Supplementary Notebook (RTEP - Brazilian academic journal, ISSN 2316-1493)

UNIVERSITY REFORM AND ITS IMPACT ON SCIENTIFIC PRODUCTION IN PERU

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Abstract: *The present study had the objective of analyzing the Peruvian scientific production published after the university reform initiated in 2014 with the purpose of evidencing the impact of this one on the other. A systematic search for data related to research indicators of the competitiveness rankings of the World Economic Forum, the Global Innovation Index, the Scimago Journal Rank, the Ricyt, the Concytec, the Peruvian Council of Competitiveness, among other organizations that analyze global or regional performance was carried out. The results indicate that, during the last decade, Peru has shown some improvements in scientific research: it has quintupled investment in science and technology, increased scientific production and thus obtained better positions at the regional and global level; it has also shown sustained growth in publications. However, Peru's performance is still limited, especially when compared to other countries in the region, and in view of its remarkable macroeconomic growth over the last two decades, which is not in line with the budget allocated to science, technology and innovation (STI). University reform was expected to accelerate the improvement in research performance; however, its impact has not been as relevant in this last five-year period.*

Keywords: *higher education, research, scientific publication, reform, university.*

INTRODUCTION

Throughout the 20th century, the Peruvian university has been the object of various attempts at reform, which have taken place through the enactment of university laws that seek to improve the quality of teaching. A new reform process began in July 2014 with the enactment of Law No. 30220, the University Law which, unlike its predecessors, establishes academic quality, research and innovation as some of the principles and purposes of the university. In 2015, at the beginning of the licensing process, there were 50 private corporate universities, 41 private associative universities and 51 public universities operating in Peru. At the end of this first phase, the results are: 93 universities with an institutional license, 40 with a denied license and 7 universities with a licensing evaluation in progress. Initially, the closure process was scheduled to take place within two years of the denial of an institutional license; however, given the current situation of the pandemic that is sweeping the world, the deadline has been extended (National Superintendency of Higher University Education [SUNEDU], 2020-a).

This study aims to analyze Peruvian scientific production and its evolution before and after the university reform initiated in 2014. For this purpose, a systematic search was made for data related to research indicators from the World Economic Forum's competitiveness rankings, the global innovation index, the Scimago Journal Rank, the Ricyt, the Concytec, the Peruvian Council for Competitiveness, among other organizations that analyze global or regional performance in various areas, including research. Likewise, data from economies in the region like Peru -such as Colombia and Chile- were considered to carry out a comparative analysis of efficiency.

UNIVERSITY REFORM AND LICENSING

University enrollment in Peru began an accelerated increase between the 1960s and 1980s, when it went from 30,000 to 255,000, with 79% concentration in public offerings. However, the population explosion and the demand for tuition was not met; this was compounded by the economic and social crisis Peru was going through as a result of the years of violence, which resulted in neglected state universities without funding or institutional integration (Sandoval López, 2002). The National Council for Science, Technology and Technological Innovation (Concytec), an institution created to lead research policies in Peru, also began to be weakened by the crisis. In the 1980s, interest in the promotion of research began to disappear from the public agenda, reflected in the decrease in the annual budget for Concytec (Alcazar and Balarin, 2018).

Faced with this abandonment of the public university and in accordance with the policy of structural transformation that followed the Washington Consensus of 1989, a program demanded by countries in crisis such as Peru, the liberalization of the educational market was established through Decree Law No. 882, Law for the Promotion of Investment in Education, in 1996, and with this the opening of private universities for profit began (Morandé L., 2016). The economic legacy of the adoption of the Washington Consensus for Peru represented an average growth of the gross domestic product (GDP) of 0.8% per year between 1998 and 2001, which grew to 5.6% on average between 2002 and 2016, according to data from the National Institute of Statistics and Information (Instituto Nacional de Edtadística e Informática, 2020). In terms of education, this first reform of opening the university education market brought about a considerable increase in the number of universities, which between 1997 and 2015 went from a total of 57 to 142. Public or state universities almost doubled in those 18 years, from 29 to 51, while private universities tripled, from 28 to 91. Additionally, enrollment between 2000 and 2014 nearly tripled, rising from 4,26029 to 1,105,010 students, with coverage going from 6.5 to 27.4 in private universities and from 9.7 to 11.8 in public universities (Cuenca & Reátegui, 2016).

Thus, the process of massification of the university in Peru became a reality; it was possible to attend to the growth of the population. The greater number of people, mostly young people, who needed access to higher education, was served by the increase in coverage and enrollment rate, especially by private corporate for-profit universities. However, although the first objective of meeting the growing demand for education and the massification of higher education was achieved, the expansion of the university offer ran unchecked, and this brought about the dispersion and deterioration of academic quality, as well as the non-democratization of university education, which resulted in the country's persistent socioeconomic inequalities, incongruent with the economic improvement and citizen optimism experienced between 2003-2013 (Ministry of Education [MINEDU], 2006; MINEDU, 2015; Cuenca and Reátegui, 2016). However, a greater diversification of university offerings has not meant greater equity in access to different types of universities (Benavides, León, Haag and Cueva, 2015).

The increase in the number of universities was not a singular Peruvian issue, but rather a phenomenon that occurred throughout the world, although it is important to note that in other Latin American countries, such as Brazil, Argentina, Chile, Colombia and Ecuador, there are instances of national coordination of university institutions and the promotion of their academic quality. In the case of Peru, the accelerated expansion of university offerings was not at all driven by mechanisms equivalent to those of foreigners that would certify their suitability and academic and institutional quality (MINEDU, 2006). In the absence of effective evaluation and coordination bodies for the university function, these institutions ended up not fulfilling the purposes contemplated in the Political Constitution of Peru: professional training, cultural dissemination, intellectual and artistic creation, and scientific and technological research. In addition, the excessive university supply exacerbated the gap between the professional offerings of universities and the needs and possibilities of the country, both in terms of the labor market and its relevance to development. The saturation of certain professional careers, while others, more functional to the use of available resources, were not offered. This is also the reason for the extreme dispersion and low quality of postgraduate courses and the insignificant amount of research (MINEDU, 2006).

On the other hand, since the end of the 1990s, there had been discussions about the need to confront the deregulated growth of the university system, which, according to Cuenca and Reátegui (2016), did not comply with the hypothesis that the market would efficiently regulate the quality of the university educational service. In 2006, reports from the Ministry of Education confirmed the conclusions of the National Commission for the Second University Reform of 2002 with respect to the situation of research in Peru, pointing out that the production of knowledge was greatly relegated, particularly in the strategic area of basic sciences and the production of technology. Likewise, it pointed out the absence of general guidelines of national scope that would coordinate research in universities, setting priorities and distributing functions, a problem that was not exclusive to public universities, but also reached out to private universities (Congress of the Republic of Peru, 2002; MINEDU, 2006). Protected by the autonomy granted by the Constitution of Peru, before Law No. 30220, accountability was not practiced nor was transparency promoted, in addition, state universities presented low budgetary execution; all this combined with the absence of effective control and supervision bodies for Peruvian universities.

> The absence of coherent policies for long-term research and social impact, which favor interdisciplinarity and cooperation between universities, prevents the formation of a scientific, academic and intellectual community integrated into permanent cooperation networks. This shows the isolation of the university from its environment, in particular from the productive sector and the State; but it is above all the result of the scarce attention paid by the governments of the moment to the development of our scientific-technological base (MINEDU, 2006, p. 84).

The university reform began on the initiative of Congressman Daniel Mora in the Education, Youth and Sports Commission of the Congress of the Republic of Peru in 2013 to replace Law No. 23733 (1983). The new University Law was approved on June 26, 2014 and promulgated on July 9 by Ollanta Humala Tasso, president at the time. According to the same law, its purpose is to regulate the creation, operation, supervision and closure of universities, as well as to promote the improvement of the quality of university educational services (Congress of the Republic of Peru, 2014). The University Law was the starting point for the Ministry of Education, as the governing body, to make a formal commitment to the professional future of young people and to begin implementing the reform.

With the implementation of Law No. 30220, the State, in its different instances, such as ministries and executing units, has invested more in Science, Technology and Innovation (STI) than in other periods, between 0.15% and 0.2% of GDP, a lower graphic that recorded in other nations in the region such as Chile, Colombia, or the countries of the Organization for Economic Cooperation and Development (OECD), which are reaching 4.5% of GDP (León-Velarde, 2020). A structural change brought about by the new University Law was the creation of the National Superintendence of Higher University Education (SUNEDU) as an agency attached to the Ministry of Education whose main functions are to take care of licensing, quality improvement and supervision of university higher education service. Sunedu began its work in December 2014 and the licensing process for public and private universities, which began in December 2015, became the focus of its activities. Through institutional licensing, each university must demonstrate that it meets the basic conditions of quality (CBC) to provide educational service (SUNEDU, 2015); if it fails the evaluation, the operating permit is denied and the university proceeds to cease activities. The fourth CBC evaluated in the licensing process refers to lines of research and includes eight indicators: management (organization and regulations), financial resources (budget, infrastructure and equipment), human resources (research teachers, human resources in general for research) and research projects in the framework of relevant lines of research and that the country requires for its development, prioritized according to the OECD.

SCIENTIFIC RESEARCH AND PRODUCTION IN PERU

UNESCO defines research as the set of practices that aim to create theoretical and practical knowledge about the reality around us (2015). According to the Second

Biennial Report (SUNEDU, 2020), the primary role of consensus research is economic growth, public policy implementation and social development. For its part, university research contributes to the professional training of students and their social and economic development. Consequently, when defining the educational quality constructs, particularly university quality, it is measured based on criteria linked to scientific research. World and regional rankings of universities, such as the Scimago Journal and Country Ranking, consider scientific production as a component (Scimago Journal and Country Rank, 2020). To ratify their hypothesis that the Peruvian educational market did not efficiently regulate the quality of university higher education, Cuenca and Reátegui (2016) considered as supporting elements indicators of the low quality of Peruvian university education that most global and regional rankings did not include Peruvian universities. For example, in 2014, Peru had a very low volume of publications, representing 1.4% of the total Latin American scientific production. Additionally, Castro and Yamada (2013) showed that in the period 2004-2010 professional underemployment grew from 29% to 35%.

Research is evaluated from two angles: resources and results. The first groups the set of elements necessary to generate quality research and are mainly three types of resources: financial, human and bibliographic (Hackett et al., 2008). The financial resources allow the acquisition of infrastructure, equipment, and the hiring of personnel. Human resources include both researchers and adequately trained technical and research management personnel (Huisman, Weert &Bartelse, 2002). With respect to bibliographic resources, it refers to the set of scientific and academic contents available as input for the work of university researchers. In second instance, the results or products of the research, which can be: patents and publications; these last ones include all the written scientific documents, such as articles, books, chapters of books, among others, in which the terms of the research, the method used and the findings obtained are detailed; generally, they are published in specialized magazines. This is important when it is intended to evaluate the research from a perspective of greater consensus. Sunedu, for example, in its Second Biennial Report (2020), adopts these evaluation criteria. In this study we will focus on analyzing the situation in Peru in terms of research results through scientific publications in indexed journals. Another aspect to take into account is that, as a result of the mandate of Law No. 30220, universities grew in formative research; however, it is necessary to improve the quality of this, while it is necessary to strengthen some aspects related to methodology and others to scientific writing (Perdomo, et al, 2020).

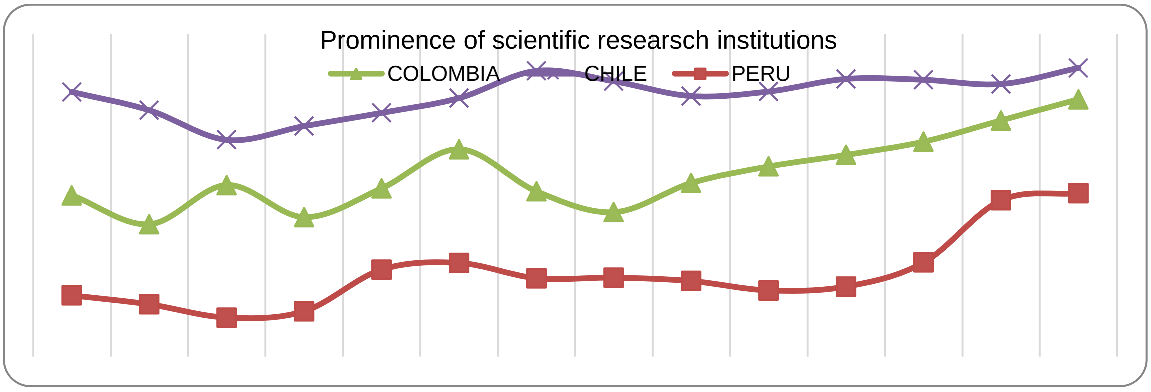
EVOLUTION OF SCIENTIFIC RESEARCH-PRODUCTION INDICATORS IN PERU

A criterion for the quality of scientific production consists of the inclusion of scientific and academic results in indexed journals with high editorial standards, visibility and scientific impact (Scopus databases, Web of Science). One way to measure the scientific impact of a publication is through the number of citations it receives, which measures the relevance, visibility, and influence of the research findings for the scientific community (Hackett et al., 2008). Thus, it is generally measured by the scientific quality of the publications according to the indicators: number of articles published in indexed journals, percentage of journals of higher quartile or Q1 with national authorships, impact factor-Index H, percentage of citations in prestigious journals visible in Scopus or Web of Science, and number of doctors in a country.

At an international level, there are organizations that periodically organize a series of indicators that allow us to know the status of STI in each nation. The indicators cover the resources dedicated to research and development, patent families, technological balance of payments and international trade in highly intensive industries in research and development (R&D). The OECD uses the following indicators: investment in scientific and technological activities (gross national expenditure on R&D), human resources in science and technology, and scientific and technological production and economic impact (Guadarrama &Manzano, 2016).
Investment in R&D is measured in relation to the GDP, being a variable and annual percentage, also measured in relation to the number of inhabitants in the country (per million inhabitants). Peru continues to be one of the countries with the lowest budget for science and technology in the Latin American region. In 1975, Peru recorded the highest historical investment in research and development: 0.46% of GDP; however, since then, investment in R&D has fallen steadily (Alcazar and Balarin, 2018).
The following are the research results obtained by Peru and compiled from the global competitiveness report that the World Economic Forum prepares annually measuring the global competitiveness index (GCI); also shown are data that since 2007 the Insead School of Business and Cornell University have published annually in the global innovation index (GII). Both reports are taken as a reference by the economies participating in the evaluation, making analysis, identifying weaknesses and taking recommendations -and ideally- to translate them into comprehensive improvement policies.

The total index of the GCI comprises twelve pillars, of which the innovation pillar will be analyzed, which in turn consists of sub-pillars that measure the expenditure on R&D, patent applications, scientific publications, among others. Peru's growth in macroeconomic terms over the last few decades has not been reflected to the same extent in its information and communication technology (ICT) adoption and innovation indicators, where it continues to underperform. Graphic 1 shows Peru's results with respect to Colombia and Chile in the GCI, taking as a reference its position in the sub-index ranking and the percentage of countries it exceeds in performance. It is worth noting the improvement in Peru's performance on the index of the prominence of scientific research institutions, going from the bottom fifth in 2014 to 2016, when it was no more than 20% of the countries evaluated, to more than a third of the economies evaluated in 2018 and 2019, standing out over 39% and 41% of countries, respectively. However, Chile and Colombia show greater prominence in their scientific research institutions; Chile surpassed 72% and Colombia was better than 64% of economies evaluated.

Graphic 1. Results of the Global Competitiveness Report. Prominence of scientific research institutions



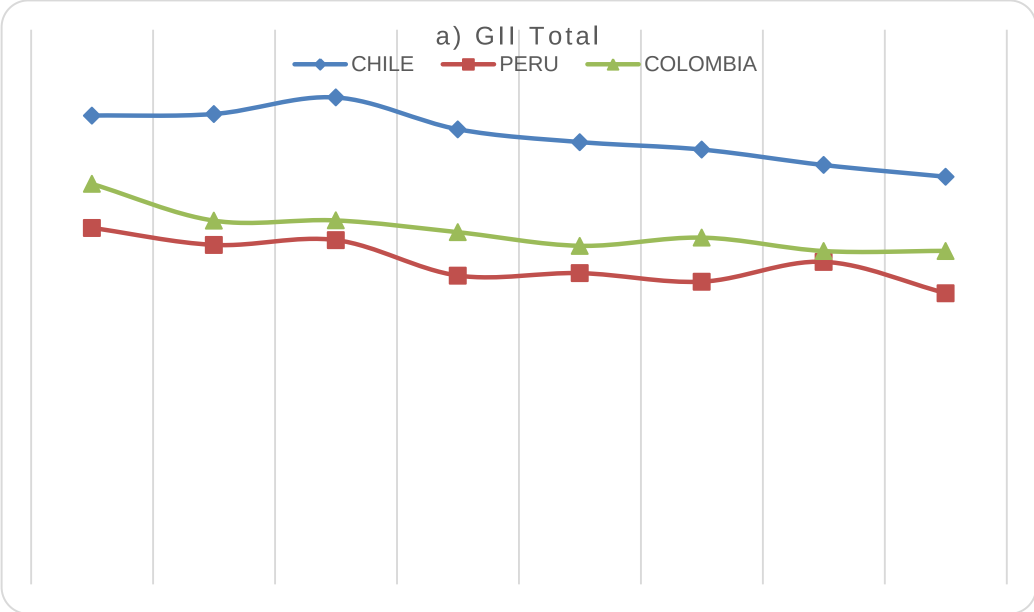
Source: WEF-GCI. Own elaboration

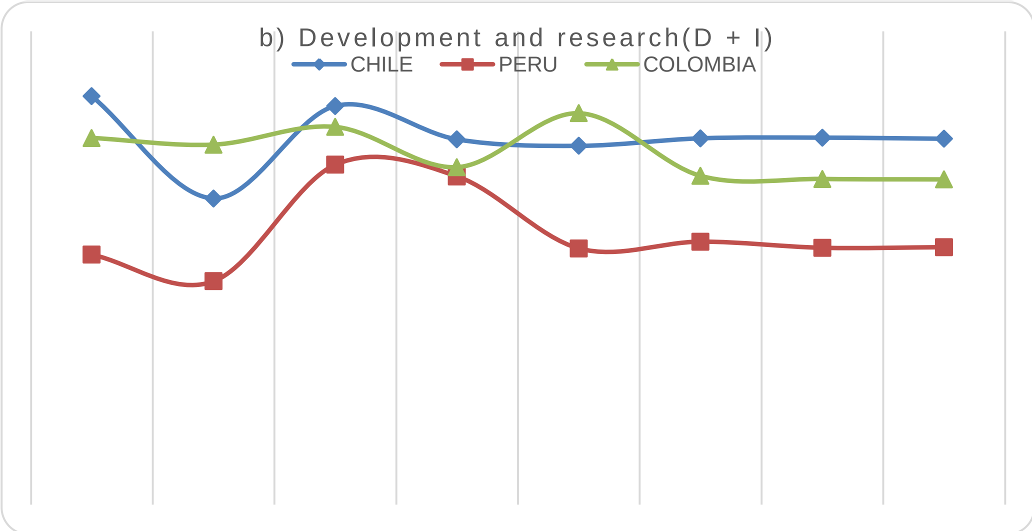
The total index of the GII comprises seven sub-indexes or pillars of innovation, which in turn include other sub-pillars; for example, in the human capital and research pillar is the sub-index that measures R&D in terms of the level and quality of research and development activities. Graphic 2 shows Peru's results with respect to Colombia and Chile in the GII, taking as a reference its position in the ranking in each sub-index and the percentage of countries that are outperforming.

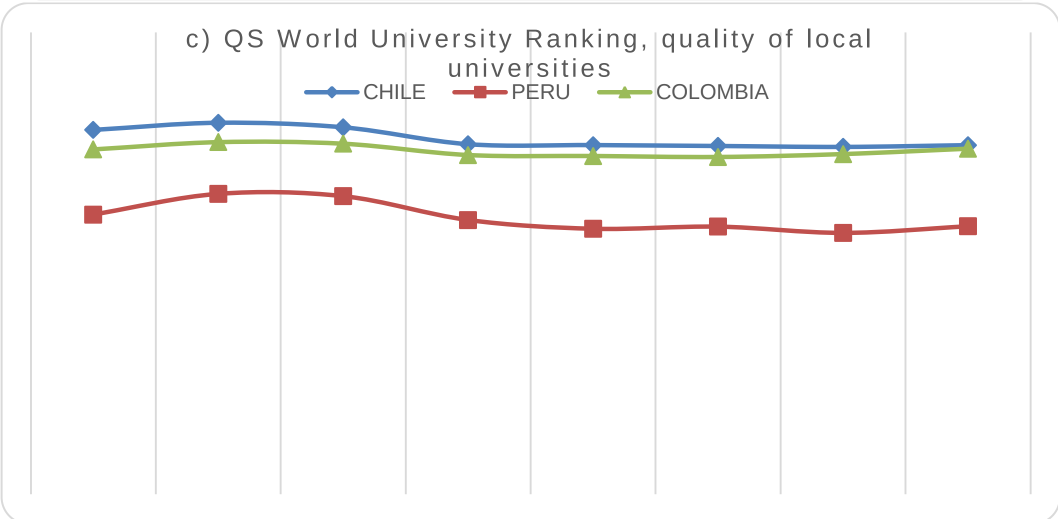
In the 2020 total GII, Peru is in position 76, dropping 7 positions with respect to 2019, and is above 42% of countries evaluated, while Chile, in position 54, is above 59% of countries; and Colombia, in position 48, is above 45% of the 131 economies evaluated (graph 2.a). The results in R&D (graph 2.b) show the same behavior of the total GII, with Chile at the top, followed by Colombia and below Peru, which despite showing an improvement in the results of 2015-2016 and being in the upper average, fell again and remained at the same level of 43-44% above the countries evaluated. As for the sub pillar of the QS World University Ranking, it measures the quality of local universities based on the quality of scientific and research institutions.

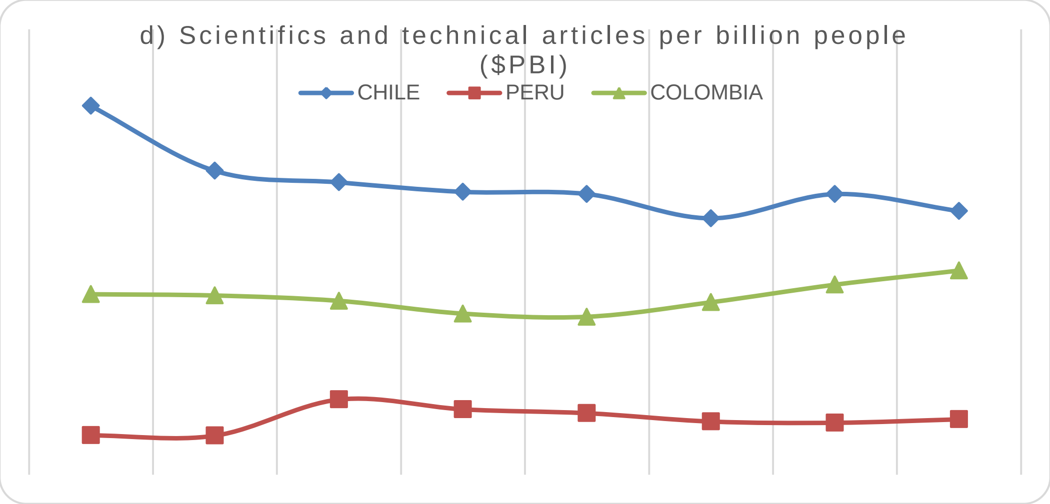
This sub-index is where Peru shows the best performance, surpassing 58% of countries. Chile exceeds 76% of countries and Colombia 75%. However, despite being in the upper average, it is important to note that Peru reduces the percentage of countries that exceed the ranking of university quality as of 2016, when it will no longer be in the upper 2.d, an exit sub-pillar is shown when showing the results of knowledge or innovations; this is how the dissemination of knowledge is considered by evaluating countries according to the publication of scientific and technical articles by number of inhabitants with respect to the GDP in U.S. dollars. Once again, Peru has the lowest results, being in the lowest tenth position, only surpassing 10% of countries; Colombia shows a better performance than 37% of economies evaluated; and Chile, despite having dropped two positions in the ranking, surpasses 47% of countries, almost five times more than Peru in the performance of this sub-index.

Graphic.2 Results of the Global Innovation Index a) total GII, b) R&D research and development, c) QS World University ranking quality of local universities, d) scientific and technical papers per billion inhabitants ($ GDP)





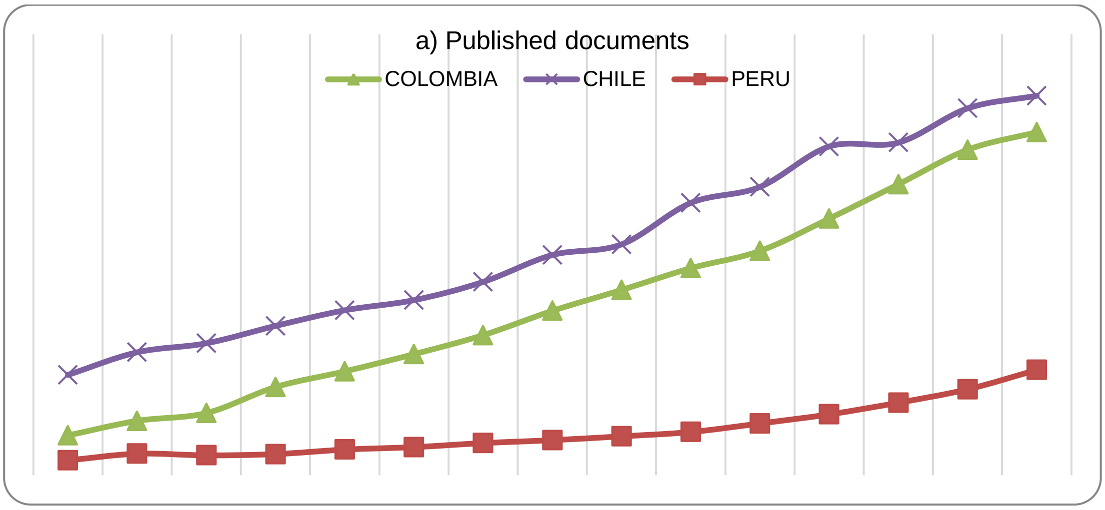


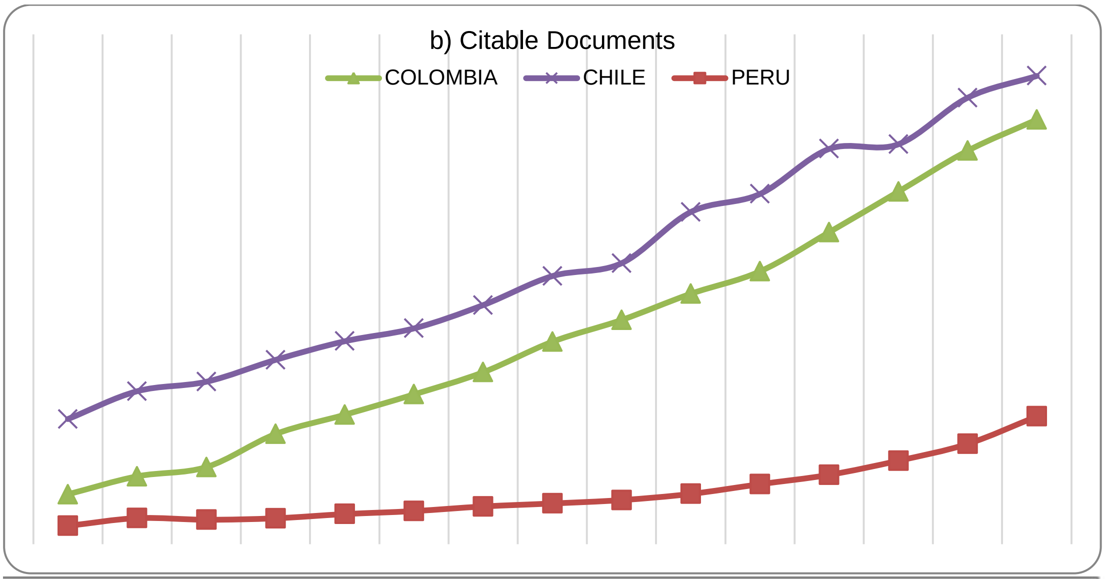


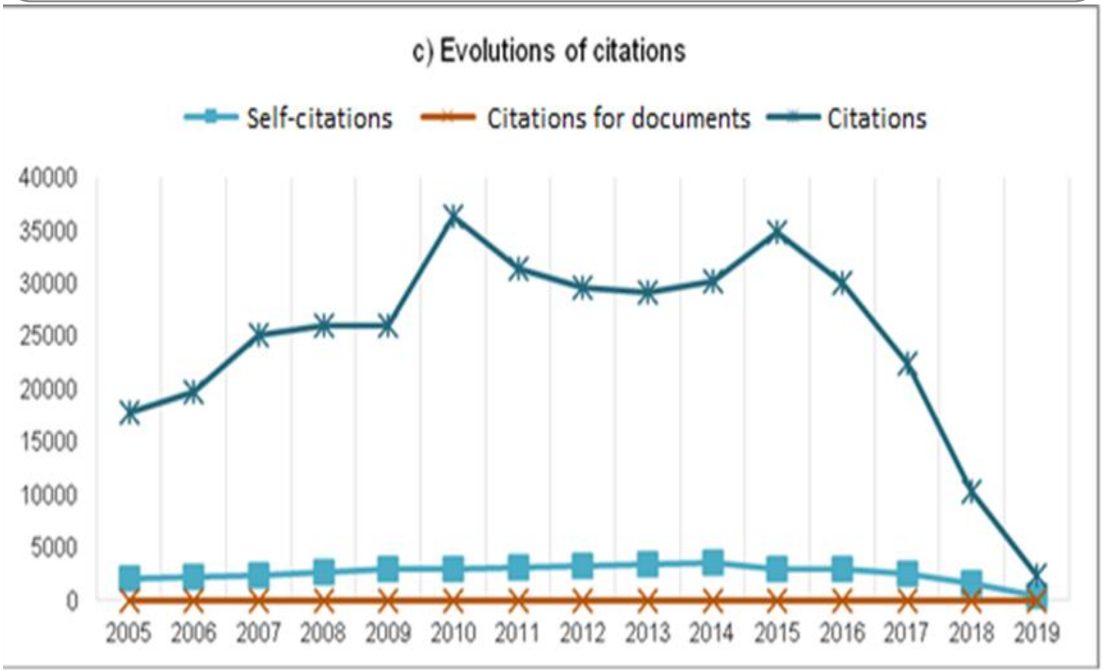
Source: WEF-GCI. Own elaboration

According to Scimago's data shown in graphic 3.a, the performance in scientific publications in Peru is observed with respect to Colombia and Chile, noting a progress in Peruvian performance that in the last decade quadrupled the number of documents published; however, despite this improvement, Peru's continues to be situated far below Colombia and Chile, who tripled and doubled, respectively, the number of their publications in the last decade. Similarly, Graphic 3.b shows the same behavior in Peru's performance with respect to the number of citable documents, and it quadrupled in the last decade; Colombia and Chile likewise tripled and doubled, respectively, the number of their citable publications. Graphic 3.c shows the drop in the number of citations of published documents, self-citations and citations per document, especially after 2016 when all of them were halved with respect to 2015, continuing the downward trend. This decline has been especially evident in the last decade when citations decreased by a factor of ten, self-citations by a factor of six, and citations per document decreased 44 times less.

Graphic 3. Results in scientific publications in Scimago 2005-2019 by a) number of published documents, b) citable documents, c) evolution of citations







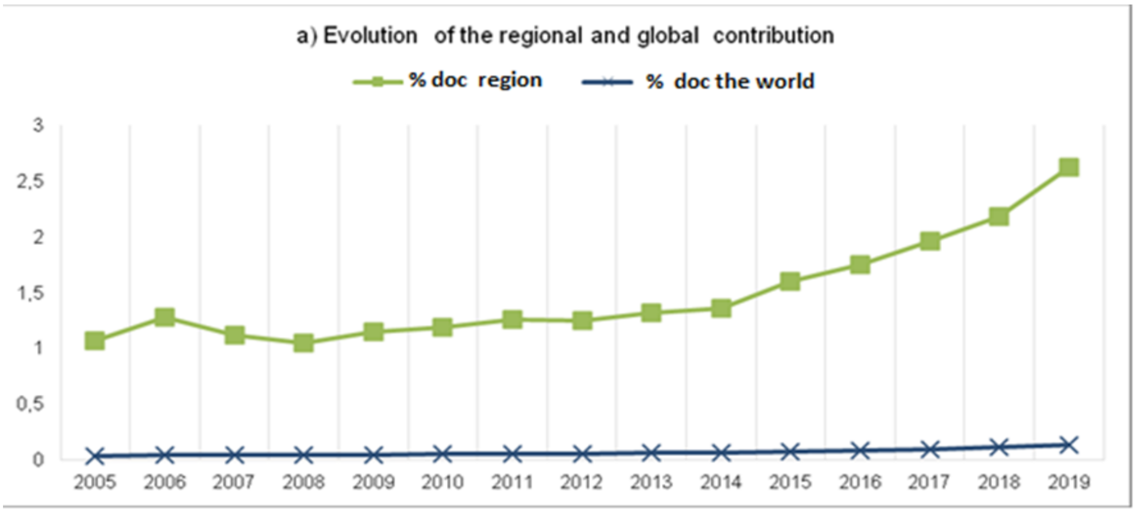
Source: WEF-GCI. Own elaboration

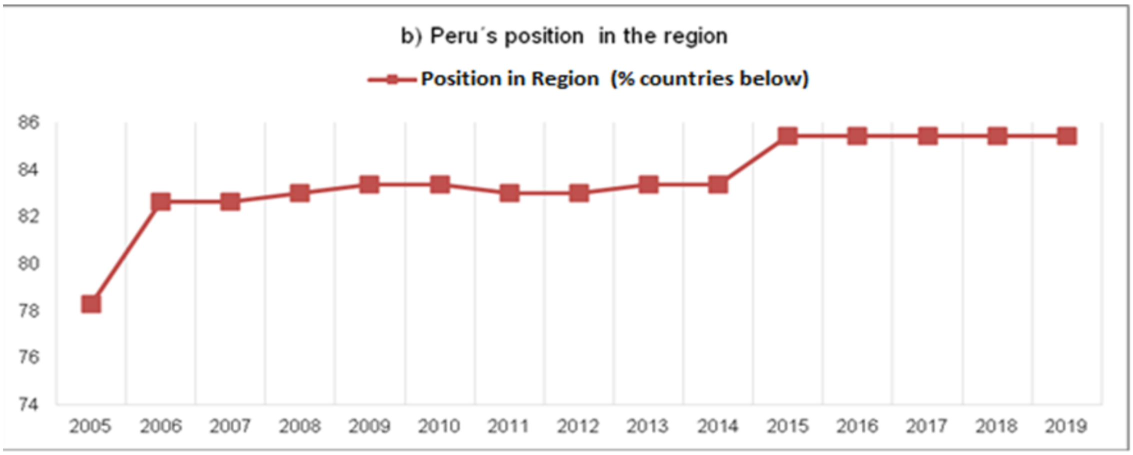
With respect to the Peruvian contribution to scientific production at a regional and global level, the results according to Scimago are shown in Graphic 4. Peru's contribution to total publications at a regional and global level has shown a sustained growth in the last decade (Graphic 4.a), especially notable in the last five years (2015-2019), coinciding with the Peruvian university reform.

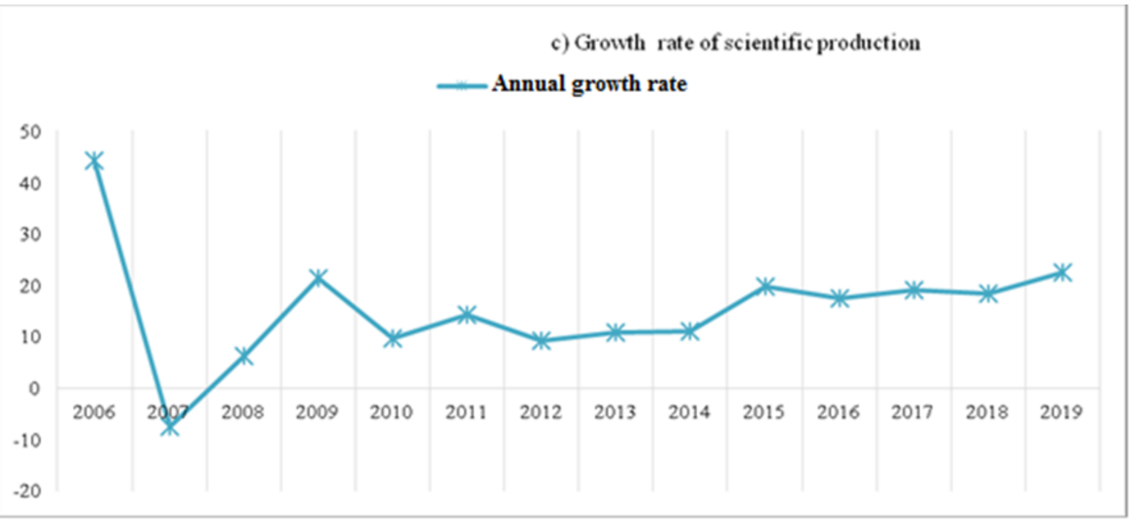
In 2009 the Peruvian contribution in the percentage of publications at the global level was only 0.04%, while in 2019 it tripled to 0.13%. Likewise, in 2009, the Peruvian contribution in the percentage of publications at a regional level was only 1.15%, doubling to 2.62% in 2019. However, this percentage is still very low in comparison to other countries in the region, such as Chile, which contributes 0.47% of the world total and 9.43% of the region's total.4.b shows Peru's position in the region in terms of its contribution in the number of documents published, surpassing 85% of the 48 Latin American countries in the ranking.

Thus, it can be seen that in the last five years Peru improved one position - position 7 - with respect to the previous nine years.4.c shows the annual growth rate of Peruvian scientific production, which has been growing steadily since 2013, except in 2016, when it showed a small decline. However, the average growth rate of the last five years, since the recent university reform, continues to be on average almost double the rate registered in the previous five years (2009-2014), reaching 23% in 2018-2019, the highest in the last 13 years. Finally, it should be noted that Peru's H index has remained at 238, well below Colombia's (290) and Chile's (384

Graphic 4. Peruvian contribution in scientific publications in Scimago 2005-2019: a) evolution of regional and world contribution, b) position of Peru in the region, c) growth rate of scientific production







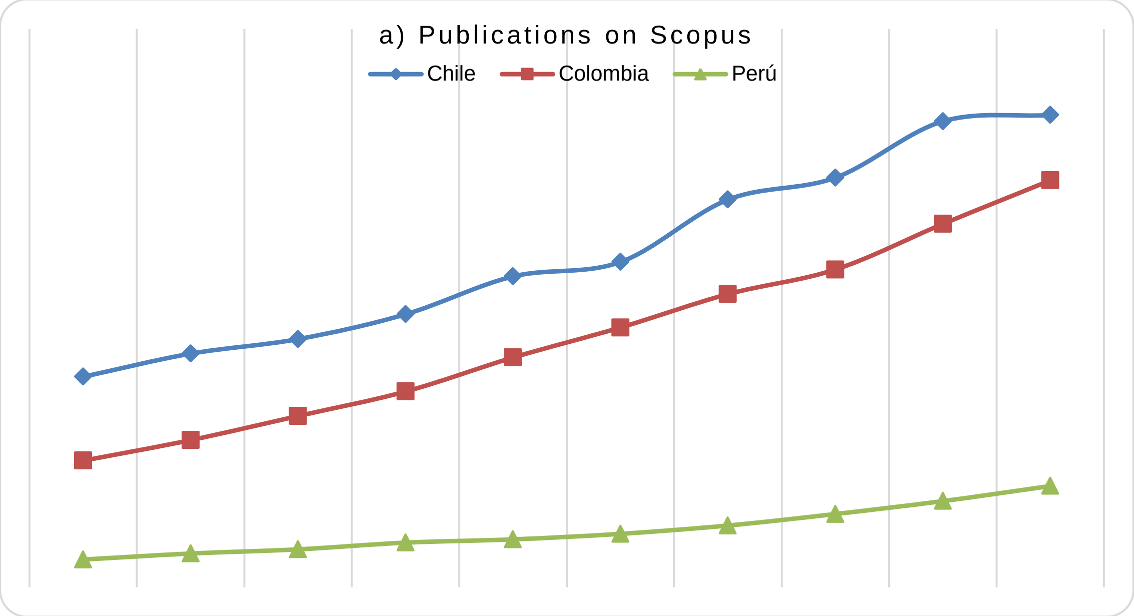
Source: WEF-GCI. Own elaboration

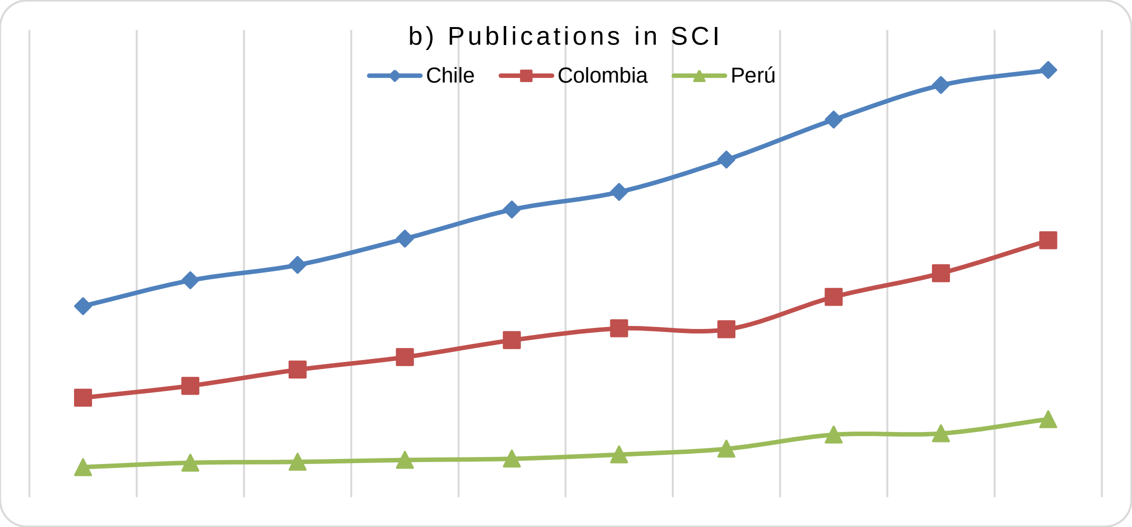
Regarding the Peruvian contribution to the regional and global scientific production in Scopus and Science Citation Index (SCI) (including the Science Citation Index Expanded, Social Sciences Citation Index and Arts and Humanities Citation Index of the main collection of Web of Science (WoS), the bibliometric indices are shown in Graphic 5. The tendency to increase the number of publications is observed, both in Scopus (graph 5.a), and the documents published in SCI (graph 5.b); however, Colombia and Chile far exceed Peru's contribution in Scopus, by factors of 4 and 4.6 times, respectively.

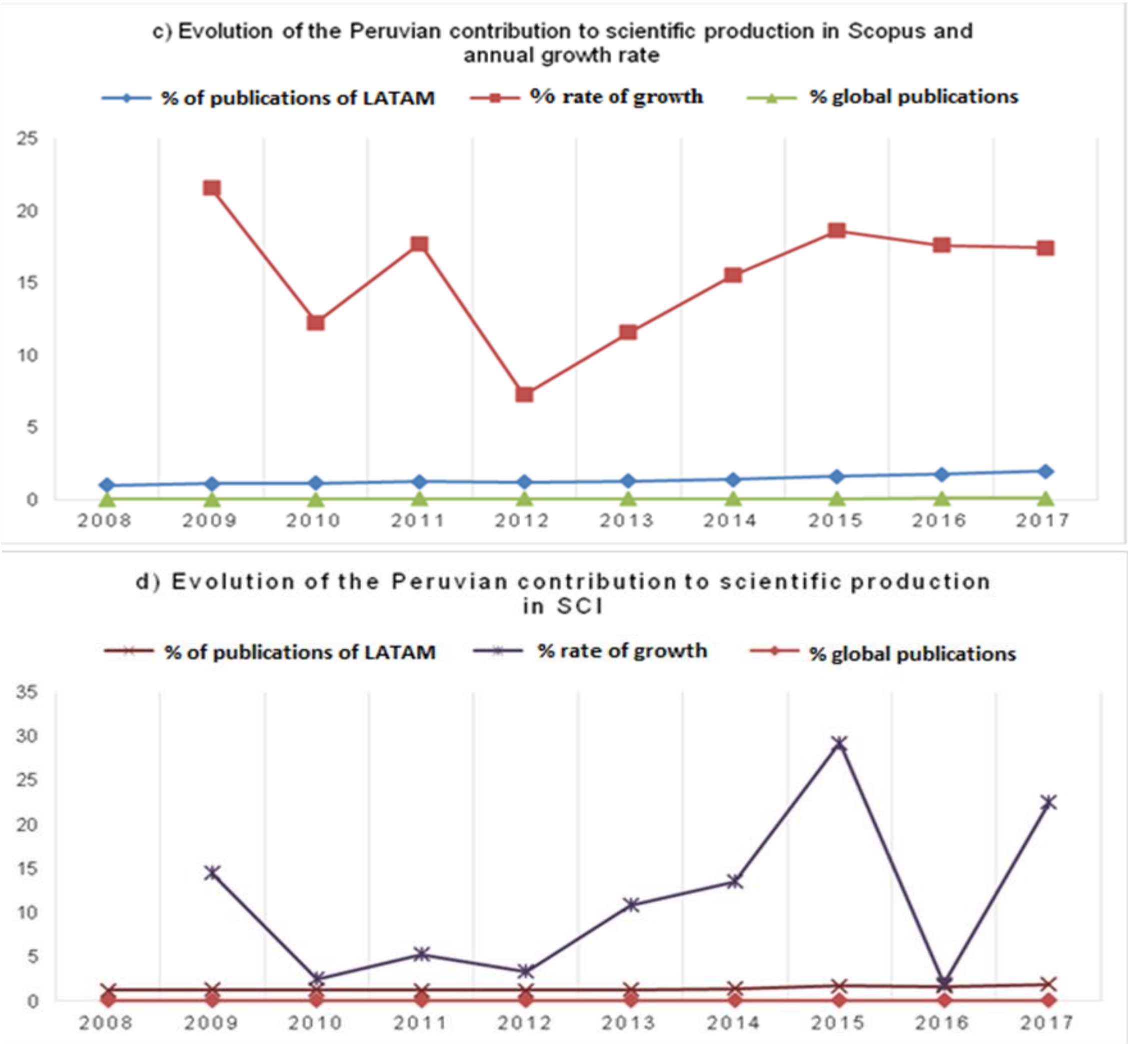
In SCI, Chile exceeds Peru by a factor of 4 and Colombia publishes 3.3 times more documents than Peru. Graph 5.c shows the evolution of the Peruvian contribution to the scientific production of Scopus at both the regional and global levels. The percentage of Peruvian contribution in Latin America has grown steadily and reached 1,956% in 2017; while at a global level, the progressive annual growth represented 0,094% of publications in 2017.Elgráfico 5. c shows the annual growth rate, which has shown an irregular increase with some peaks in 2011 (which reached 17.7%), in 2015 (18.6%) and which has decreased in a sustained way by 0.1% per year for three consecutive years (2015 to 2017); that is, since the beginning of the licensing process.

The graphic 5 shows the evolution of the Peruvian contribution in the scientific production of SCI both at regional and global level. The percentage of Peruvian contribution in Latin America has grown in a sustained way reaching 1.88% in 2017; while at global level the annual progressive growth represented 0.09% of publications in 2017. Likewise, graph 5.d shows the annual growth rate, which has shown an irregular growth especially during the last three years, reaching 29.2% in 2015, and then decreasing to a rate of only 1.93% in 2016 and increasing again to 22.5% in 2017. The behavior of both annual growth rates, in Scopus and SCI, is similar, although the second presents much more pronounced peaks.

Graphic 5. Scientific publications in Scopus and SCI 2008-2019: a) publications in Scopus, b) publications in SCI, c) evolution of the Peruvian contribution in the scientific production in Scopus and annual growth rate, d) evolution of the Peruvian contribution in the scientific production in SCI and annual growth rate







Source: WEF-GCI. Own elaboration

CONCLUSIONS

As seen in the previous section, Peru's results are still far below other countries in the region with similar characteristics-used for comparative purposes-such as Colombia and Chile. Furthermore, although investment in science and technology has increased fivefold in the last ten years, gaps remain, and new inequalities are emerging in education, innovation and technology. As a result of the latest university reform, which began with the implementation of Law No. 30220, the State, in its various bodies such as ministries and executive units, has invested more in STI than in other periods. Nevertheless, Peru continues to be one of the countries with the smallest budget for science and technology in the Latin American region. The investment is not sufficient and is not in line with the macroeconomic growth that the country has achieved in recent decades. In this sense, governments and legislators must become aware of the transcendental relevance of scientific research for the development of the country and allocate a greater percentage of the public budget to this sector.

Peru needs to strengthen the quality of its higher education institutions with a view to a transition to a knowledge-based economy. As mentioned above, the social demand for higher education has been satisfied by a significant increase in the educational offer, through the creation of many public and, above all, private universities. This increase in quantity has not been consistent with the quality of higher education, leaving the needs of the economy and the labor market unmet. Analysis of the indicators related to research shows limited performance, so it is clear that substantial improvements are required in the coming years if Peru is to significantly improve and make a qualitative leap in its ability to grow, and specifically in terms of research. Nevertheless, it must be recognized that the number of documents published is now over 85% of the 48 countries of Latin America; the total number of publications at the regional and global levels has shown sustained growth in the last decade, especially in the last five years.

On the other hand, since the enactment of Law No. 30220, Peru has taken important steps such as the design and implementation of financing instruments and incentives for research, development and innovation at various levels of the public sector, together with the evaluation of universities within the framework of the licensing process carried out in the last five years. These measures were expected to have a positive impact on innovation indicators and research sub-indicators; however, the results obtained in the last five years do not demonstrate a relevant impact of university reform.

REFERENCES

Alcazar, L. y Balarin, M. (2018). Desigualdad en la academia: mujeres en las ciencias sociales peruanas. Lima: Grupo Sofía, GRADE.

Ani, O.E., Onyancha, O.B.(2011). A measure of research productivity of Nigerian universities: a bibliometric analysis: Ed Noyons, Patrick Ngulube, Jacqueline Leta (Eds), Proceedings of ISSI 2011 – the 13th International Conference of the International Society for Scientometrics and Informetrics, Vol. 1, Durban, South Africa, 4-7 July 2011, ISSI, Leiden University and University of Zululand, 2011, 54-65.

Benavides, M., León, J., Haag, F., y Cueva, S. (2015). *Expansión y diversificación de la educación superior universitaria, y su relación con la desigualdad y la segregación.* Lima: Grade. Recuperado el 2 de noviembre de 2020, de https://www.grade.org.pe/wp-content/uploads/ddt78.pdf.

Castro, J. F., y Yamada, G. (2013). Evolución reciente de la calidad de la educación superior en el Perú: no son buenas noticias. En G. Yamada, y J. F. Castro (Edits.), *Calidad y acreditación de la educación superior: retos urgentes para el Perú* (págs. 25-63). Lima: Universidad del Pacífico/Coneau.

Chang, L., Franco, A., y Soplín , P. (2015). *Veinte años del Perú en el Foro Económico Mundial.* Lima: Consejo Nacional de la Competitividad.

Congreso de la República del Perú - Comisión Nacional por la Segunda Reforma Universitaria. (2002, junio). *Diagnóstico de la universidad peruana: razones para una nueva reforma universitaria.* Lima: Congreso de la República. Diario Oficial El Peruano. Recuperado el 5 de noviembre de 2020: http://www4.congreso.gob.pe/congresista/2001/liberico/universidad-final.pdf.

Congreso de la República del Perú. (2014, 9 de julio). Ley n° 30220, Ley Universitaria. Lima: Congreso de la República. Diario Oficial El Peruano. Recuperado el 15 de diciembre de 2020: https://diariooficial.elperuano.pe/pdf/0021/ley-universitaria-30220.pdf.

Consejo Nacional de Ciencia, Tecnología e Innovación Tecnológica. (2014). *Principales indicadores bibliométricos de la actividad científica peruana 2006-2011.* Lima: CONCYTEC. Recuperado el 6 de noviembre de 2020 de http://bvcyt.concytec.gob.pe/images/publicaciones/principales_indicadores_2006_2011.pdf.

Consejo Nacional de Ciencia, Tecnología e Innovación Tecnológica. (2014). *Situación de la formación de capital humano e investigación en las universidades peruanas: II Censo Nacional Universitario 2010.* Lima: Concytec. Recuperado el 6 de noviembre de 2020, de http://repositorio.concytec.gob.pe/bitstream/20.500.12390/97/2/capital_humano_investigacion_universidades_peruanas.pdf.

Constitución Política del Perú [Const]. Art. 18. de 29 de diciembre de 199 (Perú).

Cuenca, R., y Reátegui, L. (2016). La (incumplida) promesa universitaria en el Perú. Lima: Instituto de Estudios Peruanos. Recuperado el 7 de noviembre de 2020, de http://repositorio.iep.org.pe/bitstream/IEP/859/1/cuenca_reategui_laincumplidapromesauniversitaria.pdf.

Desigualdad en la academia: mujeres en las ciencias sociales peruanas | GRADE. (n.d.). Retrieved October 3, 2020, from https://www.grade.org.pe/publicaciones/desigualdad-en-la-academia-mujeres-en-las-ciencias-sociales-peruanas/.

Guadarrama-Atrizco, V. H., y Manzano Mora, F. J. (2016). *Indicadores de ciencia, tecnología e innovación.* Ciudad de México: Foro Consultivo Científico y Tecnológico. Recuperado el 8 de noviembre de 2020, de http://www.foroconsultivo.org.mx/libros_editados/INDICADORES_CTI.pdf.

Hackett, E., Amsterdamska, O., Lynch, M., y Wajcman, J. (2008). *The Handbook of Science and Technologies Studies* (3.ª ed.). Cambridge: The MIT Press.

Huisman, J., De Weert, E., y Bartelse, J. (enero-febrero de 2002). Academic Careers from a European Perspective: The Declining Desirability of the Faculty Position. *The Journal of Higher Education, 73*(1), 141-160. doi:10.1353/jhe.2002.0007.

Instituto Nacional de Edtadística e Informática. (7 de noviembre de 2020). Obtenido de Sistema de Información Económica. Recuperado el 8 de diciembre de 2020, de: https://www.inei.gob.pe/estadisticas/indice-tematico/economia/.

León-Velarde, F. (28 de febrero de 2020). Concytec: “Perú apuesta por más ciencia y tecnología”. (E. López Sevilla, Entrevistador). Recuperado el 5 de noviembre de 2020, de https://lacamara.pe/concytec-peru-apuesta-por-mas-ciencia-y-tecnologia/.

Ministerio de Educación. (2006). *La universidad en el Perú.* Lima: Ministerio de Educación. Recuperado el 7 de noviembre de 2020, de http://repositorio.minedu.gob.pe/bitstream/handle/123456789/321/178.%20La%20 universidad%20en%20el%20Per%c3%ba.%20Razones%20para%20una%20reforma%20universitaria.pdf?sequence=1yisAllowed=y.

Ministerio de Educación. (2015). *Reforma universitaria: un cambio hacia la excelencia.* Lima: Ministerio de Educación. Recuperado el 5 de noviembre de 2020, de http://www.minedu.gob.pe/reforma-universitaria/pdf/politica.pdf.

Ministerio de Trabajo y Promoción del Empleo. (2016). *Estrategia de competencias de la OCDE. Reporte diagnóstico: Perú.* Lima: Ministerio de Trabajo y Promoción del Empleo. Recuperado el 7 de noviembre de 2020, de http://www.oecd.org/skills/nationalskillsstrategies/Estrategia-de-Competencias-de-la-OCDE-Reporte-Diagnostico-Peru.pdf.

Morandé, F. (2016). A casi tres décadas del Consenso de Washington ¿Cuál es su legado en América Latina? *Estudios Internacionales (Santiago), 48*(185), 31-58. Recuperado el 6 de noviembre de 2020, de https://scielo.conicyt.cl/pdf/rei/v48n185/art03.pdf.

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura. (2015). *Informe de la Unesco sobre la ciencia, hacia 2030: resumen ejecutivo.* París: Unesco. Recuperado el 5 de noviembre de 2020, de https://unesdoc.unesco.org/ark:/48223/pf0000235407_spa.

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura. (2020). *La ciencia como derecho humano: una mirada desde la ciencia.* París: Unesco. Recuperado el 6 de noviembre de 2020, de http://academika.com.ar/la_ciencia_como_derecho_humano.html.

Perdomo, B., Portales, M., Horna, I., Barrutia, I., Villon, S., y Martínez, E. (2020). Calidad de las tesis de pregrado en universidades peruanas. *Revistas Espacios, 41*(2), 1-5. Recuperado el 7 de noviembre de 2020, de https://www.revistaespacios.com/a20v41n02/a20v41n02p05.pdf.

Perú Compite-Consejo Privado de Competitividad. (2020). *Informe de competitividad* 2020. Lima: Impresso Gráfica.

Red de Indicadores de Ciencia y Tecnología Interamericana e Iberoamericana. (7 de noviembre de 2020). *Ricyt.org*. Obtenido de Indicadores: http://www.ricyt.org/category/indicadores/.

Sandoval-López, P. (2002). *Modernización, democracia y violencia política en las universidades peruanas (1950-1995).* Buenos Aires: Clacso.

Schwab, K. (2019). *The Global Competitiveness Report 2019.* Ginebra: Foro Económico Mundial. Recuperado el 7 de noviembre de 2020, de http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf.

Scimago Journal y Country Rank. (7 de noviembre de 2020). *SJR*. Recuperado el 14 de diciembre de 2020 de https://www.scimagojr.com/.

Superintendencia Nacional de Educación Superior Universitaria. (2020-a). SUNEDU emite norma para ampliación de plazo de cese de universidades con licencia denegada.

Lima. Recuperado el 13 de diciembre de 2020, de https://www.sunedu.gob.pe/SUNEDU-emite-norma-para-ampliacion-plazo-cese-de-universidades-licencia-denegada/.

Superintendencia Nacional de Educación Superior Universitaria. (2020-b). *II Informe bienal sobre la realidad universitaria en el Perú.* Lima. Recuperado el 8 de noviembre de 2020, de https://cdn.www.gob.pe/uploads/document/file/1230044/Informe%20Bienal.pdf.

Superintendencia Nacional de Educación Superior Universitaria. (2015). *El modelo de licenciamiento y su implementación en el sistema universitario peruano.* Lima. Recuperado el 8 de noviembre de 2020, de http://www.untumbes.edu.pe/paginas/informacion/oficinas/Calidad%20Universitaria/documentos/X5.%20Mod_Lic_SUNEDU_Final.pdf.

World Intellectual Property Organization. (2020). *Global Innovation Index (GII)*. Recuperado el 8 de noviembre de 2020, de Wipo.int: https://www.wipo.int/global_innovation_index/en/.