



## Influence of institutional seniority and type of ownership on university quality rankings: Correlational analysis of Peruvian universities

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**Abstract:** This study evaluates the correlations between the universities' type of property (public, private associative and private corporate), institutional seniority (<20, 20-45 and > 45 years), and the presence and position in national and international university rankings. It considers 90 Peruvian universities certified by SUNEDU (public agency for the accreditation of universities in Peru), according to their presence in 20 university rankings (yes/no) and the position (tertiles) in two world rankings: Webometrics and SIR Iberoamericano. Four universities participated in 10 or more rankings and only 16 (18%) in 6 or more. The private corporate universities were the least old ( $p < 0.01$ ). No association was found with the type of property both in the presence in rankings and in the positioning ( $p > 0.05$ ), except in one where there was less participation of public institutions. Long-lived universities had higher participation and better positioning in rankings than those with less seniority ( $p < 0.01$ ). The presence and better positioning in university rankings depend on institutional seniority and not on the type of ownership in Peruvian licensed universities. This research highlights the lack of equity in several international rankings for the evaluation of the quality of universities, in the respect that most of them give priority to aspects related to institutional seniority and size. At the same time, the results of younger and smaller institutions are not put into perspective.

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# Influence of institutional seniority and type of ownership on university quality rankings: Correlational analysis of Peruvian universities

## Abstract

**Purpose** - This study evaluates the correlations between the universities' type of property (public, private associative and private corporate), institutional seniority (<20, 20-45 and > 45 years), and the presence and position in national and international university rankings.

**Design/methodology/approach** - It considers 90 Peruvian universities certified by SUNEDU (public agency for the accreditation of universities in Peru), according to their presence in 20 university rankings (yes/no) and the position (tertiles) in two world rankings: Webometrics and SIR Iberoamericano. Four universities participated in 10 or more rankings and only 16 (18%) in 6 or more.

**Findings** - The private corporate universities were the least old ( $p < 0.01$ ). No association was found with the type of property both in the presence in rankings and in the positioning ( $p > 0.05$ ), except in one where there was less participation of public institutions. Long-lived universities had higher participation and better positioning in rankings than those with less seniority ( $p < 0.01$ ). The presence and better positioning in university rankings depend on institutional seniority and not on the type of ownership in Peruvian licensed universities.

**Originality** - This research highlights the lack of equity in several international rankings for the evaluation of the quality of universities, in the respect that most of them give priority to aspects related to institutional seniority and size. At the same time, the results of younger and smaller institutions are not put into perspective.

**Keywords** University ranking, university quality, institutional seniority, property type, university education, higher education, THE, ARWU, Webometrics, QS.

**Article classification** Research Paper

## 1. Introduction

Peru, as in all of Latin America, experienced in the mid-twentieth century a phenomenon of massive privatization of services. Many of these privatizations were linked to the failure of public management of state-owned enterprises and to corruption scandals of state-administered services, which led to substantial economic crises. These crises also affected higher education institutions and laid the foundations for a new university transformation (Rama, 2006). Budget cuts in education services by the region's governments led to recommendations by the World Bank to attract private resources to the education sector. Thus, the democratic governments at the end of the 20th century opened up to private initiative in higher education and a new logic of university supply and demand (Noriega and Montiel, 2014). In the specific case of Peru, the amendment of the Political Constitution in 1993 and Legislative Decree 882 on the promotion of investment in education, allowed the creation of private corporate universities (for-profit corporations), joining the private non-profit universities (associations), and that both had the possibility of generating more significant investment in education through the reinvestment of profits or tax exemption, respectively, which led to increased investment and competition that improved the university system (Dextre-Chacón, 2012)

To understand the context, in 1990, there were 49 universities in Peru, while by 2015, there were 132 universities registered. The exponential growth was in private universities, which increased from 22 in 1990 to 90 in 2015 (SUNEDU, 2018: 41). By 2019, the National Superintendence of Higher University Education [Superintendencia Nacional de Educación Superior Universitaria] (SUNEDU) lists 145 universities, of which five are denied a license, 78 are in the process of being authorized, and 62 are licensed. In this sense, an investigation carried out by the British Council (2016) points out, among others, these three conclusions about the Peruvian University:

[...] As a result of this growth, access to higher education in Peru has increased over the last decade. Between 2004 and 2014, the number of university students doubled, from 130,000 to almost 270,000. This raise was possible because of the larger absorption of the applicants by the private universities, especially the relatively new ones with lower than average prices. As the coverage and diversity of the university system increased, so did the concern for service quality.

Several internal indicators of the universities, such as the level of training of teachers, the state of the infrastructure, and the level of scientific production, and external indicators, such as the employability of graduates and the dispersion of salaries, showed the need to improve the average quality of university educational services. The institutional framework that existed before the reform did not contribute to generating effective mechanisms to control or ensure the quality of the service. Quality regulation was based on the self-regulation of the universities and the work of the agencies in charge of ensuring quality was reduced to demanding primary conditions, not conducive to ensuring or improving quality over time. Also, the participants in the system had no information to discriminate between good and bad programs.

1  
2  
3 However, this private expansion was associated in its beginnings with the absence of regulatory mechanisms,  
4 which, justified by high student demand, produced uncontrolled growth. Therefore, private universities have  
5 been questioned under arguments of apparent "insignificant" results that would negatively impact on  
6 employability, scientific and intellectual production, entrepreneurship and innovation, among other aspects,  
7 developing the thesis of the commodification of education (de Souza Santos, 2017; Benavides *et al.*, 2015),  
8 classifying equally the entire group of private universities, without differentiating the possibility that there are  
9 good and bad institutions in each type of University.

10  
11 In the same spirit, Cuenca (2015) explains that, at the beginning of the liberalization process of the university  
12 education market, this change in the University's purpose of knowledge construction due to its almost  
13 exclusive approach to satisfying the needs of the labor market, produced a gap between the University and  
14 society. Not only was the balance between demand and the needs of the labor market altered, but research  
15 was neglected in university education. Furthermore, Cuenca (*op. cit.*) states that Peruvian universities not  
16 only do not appear in any world or regional ranking, but their volume of research is incipient, and the average  
17 academic level of faculty is low.

18  
19 As a result, there is a need to establish new public policies to regulate the operation of university institutions,  
20 especially the private ones, in order to create quality assurance mechanisms (Rama, 2006), which ended with  
21 the approval of the new University Law 30220, which recognizes these three types of high education  
22 institutions in Peru: public, private corporate and private non-profit universities, and also created the National  
23 Superintendence of Higher Education [Superintendencia Nacional de Educación Superior Universitaria]  
24 (SUNEDU), to certify higher education institutions for their operation. To a large extent, such legislation  
25 aimed to address undesirable features of the expansion of university enrollment from the 1990s  
26 regulations that allowed for profit-making educational activities (Yamada, Lavado and Martínez, 2015).

27  
28 Until mid-2020, 93 Peruvian higher education institutions obtained their operating accreditation, while 45 of  
29 them were denied the license, which includes both public universities, private corporate and private non-profit  
30 universities, being suspended the resolution of seven institutions by the quarantine of the COVID-19.  
31 Accreditation is the first step in a national policy of quality assurance, where continuous institutional self-  
32 evaluation is pursued (Zegarra, 2019), and validates the presence of these universities in the Peruvian  
33 academic ecosystem. However, the questioning of the quality of social universities in comparison with their  
34 public peers continues, and the possibility of a genuine search for quality in their educational offerings is  
35 unknown (Lynch, 2019).

## 36 37 **2. Quality of University**

38  
39 Defining something as subjective as quality is not an easy exercise since it is a polysemic concept, which  
40 generates difficulties when it is the object of study since it intrinsically involves the assessment of the user  
41 (Gonzales and Espinoza, 2008). Quality in higher education can have different meanings (Harvey and Green,  
42 1993; Harvey 1997): (1) as an exception, (2) as perfection or consistency, (3) as an aptitude for the  
43 achievement of a mission or purpose, (4) as an added value, and (5) as transformation (of the student). In this  
44 sense, depending on the ad hoc approach of its signifier, it will have different ways of being measured  
45 (Boyadjieva and Ilieva-Trichkova, 2019; Harvey 2008).

46  
47 The UNESCO World Declaration on Higher Education for the Twenty-First Century (1998) expands on this  
48 definition in terms of evaluation, involving more categories of analysis that embrace the broader role of the  
49 University, including student performance, teaching, and academic programs, research, infrastructure and  
50 equipment, scholarships and communication services, as well as its international dimension, while highlighting  
51 the diversity of typologies of institutions.

52  
53 The Council for the Evaluation, Accreditation, and Certification of the Quality of Higher Education [Consejo  
54 de Evaluación, Acreditación y Certificación de la Calidad de la Educación Superior Universitaria] (CONEAU),  
55 an agency of the Ministry of Education of Peru, explains that for the Ibero-American Network for the  
56 Accreditation of Quality in Higher Education, «quality» is a differentiating feature to meet an established need  
57 or expectation, which leads to the exemplary functioning of a higher education institution. In this regard, for  
58 the Peruvian public entity, university quality implies the evaluation of teaching, learning, management, and  
59 results obtained. Each part can be measured, and the whole implies global quality.

60  
The International Bureau of Education (part of UNESCO), in its guide to Teaching and Learning Tools for  
Development, quotes Pigozzi (2008), who considers that new approaches are needed to understand  
educational quality. First, in Pigozzi's belief (*op. cit.*), educational quality has become public policy by  
considering education as an effective lever for economic growth and development. Similarly, educational

1  
2 quality requires building measurable results (knowledge, competencies, skills, and behaviors). A third aspect  
3 is the learning of what is appropriate for a student's performance in time to achieve a creative and thinking  
4 adult who contributes to social welfare. On the other hand, Pigozzi (2008) points out, as an essential aspect  
5 for evaluating educational quality, its disparity in educational systems, expressed in the differences between  
6 private and public, rural and urban, etc., which manifest an inequality in quality and hinder social cohesion.  
7 Fourth, it takes into account that the quality of education is affected by the diversity within societies, which  
8 generates new demands to solve problems of discrimination, racism, and violence. Finally, it is necessary to  
9 consider education as an instrument for the achievement of societies in peace, equity, and democracy.

10  
11 The problem of quality is present in the whole world and especially in Latin America, where there is a  
12 scenario of expansion and national and international university competition that demands institutions to be  
13 accountable to society. Therefore, academic quality is no longer a private matter for the University, linked  
14 exclusively to its image and reputation (Romero-Rodriguez, 2020), or its brand equity (Torres-Toukoumidis *et*  
15 *al.*, 2018).

16  
17 On the other hand, there has been a transition in Latin American countries from restricted university  
18 education to an economic elite, to an inclusive university where students are often the first generation of  
19 the family to access University. The families and companies that receive these professionals demand quality  
20 assurance of the skills and abilities that these students have acquired in their education. (Armanet, 2004).  
21 Armanet (2004) explains that between 2000 and 2003, there was an "explosive" growth in the number of  
22 private Chilean universities, and points out that the need to participate in a competitive market has led  
23 Chilean universities (public and private) to expand their educational opportunities under conditions of  
24 questionable quality.

25  
26 In the Peruvian context, Lavado, Martínez, and Yamada (2014) suggest that the increase in  
27 underemployment is triggered by two components of the liberalization of the higher education market: the  
28 rise of lower quality universities and the growth of students with relatively low skills. The authors  
29 mentioned above, referring to Balarin (2013), identify a process of market deregulation of Peruvian  
30 universities that began in 1995, leading to a drop in the quality of university education offered by the  
31 institutions in operation. Similarly, they point out that the new legal scenario enhanced the number of  
32 ventures eligible to become universities, lowering entry barriers and facilitating the arrival of new higher  
33 education institutions to the market. As can be evidenced, both studies link the creation of new universities  
34 in recent decades to poor quality performance, both in Peru and Chile.

35  
36 In this regard, two main proposals have been developed to highlight the quality of higher education  
37 institutions, which are institutional certifications and university rankings (De Filippo *et al.*, 2012; Haakstad  
38 2001; Andreani *et al.*, 2020). In Peru, the processes of certification are in charge of the National  
39 System of Evaluation, Accreditation, and Certification of Educational Quality [Sistema Nacional de  
40 Evaluación, Acreditación y Certificación de la Calidad Educativa] (SINEACE), but to date, the  
41 guidelines and dates for institutional accreditation have not yet been defined, but they are for the  
42 different academic programs offered by the universities. For this reason, in order to evaluate the quality of  
43 the Peruvian universities, the present research will work with the other system of quality evaluation: the  
44 university rankings.

### 3. The assessment of the achievement of university quality through the rankings

45  
46 Before introducing the various rankings on universities in Latin America and the Caribbean, it is necessary to  
47 define what a university ranking is. Usher and Savino (2006), define them as:

48  
49  
50 University rankings are lists of specific groupings of institutions (usually within a single national jurisdiction),  
51 classified in comparative form according to a standard set of indicators in descending order. They are usually  
52 presented in the form of a "leaderboard", much like the classification of sports teams in a single division, from  
53 best to worst, according to the number of wins and losses they have experienced (p.34).

54  
55 As a result, we are facing an agreed standardization, although with different underlining by the university  
56 community of the measurable items, which has achieved the acceptance of the institutions as a set of  
57 references for citizens to consider when choosing one of them<sup>1</sup>. Thus, Usher and Savino (2006, p. 33) argue  
58 that: "university rankings or league tables, which only 15 years ago were a novelty, today are a normal  
59 feature in most countries with large higher education systems".

60  
<sup>1</sup> In Peru there is a platform that facilitates the potential user access to diverse and comparative data regarding the  
career and university that could choose. <https://www.ponteencarrera.pe/>



1  
2 The university rankings are then in charge of studying and comparing the efficiency of the different university  
3 institutions according to various indicators established by those in charge of the ranking. In general,  
4 according to Usher and Savino (2006, p. 38), four common points are evident in the leading Latin American  
5 rankings:

- 6 a) Initial characteristics: they represent the attributes and aptitudes of the students at the beginning of their programs.
- 7 b) Contribution to learning:
  - 8 1. resources, both financials, and materials, available to students and faculty for educational purposes.
  - 9 2. Faculty, on a quantitative and qualitative level, ways of lecturing and the conducive learning environment,  
10 measured by the amount of time that students are in contact with their professors, the types of exams they  
11 have to face, among other factors.
- 12 c) Learning performance: represents the "skill set" or other attributes they will have at the end of their studies, such  
13 as critical thinking, analytical reasoning, and technical knowledge. It also includes records related to student  
14 retention and completion of studies.
- 15 d) Final results: represent the fundamental purpose to which the educational system can contribute, not only those  
16 traditional measures such as employment and income rates, but any other considered necessary for individuals  
17 and society, such as job satisfaction, being "a good citizen", among others.

18 The items evaluated in the university rankings are diverse and have different values, according to those  
19 responsible for carrying them out. One of the main reasons for their existence is to be able to inform about  
20 the efficiency of university institutions in the achievement of quality towards the consumer of education. In  
21 this regard, Valle (2006) states that the basis is that the product offered presents a greater complexity for the  
22 user since he lacks the appropriate knowledge to be able to decide between a good or bad educational  
23 program (p.109).

24 According to Vernon, Balas, and Momani (2018), after a review of the top international rankings, a total of 24  
25 classification systems were identified, of which 13 were evaluated. Six of the 13 rankings are 100% focused  
26 on research performance. For those reporting weighting, 76% of the total rankings are attributed to research  
27 indicators, with 24% attributed to academic or teaching quality. Seven systems are based on reputation  
28 surveys and awards from faculty and alumni. Rankings influence the academic choice, but research  
29 performance measures are the most weighted indicators. There are no generally accepted indicators of  
30 academic quality in the ranking systems.

31  
32 University rankings depend on the objectives determined by the institution conducting the rating (Olkay and  
33 Bulu, 2017), varying in the type of information they collect, which may be from public sources (publications,  
34 patents, web, quotes), information required from universities (linked to faculty, students, organization, budget,  
35 etc.), and surveys of reputation to academics, students or stakeholders (Vernon *et al.*, 2018; Luque Martinez  
36 and Faraoni, 2020). Rankings can also be global, regional, or national in scope and evaluate the entire  
37 University or specific undergraduate or graduate academic programs.

38  
39 It is undeniable that the rankings have achieved a strong media positioning based on a context that values  
40 rankings with a quantitative, structuralist, and marketing approach. They aim to represent objective  
41 measures of quality through weighted quantitative indicators, but which leave limitations and biases not  
42 made explicit in the results (Ordorika, 2015). These biases include a focus on research outputs, while  
43 student education and attention to society's needs are absent from most of the rankings. Another critical  
44 factor favors English-speaking academics and universities. The total number of full-time Spanish-  
45 speaking professors slightly exceeds 10% of the total, while scientific journals in Spanish only represent  
46 5.8% in the JCR and 14% in Scopus. Ordorika (2015) also highlights the use of surveys of "selected  
47 samples of academics and potential employers" to assess reputation. In that sample, academics from  
48 Central and South America represent only 5%. This distribution is reflected in the fact that out of a total of  
49 401 universities in the THE ranking, only 4 are from South America. These tendencies make clear the  
50 prioritization of the "elitist North American research university" model, which places other university  
51 traditions in a condition of marginality (Ordorika, 2015).

52  
53 It has been found that countries with universities in better positions in rankings have a higher gross domestic  
54 product (Demberedeldori *et al.*, 2018), as well as that the presence in rankings feeds back into the prestige  
55 of the institution at a global level (Ramirez-Gutierrez, 2019), with stakeholders (Thakur, 2007) and  
56 generates more interest in highly competitive students (Horstscharaer, 2012). Better position in ranking  
57 results in more prestige and visibility of universities (Sadlak *et al.*, 2008), the best-positioned universities are  
58 eligible to receive funding through scholarship students, for example, the President's Scholarships in  
59 Peru, which include universities ranked up to the top 400 in the ARWU-Shanghai, QS and Times Higher  
60 Education world rankings, which do not include any Peruvian university.

Among the different factors that are linked to the presence or better positioning in a university ranking is the  
size of the institution (Docampo and Cram, 2015), that is, the more students, the more faculty and research

staff, and thus the higher scientific production, collaboration networks, patents, etc. Likewise, the time of institutional life of the University (seniority) also influences, because the results of prestige from graduates or the development of stable research groups requires time and maturation (Frenken *et al.*, 2017), which is why there is even a ranking that is generated only for "young" universities, the Young University Ranking, which only includes institutions under 50 years.

With the above considerations in mind, the objective of this study is to evaluate the correlation between the type of property and institutional seniority of Peruvian universities with university quality measured through presence and positioning in university rankings. In this sense, three research questions arise:

RQ1: Is institutional seniority a key factor for the positive positioning of universities in international rankings of quality?

RQ2: How does the size of the institution (density of students, staff, faculty, etc.) influence the positioning of universities in international rankings?

RQ3: Is there a relationship between the type of ownership of the University (public, private associative, and private corporate) and the position of the institution in the international rankings?

#### 4. Materials and methods

The present study has a quantitative design of correlational-descriptive scope. A transversal study was carried out, taking as study population all the Peruvian universities that have been accredited by the National Superintendence of Higher University Education (SUNEDU) until June 2020. Two graduate schools and one University with no students were excluded from the accredited institutions, leaving the effective sample ( $M_E$ ) made up of a total of 90 universities. The sampling refusal criteria is because, for most rankings, the participating universities must have active undergraduate programs

For each of the universities, the years of operation up to the present year 2020 were considered, information that was located in their accreditation resolutions or on their respective official websites and were categorized into three groups according to tertiary: young universities (<20 years), intermediate universities (20 to 45 years) and long-life universities (>45 years). Likewise, the type of ownership was determined as public, private associative, and private corporate, according to their statutes or regulations. Finally, we included the geographical location of their main campus: Lima Metropolitan (Capital) or region (other cities).

For the quality evaluation, thirteen world rankings were obtained (Table I) following the study by Vernon *et al.* (2018), as well as three regional rankings (THE Latin America, QS Latin America, SIR Iberoamericano) and four national rankings (SUNEDU, INDECOPI, América Economía y Sostenibilidad)

**Table I.** Global rankings of universities and the presence of Peruvian universities

Ranking	Start year	Responsible institution	Indicators / Research	Reviewed version	Global Universities (Peru)
Academic Ranking of World Universities (Shangai)	2003	Shanghai Ranking Consultancy	6 / WoS	2019	1000 (0)
Webometrics	2004	Cybermetrics Lab	4 /Scopus	2020-1	12007 (90)
Times Higher Education World University Rankings (THE World)	2004	TES Global LTD	13 / Scopus	2020	1397 (2)
U-Multirank (UMR)	2004	European Union and Advisory Board	30 / WoS	2019-2020	1711 (1)
Scimago Institutions Ranking World Report (SIR World)	2009	Scimago Lab	17 / Scopus	2020	3897 (9)
Round University Ranking (RUR)	2010	RUR Ranking Agency	20 / WoS	2010	829 (0)
Leiden Ranking (Leiden)	2011	Universidad de Leiden	18 / WoS	2019	963 (0)
University Ranking by Academic Performance (URAP)	2012	Center for World University Ranking	6 / WoS	2019-2020	3000 (3)
Center for World University Ranking (CWUR)	2012	Center for World University Ranking	8 / WoS	2019-2020	2000 (2)
QS World University Ranking (QS World)	2013	Quacquarelli Symonds Limited	6 / Scopus	2020	1002 (3)

US News and World Report–Global Ranking (USN&W)	2014	US News and World Report	12 / WoS	2019	1500 (1)
World Most Innovative Universities (Reuters)	2015	Reuters	10 / WoS	2019	100 (0)
The Times Higher Education Impact Ranking (Impact)	2019	TES Global LTD	51 / Scopus	2020	768 (6)

For the evaluation of the correlations, only those where there are more than three Peruvian institutions were included, since smaller numbers would not allow evaluating the level of association with the variables of interest. The most updated version of the ranking was considered, which were:

*Times Higher Education Latin America University Ranking 2019* (THE Latin America): requires the submission of information on behalf of the University. Additionally, it takes information from the scientific production and citations of Scopus and carries out surveys with students, professors, university authorities, industry, and governments. It is made up of five areas: teaching, research, citations (influence of research), internationalization, and technology transfer (income from industry). For the 2019 version, only universities with undergraduate programs that had more than 200 publications indexed in Scopus between 2013 and 2017 were considered, and their publications were not concentrated in more than 80% in a single area of knowledge. The results can be verified at <https://www.timeshighereducation.com/world-university-rankings/2019/latin-america-university-rankings>

*Times Higher Education Impact Ranking 2020* (THE Impact): requires the submission of information by the University related to policies and evidence, as well as scientific production and Scopus citations in the period 2014-2018. It is based on the 17 Sustainable Development Objectives (ODS), evaluating objective 17 and the following three with the highest scores of the institution. For the 2020 version, only universities with undergraduate programs that are certified, have publications on Scopus, and send the requested information were considered. The results can be verified at <https://www.timeshighereducation.com/rankings/impact/2020/overall>

*Scimago Institution Ranking* (SIR World) 2020: does not require the submission of information by the University. It is composed of 17 indicators grouped into three factors: research (Scopus 2013-2018), innovation (PATSTAT), and social impact (PlumX metrics, Mendeley, Ahrefs, and Google). To enter this ranking, institutions must have at least 100 articles indexed in Scopus by 2018. The results can be verified at <https://www.scimagoir.com/rankings.php>

*QS Latin America University Ranking 2020* (QS Latin America): requires the submission of information from the University. Additionally, it takes information on scientific production (2013-2017) and citations (2013-2018) from Scopus and surveys students, faculty, and leaders from universities, industry, and government. It is composed of eight indicators: academic reputation, the reputation of employers, ratio of professors to students, percentage of professors with PhDs, international research networks, citations per article (only including universities with more than 150 articles in the 2013-2017 period), articles per professor, web impact (Webometrics). The results can be verified at <https://www.topuniversities.com/university-rankings/latin-american-university-rankings/2020>

*Ranking América Economía Universidades del Peru 2019* (América Economía): requires the submission of information by the institution, including its scientific production in Web of Science, Scopus, SciELO and other databases, as well as three surveys addressed to human resources managers, resident readers in Peru of the magazine *América Economía* and full-time professors (America Economía Intelligence, 2019). It evaluates eight components: teaching quality, research and innovation, prestige, accreditation, internationalization, infrastructure, inclusion, and academic selectivity. The results can be verified at <https://mba.americaeconomia.com/articulos/notas/conozca-los-resultados-de-ranking-de-las-mejores-universidades-de-peru-2019>

*Ranking de Universidades 2018* (SUNEDU): does not require the submission of information from each University. This ranking is based on the scientific production of the Web of Science Core Collection from four indicators: number of publications for the period 2014-2016, number of citable documents 2014-2016, h index in the period 1996-2016 and number of articles in the top 10% cited by area of study in the period 2014-2016. The results are available in the Sunedu Biennial Report 2018 (Superintendencia Nacional de Educación Superior Universitaria, 2018).

*Ranking de Universidades con más Solicitudes de Patentes* (INDECOP): does not require the sending of information from the institutions. The National Institute for the Defense of Competition and Protection of

Intellectual Property [Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual] (INDECOP) reports the number of applications for patents and utility models by Peruvian universities. For the present investigation, the report of the period 2010-2019 was included.

*Sostenibilidad Ambiental en Universidades Peruanas 2019* (Sostenibilidad): the Inter-University Environmental Network Peru [Red Ambiental Interuniversitaria Perú] includes 37 indicators presented by the universities voluntarily, grouped into five areas: government and participation, internal environmental management, teaching/training, research, cultural extension and social projection (Red Ambiental Universitaria, 2019).

*Ranking Iberoamericano de Instituciones de Educación Superior 2020* (SIR Iberoamericano): does not require information from the institutions. To be included, they must have at least one article indexed in Scopus in the period 2014 to 2018. The Scimago group (Spain) carries out the disambiguation process of the affiliations for greater precision and quality of the information. The institutions are ordered according to the number of articles found, although other indicators are measured that are not considered for the ranking (De Moya-Anego *et al.*, 2020).

Ranking Web 2020-1 (Webometrics): does not require information from the universities. It is the most comprehensive ranking on a global scale that involves more than 30 000 higher education institutions in more than 200 countries (Aguillo, 2008). It includes four indicators: web presence (shared public knowledge, Google), visibility (impact of web content, Ahrefs), openness (most-cited authors, Scholar Google Profiles), and excellence (number of articles in the most cited 10% in their discipline, Scimago).

Of these nine rankings, only Webometrics included all Peruvian universities, and the Ibero-American SIR [SIR Iberoamericano] considers them all, although those that did not appear are replaced with a zero as the total number of publications in Scopus for the 2014-2018 period. Based on the order of the ranking, terciles of classification were generated, ranking as best (1-30), intermediate (31-60), and worst (61-90). Finally, the number of rankings in which each University appeared and those in the first three positions were added.

The data were computed in a .csv database in Excel and exported to the STATA v.14.0 statistical package. Descriptive frequencies are presented, and the association between type of University and institutional seniority with presence in each of the nine rankings is evaluated, as well as the positioning in the Webometrics and SIR Iberoamericano rankings, using  $\chi^2$  or Fisher's exact test, as appropriate, following the statistical assumptions. A  $p < 0.05$  was considered significant.

## 5. Results

By a slight majority (51.1%), the certified Peruvian universities are public institutions, which are significantly older than their private peers. Private associative universities represented 32.2% and private corporate universities 16.7%. It should be noted that private corporate universities are the youngest, all under 30 years of institutional life, so there is a clear association between the type of ownership and institutional seniority ( $p < 0.001$ ) of universities in Peru. One of three universities (32/90) has its main campus in Lima.

Of the 20 rankings analyzed, 13 were world rankings (Table I). In four of them, no Peruvian university appeared, which had the characteristic of being based on the best profiles of universities according to their scientific production in Web of Science (Wos) or patents, including the Academic Ranking of World Universities, The Round University Ranking, the Leiden Ranking, and the World Most Innovative Universities.

Two rankings had only one Peruvian University: U-Multirank and the US News and World Report-Global Ranking. Two rankings evaluated two Peruvian universities: THE World and CWUR, while two rankings had three Peruvian universities: QS World and URAP. The other three global rankings, besides the regional and national ones, were included in the evaluation by type of ownership and seniority of the institution.

Of the ten rankings analyzed, THE Latin America and THE Impact had the fewest Peruvian universities (5 and 6, respectively), and Webometrics included all of them. Sixteen rankings included less than a third of the Peruvian universities. When evaluating differences by type of ownership, there were only differences for the ranking América Economía, where there was lower participation ( $p = 0.009$ ) of public universities (10.9%) concerning private associative universities (37.9%) and private corporate universities (40%). In the rest of the ranking, there were no significant differences ( $p > 0.05$ ; Table I).

**Table II.** Presence in international rankings of accredited Peruvian universities according to the type of property



	Publi (n=46)	Private Associatives (n=29)	Private Corporate (n=15)	Total N=90	p*
<b>Seniority</b>					
Young (<20 years)	16 (34.8)	7 (24.1)	5 (33.3)	28 (31.1)	<0.007
Intermediate (20 to 45 y/o)	10 (21.7)	12 (41.4)	10 (66.7)	32 (35.6)	
Long-life (> 45 years)	20 (43.5)	10 (34.5)	0 (0)	30 (33.3)	
<b>Ranking</b>					
THE Latin America	1 (2.2)	2 (6.9)	2 (13.3)	5 (5.6)	0.188
THE Impact	1(2.2)	3 (10.3)	2 (13.3)	6 (6.7)	0.169
SIR World	4 (8.7)	3 (10.3)	2 (13.3)	9 (10.0)	0.894
QS Latin America	8 (17.4)	8 (27.6)	4 (26.7)	20 (22.2)	0.529
América Economía	5 (10.9)	11 (37.9)	6 (40.0)	22 (24.4)	0.009
SUNEDU	12 (26.1)	13 (44.8)	5 (33.3)	30 (33.3)	0.254
Indecopi	15 (32.6)	12 (41.4)	6 (40.0)	33 (36.7)	0.713
Sostenibilidad	17 (37.0)	15 (51.7)	6 (40.0)	38 (42.2)	0.443
SIR Iberoamericano	37 (80.4)	23 (79.3)	12 (8.0)	72 (80.0)	0.999
Webometrics	46 (100)	29 (100)	15 (100)	90 (100)	0.999

\* Fisher's exact test or  $\chi^2$ , as appropriate.

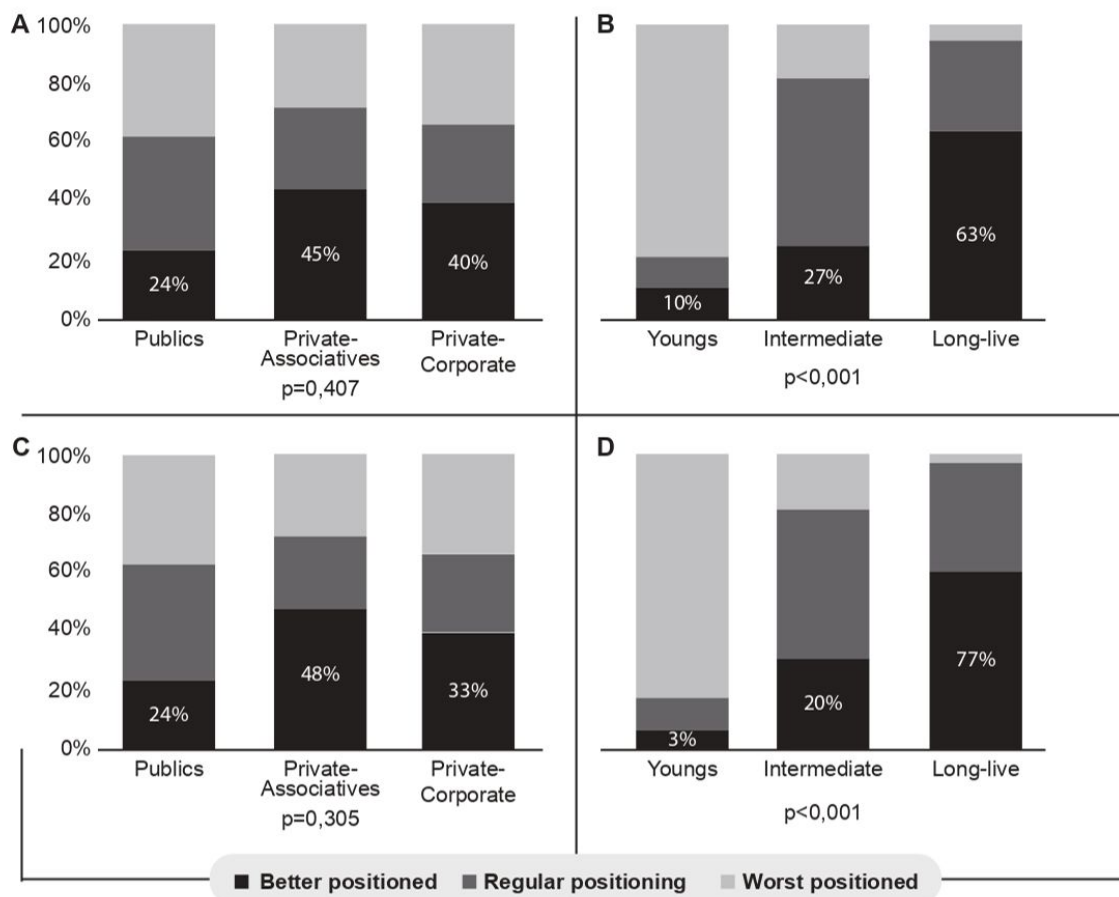
However, when universities are evaluated by seniority, a significant difference is found in 7 of the rankings showing an increasing trend in favor of older universities (Table III). The only rankings where no difference was found were in THE Latin America due to the lower number of universities (5) and Webometrics because it included all of them. It should be noted that in the other six world rankings where there was at least one Peruvian University, all were long-lived (Table I).

**Table III.** Presence in international rankings of accredited Peruvian universities according to seniority

Ranking	Young (n=28)	Intermediate (n=32)	Long-life (n=30)	Total N=90	p*
THE Latin America	0 (0)	2 (6.3)	3 (10.0)	5 (5.6)	0.246
THE Impact	0 (0)	2 (6.3)	4 (13.3)	6 (6.7)	0.158
SIR World	0 (0)	2 (6.3)	7 (23.3)	9 (10.0)	0.006
QS Latin America	1 (3.6)	4 (12.5)	15 (50.0)	20 (22.2)	<0.001
América Economía	1 (3.6)	11 (34.3)	10 (33.3)	22 (24.4)	0.008
SUNEDU	2 (7.1)	9 (28.1)	19 (63.3)	30 (33.3)	<0.001
Indecopi	3 (10.7)	13 (40.6)	17 (56.7)	33 (36.7)	0.001
Sostenibilidad	6 (21.4)	16 (50.0)	16 (53.3)	38 (42.2)	0.026
SIR Iberoamericano	14 (50.0)	30 (93.8)	28 (93.3)	72 (80.0)	<0.001
Webometrics	28 (100)	32 (100)	30 (100)	90 (100)	0.999

\* Fisher's exact test or  $\chi^2$ , as appropriate.

In the evaluation by positioning within each ranking, it was found that there was no difference between a better place in the ranking by type of property, both in the Ibero-American SIR [Iberoamericano] ranking (Figure 1A;  $p=0.407$ ) and in the Webometrics (Figure 1B;  $p=0.305$ ). However, it was shown that the older the University, the better its position in the ranking. For example, in the Ibero-American SIR, the best positioned represented 63.3% of the longest-lived, 26.7% of the intermediate, and only 10% of the youngest (Figure 1C;  $p<0.001$ ). Similar results (Figure 1D;  $p<0.001$ ) were found with the Webometrics ranking, where the worst positioned were the youngest universities (76.7%), followed by the intermediate (20.0%) and the longest-lived (3.3%).



**Figure 1.** The positioning of accredited Peruvian universities in the Ibero-American SIR ranking according to (A) property type and (B) seniority by tertiles, and in Webometrics 2020-1 ranking according to (C) property type, and (D) seniority.

Of the 20 rankings examined, two Peruvian universities appear in 15 of them with an equal number of positions in the first place (Pontificia Universidad Católica del Perú and Universidad Peruana Cayetano Heredia), followed by Universidad Científica del Sur and Universidad Nacional Agraria La Molina, with a presence in 10 rankings, leading the other two rankings Universidad Científica del Sur and Universidad Nacional de Ingeniería. Besides, the Universidad Nacional Mayor de San Marcos appears in the first places (8/9) in the rankings in which it has been included (Table IV). Of the group of universities that appear in six or more rankings, no young university is found. On the other hand, all the public and private associative universities that are long-lived and all the intermediate universities are private corporate universities. Universities located in Lima 12/32 had more presence and leadership rankings than universities in other regions (4/58).

**Table IV.** Accredited Peruvian universities with a more significant presence and leadership in university rankings.

University	Ownership	Location*	Seniority (years)	Rankings**			
				Presence	1°	2°	3°
Pontifica U Católica del Perú	Associative	Lima	103	15	7	6	0
U Peruana Cayetano Heredia	Associative	Lima	59	15	7	3	1
U Científica del Sur	Corporate	Lima	22	10	1	0	0
U Nac de Ingeniería	Public	Lima	141	7	1	0	0
U Nac Mayor de San Marcos	Public	Lima	469	9	0	3	5
U Nac Agraria La Molina	Public	Lima	119	10	0	1	1
U Peruana de Ciencias Aplicadas	Corporate	Lima	26	8	0	1	1
U San Ignacio de Loyola	Corporate	Lima	25	7	0	1	0
U de San Martín de Porres	Associative	Lima	58	7	0	0	2
U del Pacífico	Associative	Lima	58	6	0	0	1
U Nac de San Agustín	Public	Arequipa	192	7	0	0	0
U Nac de Trujillo	Public	Trujillo	196	7	0	0	0
U Ricardo Palma	Associative	Lima	51	7	0	0	0

U de Piura	Associative	Piura	51	7	0	0	0
U Privada del Norte	Corporate	Trujillo	26	6	0	0	0
U de Lima	Associative	Lima	58	6	0	0	0

\* Lima is a Peruvian Capital, U de Piura and U Privada del Norte have also a campus in Lima.

\*\* It includes nine worlds, three regional and four national rankings where there is at least one Peruvian University.

## Discussion and conclusions

There is a low number of Peruvian universities in world rankings. In 4 of them, there were no Peruvian universities, while in 6, there were three or fewer universities. More than 80% of Peruvian universities appear in less than six rankings, considering that 4 of them are national, one world ranking that includes all of them (Webometrics) and for the other one it is required to have published only one article in journals indexed in Scopus in five years (SIR Iberoamericano). These findings are not surprising since different studies have shown that Latin American universities have a low presence in global rankings (King *et al.*, 2018; Guaglianone, 2018), particularly in the most demanding.

One of the explanations could be related to a predominantly young university system, since in the Peruvian case, two-thirds of the universities are younger than 50 years old, which would mean less possibility of appearing in rankings (Lim and Boey, 2014). For example, from THE world, only 25% of universities are under 50 years old, and 21 of 1397 (1.5%) are under 20 years old. These data are corroborated with the findings of the present research, since it was found a correlation with institutional seniority (RQ1), both with presence and positioning in the different rankings (Table III, Figure 1).

Seniority is necessary for the development of the different research products (publications in indexed journals, citations, collaborative networks, patents, research income), which are part of all the rankings evaluated, either as an income criterion or as an essential evaluation score (Vernon *et al.*, 2018; Olkay and Vulu, 2017).

The longevity of the institution runs counter to the ability of corporate universities with less than 30 years of existence to offer better results in evaluation, not only because of the research component but also because of the results of their students. For example, the presence of international awards such as the Nobel and others, in the case of the Shanghai ranking (Frenken *et al.* 2017) or having a high volume of graduates in leadership positions in government and business, helps in reputation surveys that are included in rankings such as Shanghai, QS, THE, among others.

Despite this, no difference was found in the presence and better positioning in the rankings by type of property of the University (RQ3). The only ranking where differences were found was due to the lower participation of public universities in the Peruvian ranking of América Economía. This, linked to the findings regarding seniority (RQ1), supports the role that private corporate institutions have been playing in the Peruvian university system. The presence of the private corporate University has meant new organizational models for learning and research, curriculum innovation, new models of university organization and has moved the capital to allow university education services to expand and cover sectors of the population that traditional public and private universities could not cover, suggesting a "democratization" of university education traditionally elitist in academic and economic terms (Noriega and Montiel, 2014).

Two Peruvian universities stand out for their participation and positioning in the different rankings: the Pontificia Universidad Católica del Perú and the Universidad Peruana Cayetano Heredia (UPCH), both privately owned associations, the first with more than 100 years and more than 20 000 students, and the second with less than 60 years and less than 10 000 students. However, it can be stated that the UPCH has a longer institutional life, since its creation occurred from a split in the Faculty of Medicine of San Fernando of the Universidad Nacional Mayor de San Marcos, where most of the professors and researchers resigned, forming this institution and taking with them the institutional networks established, agreements, equipment and research groups (Zarate *et al.*, 2016), that explain why they quickly achieved a good position in research. This situation has been seen in other "young" universities in international rankings such as the Medical University of Graz, the Medical University of Vienna, or the Brighton and Sussex Medical School, which appear in THE world despite being less than 20 years old.

On the other hand, no university located outside Lima leader any ranking, and only 4/58 are in the top universities with more presence (Table IV). These results are similar to Chile were universities outside Santiago are worst positioned in the different local rankings (Ganga-Contreras *et al.*, 2018).

No correlations were found between the type of university property and presence in rankings, as well as better positioning in the rankings evaluated (RQ3). However, there was a more significant presence and a better positioning in the longer-lived universities (>45 years) (RQ1). The development of institutions, research groups with international networks (and thus higher productivity of indexed publications and patents) and academic prestige, are strongly influenced by institutional age. Therefore, the prejudice against private corporate universities (<30 years) is based on an unfair comparison with institutions that double, triple, or more institutional seniority.

However, this result would not have been the same without the institutional accreditation process carried out by SUNEDU after the University Law, which highlighted research as an essential function of the University. The establishment of fundamental indicators of quality related to research, can be seen in the increase in the scientific production of all Peruvian universities (Mayta-Tristan *et al.*, 2019), and therefore, the higher possibility of entering university rankings. Likewise, the accreditation process has denied more operating licenses to private corporate universities than those that did obtain them.

This study has certain limitations since it only evaluates two variables out of many that can determine a better positioning in rankings, but being only one country. With so few universities in rankings, the sample size is limited to generate predictive models and simulations that fit better. Other studies could explain why some Peruvian universities have better performance in ranking including variables as the number of students, the number of academics (staff), student/staff ratio, budget, researchers, patents, international staff, staff with Ph.D., excellence and leadership in publications, etc. (Lukman *et al.*, 2010; Jeremic *et al.*, 2013; Buena-Casal *et al.*, 2007). On the other hand, although the rankings are used to measure some aspects of the quality of university education, they do not measure all the elements that would be expected, and each one has certain particularities (Harvey, 2008), even more so if we understand how controversial the concept of "university quality" itself can be (Boyadjieva and Ilieva-Trichkova, 2019).

Despite these limitations, this is a first approach to the performance of Peruvian universities in 20 university rankings and contributes to the discussion on the quality of universities according to the type of ownership and institutional seniority. Future studies should evaluate the performance of universities of similar antiquity in the Peruvian and Latin American university system. An additional aspect observed in the evaluation of universities under 20 years of age present in THE world, is a high casuistic (31 institutions) that when merging appear as new, increase the institutional size and with it their research groups and better positioning in rankings (Docampo, 2015) (RQ2), a possibility that could be explored in Peru and Latin America, particularly after the effects caused by the COVID-19 pandemic on university education that puts the continuity of several higher education institutions at risk (Burki, 2020).

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