two thirds were founded under the legal form of for-profit universities (SUNEDU, 2017). This rapid expansion resulted from the implementation of a liberalization policy in Higher Education, similar to that observed in the same period in other countries in Latin America, such as Chile and Colombia.

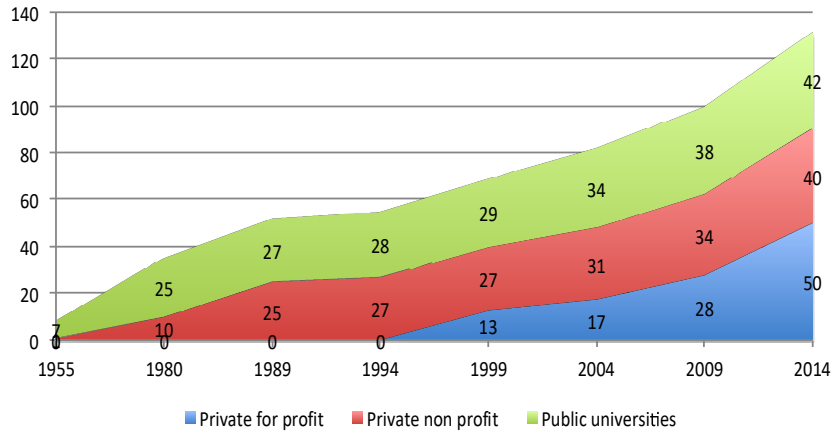

Fig. 1: Universities in Peru from 1955-2014

Today there are 132 universities providing Higher Education to more than 1.3 million students; yet, nearly 40% of this student population is enrolled in for-profit universities (Table 1). In this regard, it is important to highlight that many of these new students who attend this type of universities represent the first generation of university students and belong to the lowest income segments in the country. In other words, Higher Education coverage has been delegated to private initiatives and, to some extent, abandoned by the State.

University Type	Total	%	Enrollment	%
State Universities	42	32%	374,000	27%
Private non-profit (associative)	40	30%	463,000	34%
Private for-profit (enterprise)	50	38%	524,000	39%
Total	**132**	**100%**	**1,361,000**	**100%**

Table 1: Peruvian University in numbers[55]

Poor regulation and the decline in public investment have accompanied this rapid growth of Higher Education institutions (HEIs). As a result, universities characterize themselves for being heterogeneous and mainly of low quality,

[55] Source: SUNEDU, 2017.

especially those for lower income groups (Benavides et al., 2015). Studies on the effects of the liberalization of university education in Peru have found that the main factors of poor quality are the rapid increase in supply, its misalignment to the needs of the labor market, the low student selectivity, the low teacher/students' ratio, and the degree of dedication of university teachers. Simultaneously, these factors contribute to the increase of university graduates with less opportunities to access quality jobs and graduates' underemployment in Peru (Lavado, Martínez, and Yamada, 2014).

Given this context, in 2014 the Peruvian government promulgated the Law No. 30220, known as the New University Law. The purpose of this Law is to regulate the creation, operation, and supervision of universities. It promotes the continuous improvement of quality education of university institutions as fundamentals of national development, research, and culture. It also establishes the principles, purposes, and functions that govern the institutional model of the university. The Ministry of Education is the governing body of the policy of quality assurance of Higher Education.

One of the main reforms of the New University Law is that 25% of the hired full-time professors is required to have a master or doctoral degree and should be centered in research. Despite the opposition and strong criticism of Law 30220, which indeed may require improvements, in the last three years it has been inducing public and private universities to improve hiring conditions, to raise the salary of its academic staff, to invest in MA programs and doctorates for their professors, and to reshape their organization structures in order to have a functional unit responsible for the development of academic-scientific research.

Although some years have passed since the implementation of Law 30220 in 2014, little can be observed in terms of improvements in research and academic productivity. A different situation occurs with research in science, technology, and technological innovation, under the responsibility of the National Council of Science and Technology (CONCYTEC). This institution has a national policy, regulatory frameworks, and State budgets that stimulate research in these areas, prioritizing their link to industry demands and to the main productive sectors of the country (CONCYTEC, 2017b). Although universities undertake this type of research, other areas of knowledge are not being supported with public resources.

In general terms, it can be pointed out that university education in Peru has grown in supply, but it is of low quality and only a few universities (most of them private non-profit) are considered prestigious. Additionally, in the Peruvian context of a new regulatory framework that demands the improvement of the quality of university education, the role of deans has become increasingly

relevant. Nowadays, it depends to a great extent on the deans to generate the conditions for the development of the human capital necessary to guarantee the quality of Higher Education, the production of knowledge, and the strengthening of the relations between university and industry.

Industry-University Relations

One of the expected contributions of universities is the collaboration with national industry development. This is a process of articulation between universities and industry that results from the identification of needs and interests in common to facilitate the transfer and management of knowledge between the parties. The actors involved in the collaboration process between public, private, and academic sectors are firms, public institutions, the government, and public and private universities (Dueñas and Duque, 2015). Although the results indicate that academia is usually in favor of working with industry, there are still several barriers to such relationships. Such boundaries are, for instance, a lack of institutional support, a sometimes-unfriendly political atmosphere in universities, and a national industry structure with few firms in knowledge-intensive sectors and many firms with low absorptive capacity (Stal and Fujino, 2016).

Since the last decade, the government and national financing agencies have created new programs and fiscal mechanisms in order to stimulate innovation in the local industry through the cooperation between universities, research institutes, and firms. However, the outcome has not met the expectations and institutional voids can be partly blamed for this lower outcome. These voids can be caused by an internal problem of the firms (such as little knowledge about the available instruments and programs), by shortage of skilled people to seek funding opportunities for innovation (often the financial area is responsible for this task), or by little capacity for elaborating and presenting projects aligned with the rules of financial agencies.

In Peru, the National Council of Science, Technology and Technological Innovation (CONCYTEC) is the governing institution of the National System of Science, Technology, and Technological Innovation (SINACYT). Universities, state research institutes, business organizations, communities and civil society are all part of SINACYT. CONCYTEC aims to regulate, direct, guide, encourage, coordinate, monitor, and evaluate the actions of the State in the field of science, technology, and technological innovation; and to promote the development of this field through concerted actions and complementarity between the programs and projects of public, academic, business, and social organizations, as well as other SINACYT members. Both, SINACYT and

CONCYTEC are under the legal framework of the Law No. 28303 on Science and Technology.

The Law No. 30309 is relevant to strengthening the relationship between universities and industry as well. This law promotes private investment in scientific research projects, technological development, and technological innovation (R+D+i) through tax exemptions applied to income tax. This law seeks to encourage Peruvian companies to carry out R+D+i activities and to diversify their businesses. Firms that invest in research, technological development, or technological innovation projects (qualified as such by CONCYTEC) will benefit from a lower tax burden through the deductions provided by the Law. Deductions can be as much as 75% if the project is carried out by a university domiciled in the country, and 50% if it is outside of Peru.

As stated in this law, the principles that govern the National Policy for the development of Science, Technology, and Technological Innovation are focused on achieving a tight integration between industry and university. Despite these efforts, Peru has another weakness: the lack of a robust system for the protection of intellectual rights. According to CONCYTEC (2016), this problem has two dimensions. First, generators of new knowledge and technologies do not have incentives to register the results of their R+D+i activities for various reasons (for example, due to the unawareness of the regulation or the absence of specific procedures). Second, the perception that the registration of intellectual rights is not necessarily due to the weak link they have with the productive sector and the distrust of the benefits that their protection could generate.

Research and development activities, and specifically innovation activities, face considerable risks due to the high uncertainty about their outcomes, the nature of public goods, and the information and knowledge they contain. Additionally, the companies and research institutions have serious coordination problems, which increases the cost of carrying out those activities. These conditions reduce the incentives of companies and other SYNACIT stakeholders to embark on R+D+i activities.

Another aspect to be considered is the access to public financing. Support and financing are limited due to the scarcity of financial resources and usually concentrate on R+D+i activities without any coordination between the relevant actors (such as universities and firms), thus wasting the possibilities of creating synergies and obtaining better results. Furthermore, serious deficiencies are also found in management, as it does not always coordinate the demand of the productive sector with the agenda of the corresponding sectors of government. Similarly, the risky nature of innovation activities requires the financial market

to create and offer financial instruments for these activities and companies, reducing the costs for all the agents involved (CONCYTEC, 2016).

In Peru most of the universities that have good relations with the industry for the development of R+D+i activities are private ones. For example, the University of Piura has a model supported by the industry to take the lead in proposing projects that seek to solve innovative and high-impact problems that allow connecting industry and government and, in this way, help society. The University of Lima cooperates with the textile and software industries in projects carried out by teachers and students. Although some universities do have various cooperation projects with industry, these mainly arise on their own initiative. There are still only a few university-industry cooperation projects designed within the framework of the Law No. 30309 that allow access to tax benefits. By 2018, only the School of Engineering of the Pontificia Universidad Católica del Perú had succeeded in obtaining the approval of CONCYTEC for the first supported project, an automation project on the creation of a mobile robot that removes the guano in a teleoperated way from the main poultry company of Peru.

Carrying out these initiatives, developing these projects, and creating the conditions to sustain them, undoubtedly require the institutional support of the universities. Yet, most importantly, they require the commitment of the deans to stimulate and provide the facilities (e.g. laboratories) and resources (e.g. money and time) for their professors, researchers, and students.

Human Resources Management

One of the main problems faced by Peruvian universities is the low level of development of their human capital (both in academic and administrative categories), as well as in all types of HEIs (such as public, private non-profit, and private for-profit universities). Even though new regulations are increasing the demand for qualified academics and administrators, still few positive changes can be observed.

In most cases, professors or lecturers are employed either as staff with temporary contracts or as lecturers hired for a specific course, they teach part-time at different universities, and they do not have the desirable academic or professional degrees. Regardless of the fact that the New University Law has established that at least 25% of the total number of teachers hired must be full-time and have at least a master's degree, by 2015 figures showed that the gap is still large in private universities, and mainly in for-profit ones.

According to SUNEDU's latest report (published in 2017), in 2015, only 116 of 132 universities submitted information on the teaching positions. The

collected data proves the existence of 84,774 positions for university teachers. Of this total, only 10% of teachers declare having a doctoral degree, 27.4% a master's degree, and 59.5% a bachelor's degree. Still, 2.6% of the employed teachers do not have a university degree. Public universities have the highest number of lecturers with the highest academic degree. Whereas 18.5% of all positions in public universities are held by professors with a doctoral degree (the highest academic degree), this percentage reduces to 10.9% in the case of non-profit universities and to only 6.4% in for-profit universities. On the other hand, there is still a considerable high percentage of university teachers who only have a bachelor's degree: approximately 60% in private universities and 45% in public universities.

Another main feature of the way in which an academic career is developed is the contractual modality: nearly 80% of all university teachers in Peru are temporarily hired. If this figure is seen exclusively in for-profit universities, the indicator reaches 98%, i.e. only 2 out of every 100 academics hired in for-profit universities are tenured (SUNEDU, 2017).

In terms of human resources dedicated to research work in universities, by 2015, a total of 3,586 researchers, technicians, and support staff were listed in the report (SUNEDU, 2017). According to the Research Census of 2015, the CONCYTEC (2017a) shows that 70% of the 5,408 registered researchers work in universities according to the following distribution: 34% in public universities, 30% in private non-profit, and 5% in private for-profit.

From the official figures regarding university teachers and researchers it can be inferred that in the university structure the academic staff has a lower quota in relation to the administrative and operational personnel, and that a high percentage of academics is only hired temporarily. Although there are no official indicators on the administrative/academic ratio, and even less on the average salaries between both categories, this type of information is necessary to better understand the HR management strategies in public and private universities, in order to stimulate best practices between them.

Law 30220 includes an article (Art. 122) that stipulates that private universities, both non-profit and for-profit, are authorized to define their bylaws, their forms of government, and the selection and election of their academic authorities, as long as they meet the previously defined academic degree and category requirements. In the same way, it establishes that each private university defines the processes of selection, hiring, promotion and tenure of the lecturers, provided that they meet the requirements defined to access the academic career. Under these conditions, private universities enjoy a certain degree of freedom to organize their human resources. For-profit universities' organizational structure responds to their business model, which is that of an educational service

company that competes in a highly competitive university market. That given, such universities have fewer teachers and a greater number of administrative staff.

In this sense, private non-profit universities such as Pontificia Universidad Católica del Perú (PUCP), Universidad de Lima (UL), and Universidad de Piura (UDEP) compete for the few PhDs who return after finishing their studies abroad, or for the foreign academics that see Peru as an interesting place to develop in the medium and long term. For example, the PUCP is in the process of reviewing the requirements and benefits of an academic career in the university, stimulating the participation of young PhD professors, improving average salaries through fixed-variable compensation systems, and granting research funds with own and third parties funds. Deans, through their academic departments, summon recent graduates with potential for teaching and research, and help them plan their academic trajectory in order to form a new generation of academics with teaching and research skills. On the other hand, the UL has designed a doctoral program in Business Studies with a Spanish university that allows lecturers to get a doctoral degree in 4-5 years.

Given these conditions, developing human resources to promote high-quality Higher Education is not an easy task. It is up to the universities and their deans to plan and develop human capital to guarantee the sustainability of their educational model, and this requires that deans acquire specific skills to recruit, select, evaluate, develop, and retain a highly trained and motivated academic body that guarantees excellence in teaching and research.

Quality Management and Accreditation

In 2008, and after the evidence on quality problems related to the disorganized and deregulated growth of universities at the national level, the Constitutional Court established that public and private universities must be supervised and controlled by the State. Thus, in 2012, with more than 130 universities authorized by the CONAFU, the Moratorium Law was enacted, suspending with it the right to create new universities for five years. In this context of urgent reform, the New University Law was passed in 2014, with the main objective of structuring the university Higher Education market in Peru.

This New University Law establishes the Ministry of Education as the governing body for the quality assurance of university Higher Education and has founded a specialized technical body to supervise the quality of service provided by public and private universities: the National Superintendence of University Higher Education (SUNEDU). The main responsibilities of SUNEDU are the following:

- Verify the fulfillment of basic quality conditions and grant operating licenses to universities.
- Assure that public resources and tax benefits granted to universities be allocated to educational purposes.
- Administer the National Register of Degrees and Professional Titles.
- Identify violations and impose sanctions on universities that fail to comply with the obligations established by the law.

Resulting from the creation of the SUNEDU, as of August 2018, 50 out of 132 universities obtained the operating license and the SUNEDU sanctioned 20 universities for offering unauthorized programs.

Although the New University Law establishes that the accreditation system and thus also the SINEACE need to be reorganized, the SINEACE still remains in charge of the accreditation of university education study programs and voluntary institutional accreditation. As of July 2017, this agency reported 190 accredited university study programs (of more than 3000 registered), most of them in medicine and education, which must be accredited (see Table 2).

To date, 50 out of 132 universities in the country have received the license offered by the SUNEDU, and those that offer medicine and education programs have managed to have them accredited as well. However, the national accreditation system for these universities seems to be insufficient, since several of their professional programs have international accreditations. For example, the engineering degree programs of the PUCP and the National University of Engineering (UNI) have acceded to the ABET and CIAC accreditation; various management programs have been certified by the IAC and the AACSB; and in health sciences and education the UPCH and the PUCP have been accredited with CINDA and CNA, among others.

Ministry of Education	
SUNEDU	**SINEACE**
Created by Law 30220 (2014)	Created by Law 28740 (2006)
Ascribed to the Ministry of Education	Ascribed to the Ministry of Education
Tasks	
Grant operating licenses	Accredit educational quality at all levels
Monitor university quality	Certify work and professional skills
Monitor the use of public resources and tax benefits	Accredit compulsory university programs (health sciences and education)
Manage the National Registry of Degrees and Professional Titles	Voluntary accreditation of other careers and programs
Impose penalties for not complying with the University Law and its related regulations	Voluntary institutional accreditation

Table 2: Public bodies in charge of the university quality assurance in Peru

With regard to quality management, the PUCP has two specialized offices: one to conduct licensing processes according to SUNEDU's requirements, and the other for quality management and accreditation to accompany the processes of institutional and degree program accreditation through national and international systems. These administrative support units demand schools to comply with and report on a series of goals and results which are necessary to maintain the licenses and access the accreditations. At the PUCP, deans are responsible for incorporating the objectives of accreditation and quality assurance in their strategic plans, and therefore of having human resources prepared to lead them. Currently, the School of Management is undergoing an accompaniment process for the international accreditation of the Management degree program through the EFMD. The main implications of this process are updating the curriculum, monitoring the performance of graduates, raising the teaching profile, and increasing academic productivity over the next three years (a very demanding task in human and financial resources).

In the case of the UL, the Office of Planning and Accreditation is responsible for these processes and there are also specific requirements that deans and directors of the various degree programs must verify and meet. To this end, the UL uses the ISOTOOLS software for monitoring the compliance indicators of the annual plans and strategic objectives.

Additionally, the School of Business and Economics has obtained the international accreditation of the IAC-CINDA for its five degree programs, which requires the work of quality committees to maintain the standards of this accreditation. Additionally, the school is working to achieve national accreditation of the National System of Evaluation, Accreditation, and Certification of Educational Quality (SINEACE), as well as to adapt its procedures for an international accreditation with an entity specialized in the business field.

In this context, it does not seem sufficient to enjoy the license granted by the SUNEDU and to have been accredited nationally. The rationale of this is that, in a still messy market characterized by the low confidence in local systems, the international seal is a sign of prestige and credibility, especially among private universities.

Funding and Financial Management

With regard to the resources, mechanisms, and financial management of Peruvian universities there are clear differences but also some similarities between public and private universities. Public universities are mainly financed by the following sources: State funds from the Public Treasury, resources directly raised by each university, funds that have been assigned by special laws (i.e. Mining Royalties Law No. 8258), research contests financed by public funds and, to a far lesser extent, donations. By 2015, the average annual public budget (measured in the previous four years) reached the amount of 4,600 million Peruvian Soles—PEN (approx. USD 1,415 million) that were distributed among 47 universities. Thus, the average annual budget per public university amounted to 97 million PEN, an amount that should cover expenses per student, teacher and administrative payrolls, goods, and services, among others. The allocated public budget is expected to cover the main current expenses and operating costs. While, in the period from 2011 to 2015, the State increased the budget by about 700 million PEN (less than USD 200 million), for the next budgetary period it made a new reduction of around 4% (SUNEDU, 2017).

It should also be noted that the annual budget allocated by the State includes the budgetary item of the retirees' pensions. This aspect is important given that, when analyzing the budget item for this sector, it can be observed that about 20% of the budget is assigned to cover the expenses for retired personnel, which affects the oldest universities (Gonzalez de la Cuba, 2004).

Nevertheless, a group of public universities has managed to generate important additional income from continuing education, some postgraduate programs, third-party services (consulting and leasing of laboratories), and, in some cases, the operation of own companies linked to engineering and technol-

ogies, such as the National University of Engineering (UNI). According to Gonzalez de la Cuba (2004), these funds can represent about 40% of the total income of a university and allow to cover additional expenses for teachers, student support, and some investments in infrastructure, goods, and services.

On the other hand, as far as private universities are concerned, they do not receive direct financing from the States, although they can have it indirectly, through competitive research funds, student scholarships, academic scholarships for teachers, and, above all, through tax exemptions. The available information about financial management of these universities can only be reviewed in an aggregate manner from two sources of information: the reports that private universities must make to the SUNEDU (data to 2015), and the information reported to the CONCYTEC 2106 Research Census; the first due to the tax exemption inspection and the second due to the follow-up of the research expenditure.

The SUNEDU (2017) reported that the total income of private universities in 2015 reached USD 2,400 million, of which 95% came from study fees of undergraduate and postgraduate programs, and some from sales of goods. Information by type of private university shows that while for-profit universities are concentrated in sales of educational programs, the non-profit universities report a more diversified income, consisting of continuing education, research funds through contests, fundraising from third parties, third-party services, and, in some cases, related companies.

In the case of private universities, it is also interesting to see their spending priorities. While the non-profit universities report an expenditure structure with 63% of the total allocated to personnel expenses, for-profit universities allocate more than 52% of their budget to goods and services (SUNEDU, 2017). According to the study carried out by Benavides et al. (2015), for-profit universities tend to reduce expenses in academic staff, research, and quality of education in order to finance marketing and advertising instead.

In the case of the PUCP and the UL, the annual budgets are assigned by an organ of the central administration and calculated according to their historical expenditure and in line with an institutional policy of subsidy between schools. In this sense, deans participate very little in the economic policy of the university and have little control over the resources generated by their schools. In the case of the PUCP, there is an exception with continuing education and extension services, which constitute marginal income for each school. Generally, it can be pointed out that the financial management model leaves little room for action for deans. Therefore, one of the main challenges deans of both public and private non-profit universities share is to strengthen their ability to generate

income from diversified sources, to attract funding from external and international sources, and to increase the efficiency—skills that yet have to be developed through the professionalization of university management.

To sum up, the Peruvian university sector operates as a market for private goods in which competition becomes increasingly strong in terms of obtaining market share. In this light, marketing and advertising expenses become increasingly important. This situation can directly affect private non-profit universities, which prioritize expenses and investments in teaching and research as fundamental functions that support the prestige of this educational model.

Research and Publishing

Although the Peruvian Constitution and public policies related to education and research set the necessary standards to develop research, the country and, more specifically, its universities are still at a noticeably deficient level. The low academic productivity, measured with the number of publications in high-impact repositories, is evidence of this. The total number of publications and the average production per researcher are relatively low compared with those of other countries in the region or countries with similar economies to that of Peru. According to specialists, this situation has been caused by the lack of financial resources, little knowledge about available funds, low management capacity, and, perhaps the most important, the scarcity of qualified human capital.

In its first Research Census Report, the CONCYTEC (2017a) highlights that a determining factor of low production of knowledge is the shortage of qualified human capital to carry out research, development, and innovation activities. As stated in this report, the number of researchers in Peru is well below the average for the region. Thus, in Peru there are only 0.2 researchers for every thousand members of the economically active population, while the Latin American average is 1.3, and that of the OECD countries 12.7. Additionally, in relation to the academic level of the total number of registered researchers it was found that only 31.8% have a doctoral degree, 34.3% hold a master's degree, and 26.9% merely completed a bachelor's degree. Private non-profit universities have the highest percentage of researchers with a doctoral degree with 42.2%, followed by 39% in public universities, and 30% in for-profit universities.

With regard to the need of human capital, studies on public universities receiving additional funds from the exploitation of natural resources in their regions (mining royalties) have found that they are not able to spend these funds because, among other factors, they lack academic staff with research capabili-

ties for designing strong research projects (Garfias, 2011). A recent report from 2014-2015 shows that, in this period, those public universities which benefited from this budget have allocated only 2% of the total funds to carry out research (El Comercio, 2015).

Regarding the production of knowledge, measured with the indicator of the number of citable documents, official reports point out that research published in indexed impact journals shows a significant improvement from 2010 to 2015, growing from 927 to 1,610 publications, which corresponds to an average annual growth rate of 12%. However, comparing this percentage with those of other countries in the region, Peru lies well below countries like Colombia and Chile, which currently publish between 7,000 and 10,000 citable documents respectively. Another important research indicator is the number of published indexed academic journals. Whereas Peru reported seven indexed journals in 2015, Chile and Colombia reported 87 and 78 respectively for the same year (SUNEDU, 2017; CONCYTEC, 2017a).

These results can be seen as a reflection of the lack of qualified human resources or little financial resources, and also of a characteristic culture of research and publications of Peruvian universities. According to the CONCYTEC (2017a), the preferred publication and dissemination media for researchers is the indexed academic journal. However, in most universities, a large part of the dissemination of academic research is performed through non-indexed journals and own edited books of local scope.

Thus, at present, a large part of the academic-scientific productivity takes place through the initiative of a few private non-profit and public universities. These universities have financed the scarce academic production of quality and international visibility with their own resources and from international sources. It is thus pertinent to mention that, in 2016, only 16 Peruvian universities of the 132 were among the best 300 in Latin America according to the Quacquarelli Symond (QS) Ranking. Moreover, only one Peruvian university is among the best 50 in the region, according to The Times Higher Education (THE); only one is among the best 500 in the world, as reported by the QS Ranking; and no Peruvian university is considered among the best 500 according to the ARWU Research Ranking (SUNEDU, 2017).

In this context, some universities like the PUCP and the UL are promoting essential changes. On the one hand, the schools of Sciences, Humanities, and Social Sciences at the PUCP have distinguished themselves by training academics with research potential. On the other hand, in the last ten years, Engineering, Law, and Management schools are becoming increasingly involved in stimulating the expansion of applied research focused on innovation, public policy, and the development of industries and the market. To this end, deans

and academic departments, with the support of the Vice-President of Research, have committed themselves to creating incentives for professors to design and carry out short and medium-term research projects, either through students' theses or the formation of research groups. Both projects and research groups receive support funds and are becoming fundamental spaces to strengthen research ecosystems in the university, the first results of which have begun to show. At the UL, research is centralized in the Institute of Scientific Research (IDIC). The IDIC defines the areas of research to be supported through annual research contests for professors. These contests grant the winners the financial support and academic facilities to develop their projects for one or two years.

Internationalization

In Peru, as in other countries of the region, the Ministry of Education is responsible for defining the policies of internationalization of Peruvian Higher Education. There are, however, other actors that should be taken into account, such as the SUNEDU, a regulatory agency which is in charge of the recognition of degrees; the PRONABEC, which offers scholarships to study abroad in coordination with international cooperation agencies; and the CONCYTEC, that develops national policies for research promotion.

Country	2008	2010	2013
Argentina	9,304	9,753	7,166
Brazil	23,003	27,753	32,051
Chile	7,120	9,127	8,937
Colombia	20,106	24,391	25,509
Mexico	25,608	26,072	27,118
Peru	15,598	17,282	14,204
Total	**100,739**	**114,378**	**114,985**

Table 3: Total number of students going abroad by country of origin[56]

Following the educational trends in Latin America (Table 3), Peruvian universities have developed different strategies (such as regional academic networking, joint research projects, promotion of the internationalization of curricula, student and faculty mobility, marketing, and recruitment of international stu-

[56] Source: British Council, 2016.

dents) to incorporate a global dimension in their campuses. Internationalization is a cornerstone in every strategic plan but, due to financial restrictions, private universities are mainly the only ones able to implement it.

Most of the Peruvian Higher Education institutions boast over student exchange agreements with Argentina, Belgium, Brazil, Canada, Chile, Colombia, France, Germany, Mexico, Spain, and the USA (CLADEA, 2017). The most popular program is the undergraduate student exchange for one semester, and preferred countries are United States of America (17.4%), Italy (12.3%), and Spain (24.5%).

Country	2008
Brazil	1,409
Chile	1,323
France	773
Italy	2,230
Spain	2,105
United States	2,742
Total	**10,739**

Table 4: Total number of Peruvian tertiary-level students going abroad by destination country[57]

Other important internationalization mechanism in Peru takes place through summer programs offering two or three weeks abroad, and international weeks in which foreign faculty members visit the university to facilitate the international experience for those students who cannot afford travel expenses. Also online degree programs are offered by some private Peruvian universities with prestigious universities all over the world. In the last three years, many private universities (among them Universidad de Lima, Universidad del Pacífico, Universidad San Ignacio de Loyola, Universidad ESAN, Universidad Peruana de Ciencias Aplicadas, and the Centrum PUCP Business School) are offering their undergraduate and postgraduate students double degrees with international peers. These practices are highly valued and are usually financed through the students' own resources.

[57] Source: British Council, 2016.

There are still only few resources for the internationalization of Peruvian faculty and few public and private initiatives that support them. This is a structural condition that reduces the spectrum of internationalization's positive influence on Peruvian universities (CLADEA, 2017).

Since 2015, the internationalization of education is a priority in the Peruvian National Education Policy. Teaching, Learning, and the use of the English Language, also called "English, open doors to world," leads the State strategy. This policy defines the objectives and guidelines for teaching, as well as the use of the English language. Its general objective is the development of the English communicative skills that allow a broader access to educational, scientific, technological, entertainment, and labor opportunities. Moreover, this policy aims to contribute to the formation of more productive human capital and the insertion in global markets with the purpose of strengthening the country's competitiveness at the international level (British Council, 2016).

Despite this effort, there are other three structural obstacles for internationalization in public and private universities. The first and maybe most important one is the very limited availability of financial resources provided by the State. The second one is inertia, excessive bureaucratic control, and the high cost of administrative procedures. And the third obstacle is the perceived insecurity in our country.

Concerning internationalization, universities like the PUCP and the UL have established precise goals in their Institutional Strategic Plans (ISP). For example, the PUCP has established internationalization as one of its main development goals in its ISP 2018-2022, and includes not only student exchange activities, but also staff mobility for teaching and research.

In this way, the schools and their deans have started to develop operational plans that facilitate the participation of their students in international semesters, to offer courses in English, and to open courses for international students. Regarding teachers, the university has specified that staff mobility requires faculty to participate in short (one month) and long (one or more semesters) teaching and research internships. In order to obtain staff mobility, teachers must apply for third parties' funds and scholarships and rely on resources available at the university, which require expertise for their application, access, and use.

For its part, the UL, in its ISP 2016-2020, has validated internationalization as a strategic line whose deployment includes staff and student exchange for one or more semesters, short academic trips, and, from 2019, an in-house internationalization program. Nowadays, about twenty courses are taught in English in the School of Business and Economics and additionally students of the five degree programs of this school have the possibility of taking a second degree at the University of Queensland, traveling to Australia for two or three

semesters, depending on the degree program. The school also offers a double degree with the Clermont School in France, as well as an agreement with the University of London to provide academic support to the students accepted by this university to attend the online Bachelor of Science in Business Administration, while continuing another undergrad degree program at the UL.

Country	Total number of students	% of population
Argentina	7,166	0.017
Brazil	32,051	0.016
Chile	8,937	0.051
China	712,157	0.052
Colombia	25,509	0.054
Germany	119,123	0.148
India	181,872	0.014
Mexico	27,118	0.022
Peru	14,204	0.046
USA	60,292	0.019

Table 5: Annual flow of university students by country in 2013[58]

Conclusion

In Peru, 400 years passed from the founding of the first university to only ten universities in 1960, a sign of the priorities of the State with regard to the coverage of university education. In this period, Peruvian universities offered little access with very high selectivity and a low capacity to train the professionals required for the development of the industry and public services that the country needed. Although the liberalization policy of Higher Education of the 90s guaranteed greater access to university (with more than 1.4 million in 2017), this expansion has occurred under conditions of deregulation, little supervision, and a weak quality assurance system.

Under these conditions, the expansion dynamic showed a misalignment between training offer and professionals demand, a low State investment in public universities, and a private university offer characterized by low investments in infrastructure (laboratories, libraries, technology, and databases) and

[58] Source: British Council, 2016.

in human capital for teaching and research (teachers with the necessary training and academic degrees). In general, one could say that in Peru, there are very few universities of recognized prestige, and that university education is provided under a market logic in which the educational offer competes for price and market shares.

The new Peruvian legal framework requires that all universities improve the quality of education, intellectual production, and their infrastructure. In addition, the new regulatory requirements raise the need to manage universities with greater transparency, with social commitment, and with the objective of contributing to a higher international competitiveness of the country. In this new scenario, Higher Education authorities need to develop new and better skills to govern and manage institutions in Higher Education in order to guarantee the relevance and quality of professional training, research, and innovation; and a more cooperative relationship with industry. Given these conditions, the role and commitment of the deans as higher academic authorities are fundamental.

In the last decade, the government and national financial agencies have created new programs and fiscal mechanisms to stimulate innovation and cooperation between companies, universities, and research institutes. However, the response has not met expectations. Access to public financing is limited and generally focuses on financing R+D+i activities without facilitating coordination between representatives of universities and industry, thus wasting the possibilities of creating synergies and obtaining better results. In this sense, academic leadership is key, and the active participation of entrepreneurs and deans of engineering, economics, and business schools is necessary.

In recent years, Peruvian public and private universities have developed international agreements with the best universities in the world to facilitate student exchange and offer double degrees and long-distance education to promote quality in Higher Education. However, persistent internal and structural obstacles make it impossible to access the necessary resources to promote an internationalization that addresses all necessary aspects. Although progress has been made in terms of student exchange, university authorities (deans in particular) have to look for mechanisms and processes that facilitate international exchange in teaching and research.

In Peru, both public and private universities, albeit diverse, are facing common challenges in the following five areas of governance and management: development of human capital needed for training and research; relationship between university and industry; quality assurance; internationalization in terms of student and faculty mobility; and management of the financial resources essential for the long-term sustainability.

Perhaps the most important challenge now is to promote the development of the necessary human capital to raise the quality of university education, academic-scientific research, and innovation. This requires the support of the State in terms of scholarships and direct and indirect subsidies, as well as cooperation with industry. Universities should expand opportunities for academic training at doctoral and postdoctoral levels, specialization programs in university teaching and learning, and the use of information technologies. No less important is the creation of mechanisms and incentives for more professors to commit themselves to undertake a research that is valued and recognized within and outside the university. It is up to the deans to create the conditions for research to be as relevant as teaching in their schools.

When it comes to university quality assurance it is necessary to recover the credibility and trust of society and employers in university education. Credibility in quality contributes to the competitiveness of universities in relation to their local and regional peers. Very few of the Peruvian universities are among the top 20 in regional rankings, and only one is part of the best 500 in the world. The prestige and credibility of a university depends on multiple factors (e.g. graduates, intellectual production, patents, and recognized academics), but it is important for authorities to implement licenses and international accreditations, because these allow the strengthening of the institution in its different dimensions and facilitate a better positioning in the Higher Education sector.

Considering the low level of support from the State, Peruvian universities must solve the financing problem to deal with each of these challenges by their own means. While most private universities finance their activities through training and academic fees, the need (established by law) to conduct research as a fundamental function of the institution requires additional resources. Public and for-profit universities will need to strengthen their organizational structure and specialize their staff to sustain and increase their capacity to generate their own income, and to diversify their funding sources. In order to achieve this, learning to compete for contestable funds, providing relevant continuing education, and offering services to third parties will be an imperative in the dean's agenda.

Finally, considering the demands of the new Peruvian regulation and the local and global university market, the traditional university governance system faces challenges that will require taking on new roles and developing new capacities. Based on their fundamental units of government (such as Deaneries and new organizational structures) universities should be able to meet the needs of society and industry, to be sustainable in the long term, and to cope within an emerging country with the new rules of the global knowledge society.

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This handbook constitutes a stocktaking of the system and challenges of Higher Education in Latin America written from the perspectives of deans. It is the result of seven years of collaboration between Saarbrücken and Alicante in the DIES program "International Deans' Course Latin America," coordinated by DAAD and HRK. Organized according to national contexts, the articles pay attention to the following areas: National context for Higher Education, Industry-University Relations, HR Management, Quality Management and Accreditation, Funding and Financial Management, Research and Publishing, and Internationalization. This reference book serves as a guide for anyone interested in Higher Education in Latin America.

Dieses Handbuch liefert eine Bestandsaufnahme über die Systeme und Herausforderungen des Hochschulwesens in Lateinamerika aus der Perspektive von Dekan*innen. Es ist das Ergebnis von sieben Jahren Zusammenarbeit zwischen Saarbrücken und Alicante im Rahmen des DIES-Programms „International Deans' Course Latin America" des DAAD und der HRK. Die Beiträge decken Themen wie Nationaler Kontext des Hochschulwesens, Beziehungen zwischen Industrie und Hochschulen, Personalmanagement, Qualitätsmanagement und Akkreditierung, Funding und Finanzmanagement, Forschung- und Publikationstätigkeit sowie Internationalisierung ab. Dieses Referenzwerk dient als Leitfaden für alle, die sich für das Hochschulwesen in Lateinamerika interessieren.

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