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Análisis de la producción científica del Ecuador a través de la plataforma Web of Science

Analysis of the scientific production in Ecuador through the web platform on science

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Resumen

El presente documento nace de la desventaja encontrada en la producción científica de Ecuador con respecto a otros países de Latinoamérica. El objetivo de esta investigación es reflexionar sobre la importancia de la producción científica para el desarrollo social, educativo y científico del Ecuador. La metodología usada en esta investigación es de carácter inductiva - deductiva y se apoya en la investigación bibliográfica utilizando el método hermenéutico. Se presentan los resultados obtenidos en producción científica de la plataforma Web of Science de los períodos 2006 - 2008 y 2015 - 2020 en Latinoamérica. Se



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toman como referencia estos períodos para contrastar los registros de producción científica previos a la reforma universitaria en Ecuador en el 2008 con los actuales. De entre los resultados, se determina un incremento en la producción científica de Ecuador en el último período. Ecuador se encuentra en el puesto 7 de los 20 países analizados. Se concluye que Ecuador muestra un crecimiento en la producción científica al igual que los otros países. Sin embargo, aún existe una diferencia significativa con respecto a: Brasil, México, Argentina, Chile y Colombia. A partir del año 2008 se estableció un proceso de evaluación de las instituciones de educación superior que ha influido positivamente en la producción científica de Ecuador. Además, estas cifras se pueden mejorar cambiando el paradigma educativo para que la escritura científica sea tomada como un eje transversal desde los primeros años de educación formal.

Palabras clave

Difusión, Ecuador, investigación, Latinoamérica, publicación, Web of Science.

Abstract

This document arises from the disadvantage found in the scientific output of Ecuador in relation to other countries in Latin America. The purpose of this investigation is reflecting about the importance of the scientific output for the social, educational and scientific development of Ecuador. The methodology used in this investigation is inductive – deductive and it is supported by bibliographical research using the hermeneutic method. The results obtained of the scientific output from the Web of Science platform during the periods 2006 – 2008 and 2015 – 2020 in Latin America are presented. These periods are taken as a reference to contrast the records of scientific production prior to the university reform in Ecuador in 2008 with the current ones. Among the results, it is observed an increase in the scientific output in the country during the last period. Ecuador is in the 7th position among the 20 analyzed countries. It is concluded that Ecuador shows a growth in the scientific output as well as the other countries. However, there is still a significant difference with: Brazil, Mexico, Argentina, Chile and Colombia. Since 2008, an evaluation process of the Higher Education Institutions was established and it has positively influenced the scientific output of Ecuador. Furthermore, these numbers can be improved by changing the educational paradigm in which writing would be taken as a traversal axis since the first years of formal education.

Keywords

Dissemination, Ecuador, investigation, Latin America, publication, Web of Science.

1. Introduction

Scientific activity has increased and has generated the need to raise indicators for its measurement. Continuous monitoring of these indicators is important to improve countries' scientific policies and contribute to their development. Scientific production refers to the new knowledge generated and its dissemination. In this sense, there are databases, including Web of Science, that record these values and allow to analyze the situation of countries in terms of dissemination of research.

Latin America is a region that has different nuances in terms of research. Alvarez-Muñoz and Pérez-Montoro (2016) note that "these countries are developing and adapting to the evaluation and quality schemes that exist in other more advanced countries in the field of science" (p. 758). The above relates to variations in Latin American countries in terms of



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academic production. In recent years, some of these countries have obtained an important international visibility.

From 2008, in Ecuador, through Mandate 14, higher education institutions (IES) entered an evaluation process that aimed to categorize IES to ensure the quality of education. The research was developed by taking the publications as an indicator. In 2014 CEAACES¹ states: "The scientific publications of IES professors and that, in principle, are supposed to present the progress and scope of their investigative activities" (p.143). This is why the number of scientific publications of professor is currently a factor that gives accreditation to the IES of the country.

With this background, academic production is important at the higher education level. However, it has represented a great problem due to the limited knowledge of teachers and students to make an academic and scientific production. In addition, "the assessment of the students' criterion yields an Ecuadorian university fragmented by two gaps: democratic and technological" (CEAACES, 2014, p. 136). This refers to the shortcoming of the university administrative system and access to technological resources. These are obstacles to develop research in IES. For these reasons, strategies were proposed to mitigate these shortcomings and improve scientific production.

One of the main difficulties in this research paper was the shortage of information and monitoring of scientific production in the region. In addition, Cañedo-Andalia et al., 2010 mention that:

In the least developed countries, a large number of scientific articles can be seen that are only recorded in nationally-covered databases and, in some cases, regional, whose fundamental purposes are very different from those of these international databases (p. 29).

Ecuador and other Latin American countries are growing and have been inserted into the world vision, but it is important that scientific production research is carried out at the national or regional level. This paper presents Ecuador's scientific production with respect to other Latin American countries according to the Web of Science platform, which stores information from important international databases. Spain uses mainly the Web of Science to measure its scientific output. There are also a limited number of studies that have taken as a reference the data from the Web of Science. However, a broader picture of related work is required to make a comparison and discussion of the extracted data.

The purpose of this paper is to reflect on the importance of scientific production for the educational and scientific development of the country, using the data obtained from the Web of Science platform. To this end, the answers to the following questions are sought:

- What is Ecuador's situation with respect to the other Latin American countries in scientific output according to the Web of Science?
- What changes have been made in Ecuador in scientific output since Mandate 14?

As for the structure and content of the document, section 2 introduces the concepts related to the subject. Section 3 provides the results from previous research or analysis. Section 4

¹CEAACES: Council for Evaluation, Accreditation and Quality Assurance changed its name to The Council for Quality Assurance of Higher Education (CACES) through the Organic Reform Law to the Organic Law on Higher Education that entered into force on August 2, 2018.



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details the methodology used to develop this paper. Section 5 shows the results of the records obtained on the Web of Science platform. Section 6, presents the discussion of results through an analysis of the data obtained. Finally, section 7 presents the conclusions according to the results.

2. Related concepts

2.1 Epistemological background of the scientific output

Scientific production is considered to be the visible aspect of scientific knowledge or ideas, leading to a process of material construction of knowledge. "Scientific production (SP) is considered to be the materialized part of the knowledge generated, it is more than a set of documents stored in an information institution" (Piedra-Salomón and Martínez-Rodríguez, 2007, p. 33). In other words, scientific production is not just a documentary record of knowledge, but it can be considered a discipline that allows the structuring of knowledge and makes possible its dissemination. Although one of its functions is the documentary record of knowledge, the definition of scientific production is much more extensive.

Scientific production processes, although not recent throughout history, have seen an increase and improvement in recent years. It can be said that scientific production is immersed in the daily events of humanity.

This phenomenon is linked to most of the events in which people are involved on a daily basis, thus its evaluation [sic], taking into account the result of research and innovation, is not a recent practice in the various discipline areas (Piedra-Salomón and Martínez-Rodríguez, 2007, p. 33).

Depending on the increase in scientific production, it is necessary to find new ways or tools that allow scientific information to become widely covered. "The rapid and dizzying development of science and technology has led to an unprecedented increase in literature, creating the need to seek new paths for the dissemination of scientific information produced" (Piedra-Salomón and Martínez-Rodríguez, 2007, p. 36). This speed creates the need to opt for different means of dissemination, where writing becomes one of the tools to disseminate knowledge through journals and articles, as well as webpages and forums.

Recalling that scientific production should be disclosed, the means by which the information is transmitted may be formal and informal. "The disclosure of the SP can be done through formal and informal channels of communication because what is sought is to transmit information..." (Piedra-Salomón and Martínez-Rodríguez, 2007, p. 36). Therefore, based on the above, the way in which scientific knowledge is shared and the medium it deals with comes to a second position because the transmission of knowledge is important.

Global scientific production rates have always been led by major powers. Since 2008, the production of scientific articles has increased on the Web of Science platform. According to UNESCO (2015) "between 2008 and 2014, the number of scientific articles included in the scientific citation index of Thomson Reuters 'Web of Science' platform increased by 23%, 1,029,471 to 1,270,425" (p. 3). Consequently, the number of articles registered on that platform increased by 240,954 over a period of approximately 6 years.

In Latin America, certain countries stand out in scientific production due to the intervention of organizations that promoted it.

After the Second World War [sic] and under the funding and coordination of international agencies, mainly UNESCO, the main institutions of the



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current Science and Technology Systems (SCyT) of Brazil and Argentina were created, although it was in the 1960s and early 1970s that there was a real boom in the creation of institutions responsible for designing and promoting policies and instruments aimed at guiding and managing scientific and technological development (Santa and Herrero Solano, 2010a, p. 380).

In this case, it is observed that countries such as Argentina and Brazil have a historical contact with scientific production. Social conflicts in the last century allowed the promotion of scientific development even in Latin America. On the other hand, the momentum of international organizations such as UNESCO, as evidenced in the above quote, was a central pillar for the scientific production in these countries.

Scientific production is considerably reduced in Latin America due to the large number of problematic factors in these countries. These problems are repeated in every country in Latin America, thus complicating the production of academic articles.

Regarding the academic production of Latin America, Santa and Herrero Solano (2010b) state that "it is one of the regions with the greatest social and economic imbalance, a situation that moves into the field of scientific-technical production" (p. 386). In other words, social, political and economic conflicts directly affect the scientific output, causing the production in the region to be disparate. In addition, these problems create barriers that do not allow the scientific production rate to be increased. Due to these factors, the publication of academic articles in Latin America is reduced in certain periods of time.

Despite all these problems mentioned above, in recent years Latin America and the Caribbean have had an increase in the publication of academic articles and scientific production.

However, it is noteworthy that the region has experienced the increase in the number of articles published in recent years ... in Latin America and the Caribbean 22,138 articles were published in Scopus in 1996, while this figure increased to 126,620 in 2015, an increase of 5.72 points, more than the increase experienced in the United States (1.82) or Canada (2.31) (Gerrero-Casado, 2017, p. 28).

In other words, the rate of publications, in terms of quantity and compared to US, has increased considerably over a 20-year period. All this data shows the increase in academic publications in Latin America.

2.2 Scientific production of Ecuador regarding the control guidelines of institutions of higher education

The Ecuadorian state is considered an emerging economy country, because Ecuador's economic stability is mostly sustained by oil exploitation and production. "Ecuador is a small economy country [...] which is making considerable efforts to locate on the map of quality knowledge-creating countries" (Álvarez-Muñoz and Pérez-Montoro, 2015, p. 578). The economic level and development of the country is an important factor influencing the production and dissemination of academic texts and scientific knowledge. Despite the economic and social difficulties experienced in the country and repeated in the other Latin American countries, it is important to maintain extensive scientific production that functions as a measure to solve these conflicts.



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Over the next thirteen years after the end of the twentieth century, Ecuador has experienced a slight increase in the scientific production, rising in relation to other Latin American countries. Álvarez-Muñoz and Pérez-Montoro (2015) in their analysis in 2014 indicate that "Ecuador is ranked 12th in Latin America. During the period of analysis, the country has gone from contributing 0.39% of scientific output in 2000 to 0.63% in 2013" to the Latin American total (p. 578). Taking into account the above, the country has experienced an increase in its scientific and academic production.

This increase in the scientific production is influenced by the events in 2008 in relation to the constitutional reform that the country experienced. From this reform, special attention is generated to the relation and connection between the university and the society.

CONESUP's² limited treatment of solving the problems associated with the institutional and academic development of IES, together with the little interest shown by a large majority of IES in fulfilling their social responsibility, were apparently the triggers for questioning the university work by various social sectors that somehow justified the intervention of the government and the National Assembly when dealing with the Constitution of the Republic and the LOES, showing that the university reform in Ecuador did not originate from its base but, rather, from the social and governmental claim (Rojas, 2011, p. 60).

With regard to the above, the reasons for paying attention to the academic activities of national universities are evidenced. Likewise, it is possible to rescue that the idea of university reform originates to meet the needs of society and contribute to its growth.

According to these events, it is possible to say that the Ecuadorian State pays vital attention to university activities in order to generate a link between the university and the society.

Ecuador is in the process of accrediting universities to improve teaching and research processes. The need to provide dynamic answers to the environment requires that work is done on the design of participatory policies that help the university-society link move to higher degrees (Cedeño, 2014, p. 22).

In other words, the process of accreditation to universities has allowed the increase of the academic production in the country. In addition, it is said of an improvement in teaching processes. Education, in general, interferes with the country's academic development process related to the production of research and academic writing.

Another factor that has allowed this boost of Ecuador's scientific production has been, as mentioned above, the 2008 constitutional reforms. The Constitution of the Republic of Ecuador in article 351 states:

The higher education system will be articulated to the national education system and the National Development Plan; [...] This system will be governed by the principles of responsible autonomy, co-government, equal opportunities, quality, relevance, integrality, self-determination for the production of thought and knowledge, in the framework of the

² CONESUP: National Council for Higher Education which was renamed as Higher Education Council (CES) under the Organic Higher Education Act of October 12, 2010.



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dialogue of knowledge, universal thinking and global scientific technological production (p. 60).

In this way, the Constitutional Reform of 2008 incorporates scientific production into the obligations of higher educational institutions. In addition, the university educational reality is linked to the entire educational system of the country, exposing the need for university academic processes to be linked with the society in general. These developments have resulted in an increase in the production of scientific knowledge and academic writing since 2008.

Within the theme of public policies immersed in academic processes, the Organic Law on Higher Education (LOES) plays an important role in the country's scientific production index. "In 2010, the Organic Higher Education Act (LOES) was enacted to promote research in universities" (Castillo and Powell, 2019, p. 11). Because of this, there is a clear interest in scientific research and production.

The LOES also shows a clear interest in teaching and the levels and percentages of publications that professors should have. "The LOES insists that all professors at the university level must have at least one master's degree and 70% of them must have a doctorate at research universities" (Castillo and Powell, 2019, p. 11). In this case, a requirement is raised to be part of the faculty at the university level. As a result, professors who do not have a doctorate must enroll in one and must generate scientific knowledge.

Similarly, the Secretariat of Higher Education, Science, Technology and Innovation (SENESCYT) is also considered a body in the area of scientific production at the level of higher education. To some extent, thanks to the policies stated by this state agency, the rate of academic publications has increased.

Over the past few years, SENESCYT has started a product-based researcher accreditation policy, which encourages professors to update their credentials and increase publication rates to improve their employment opportunities and raise their salary (Castillo and Powell, 2019, p. 11).

Therefore, this increase in academic publications is related to the boost that SENESCYT provides to professors in order to improve their working and economic life. In this way, there is a need by professors to produce scientific knowledge and publish it. Initially, with the intention of improving lifestyle, determining the growth of the percentages at the national level.

2.3 Web of Science platform

The Web of Science (WOS) is a web platform of the company Clarivate Analytics that collects bibliographic references and quotations from scientific publications of any discipline of knowledge. "It was formerly known as ISI Web of Knowledge and was owned by the Institute of Scientific Information, and it was then acquired by Thomson Reuters" (UAM Biblioteca, 2019, Home tab). Therefore, it facilitates access to databases on appointments of academic documents. Its goal is to provide analysis tools to assess the scientific quality. Different databases can be accessed on the platform through a single interface, individually or multiple bases simultaneously.

The WOS is composed of the core collection covering the Science, Social Sciences and Arts and Humanities indexes, as well as the Proceedings of both Sciences and Social Sciences and Humanities, along with the tools



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for analysis and evaluation, such as the Journal Citation Report and Essential Science Indicators. In addition, it has the databases that complement it and that are included in the license for Spain: Medline, Scielo and Korean Citation Index (FECYT, 2019, Web Databases of Science section).

The platform has access to different databases in order to contrast information. Therefore, it can have a more neutral number of records and avoid repeating articles that appear in different databases. It also contains record data in all areas of knowledge. Thus, it is possible to find information regarding various topics.

The information collected by the platform is stored in collections of data. "The Web of Science Main Collection consists of ten indexes including information collected from thousands of academic journals, books, collections, reports and conferences, among many other sources" (Clarivate, 2019, Web of Science Help section). These indexes are: Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (AH&HCI), Conference Proceedings Citation Index – Social Science & Humanities (CPCI-SSH), Book Citation Index – Science (BKCI-S), Book Citation Index – Social Sciences & Humanities (BKCI-SSH), Emerging Sources Citation Index (ESCI), Current Chemical Reactions (CCR-EXPANDED) and Index Chemicus (IC). Thus, it is a platform that contains quality information about the world's research process. These indexes help to improve the scientific production and therefore the development of humanity. In addition, the number of records show different types of publication or dissemination of research, generating figures that more accurately represent the level of science research and development in countries or regions.

3. Related works

In 2007, a research was carried out which aimed to define the rate of publications and scientific production in Latin America from 1975 to 2004 in the Web of Science, the results determine an increase in the total number of work in the region, with Brazil-Argentina partner dominating intra-regional bilateral collaborations. The authors conclude that scientific production figures at the Latin American level are constantly rising and gain momentum due to trends that exist globally (Russell et al., 2007).

In 2010, a research was carried out to analyze publication and visibility rates in the Latin American and Caribbean region for WOS databases compared to Scopus. The results show that smaller countries do not seem to grow, because national science coverage remains very limited. The authors concluded that there is an increase in the production and publications of scientific articles in the SCImago Journal Rank (SJR) indexed journal database in contrast to Journal and Country Rank (JCR) data, but this increase is not significant due to the recent publications (Santa and Herrero Solana, 2010a).

4. Methodology

The steps used in this research are described below:

1. **Selection of countries to carry out the comparative analysis:** The 20 Latin American countries were selected: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Dominican Republic, Uruguay and Venezuela.
2. **Selection of scientific production indicators:** The data were obtained from the Web of Science platform and the studied periods were: 2006 – 2008 and



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2015 – 2020, due to the existing contrast of scientific production in the years prior to the university reform in 2008 with the present, and the databases: Web of Science Main Collection of Science, Current Contents Connect, MEDLINE, ScieELO Citation Index, Korean Journal Database (KCI) and Russian Science Citation Index.

3. **Comparative analysis of scientific production indicators during the period 2006 – 2008:** The analysis allows to determine the differences between the scientific production. Latin American countries were sorted in descending order according to the academic production and the number of records obtained from the Web of Science platform.
4. **Comparative analysis of scientific production indicators during the period 2015 – 2020:** The analysis allows to determine the differences between the scientific production. Latin American countries were sorted in descending order according to the academic production and the number of records obtained from the Web of Science platform.
5. **Comparative analysis of the scientific production in databases during the period 2015 – 2020:** Ecuador's position in scientific production with respect to the other Latin American countries was analyzed in each database of the Web of Science platform.
6. **Comparative analysis of scientific production indicators for the period 2006 – 2008 and the period 2015 – 2020:** The records obtained during the two periods in Web of Science are compared to identify the differences in Ecuador's academic output from the constituent reform issued in 2008.

5. Results

The Web of Science platform shows the scientific output of countries by taking into account the number of registers. The information submitted was retrieved on January 8, 2020. Table 1 presents the scientific production of Latin American countries during the period 2006 – 2008. Countries sorted in descending order are presented depending on the total number of records during this time. The data for Ecuador are highlighted in grey.

Countries	Scientific output during 2006 – 2008			
	2006	2007	2008	Total
Brazil	37773	44169	50352	132294
Mexico	16922	18643	20417	55982
Argentina	9383	10117	11608	31108
Chile	5861	6414	7264	19539
Colombia	4218	5148	6631	15997
Venezuela	2961	3134	3643	9738
Cuba	2161	2442	2685	7288
Perú	1178	1282	1413	3873
Puerto Rico	1145	1151	1398	3694
Uruguay	765	859	997	2621
Costa Rica	701	737	842	2280
Ecuador	430	479	560	1469
Panamá	392	466	500	1358
Bolivia	290	320	390	1000
Paraguay	183	178	189	550



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Guatemala	115	135	146	396
Nicaragua	103	75	104	282
El Salvador	57	41	53	151
Honduras	49	38	56	143
Dominican Republic	6	9	8	23

Table 1. Scientific output of Latin American countries during the period 2006 – 2008. Source: (Clarivate, 2020, Advanced Search Section).

According to this number of Web of Science platform records, Brazil is the Latin American country with the most records during the period 2006 – 2008 (132294), followed by Mexico, Argentina, Chile, Colombia, Venezuela, Cuba, Peru, Puerto Rico, Uruguay and Costa Rica. Ecuador is ranked 12th on the list, showing 1.11% of Brazil's total number of records, followed by Panama, Bolivia, Paraguay, Guatemala,

Table 2 presents the list of countries sorted in descending order in terms of scientific production from the number of records obtained on the Web of Science platform for the period 2015 – 2020.

Countries	Scientific output during the period 2015 – 2020						
	2015	2016	2017	2018	2019	2020	Total
Brazil	81895	85656	91621	93510	89551	2564	444797
Mexico	31505	33532	35248	35260	32670	925	169140
Argentina	17219	17612	18217	18654	16484	486	88672
Chile	14321	15724	16284	17135	15886	358	79708
Colombia	14104	15205	17250	16112	13698	387	76756
Cuba	4468	4554	4652	4583	2927	61	21245
Ecuador	2428	3594	5088	5248	4332	126	20816
Perú	3301	3507	4243	4401	3946	89	19487
Uruguay	1965	2188	2390	2455	2253	58	11309
Venezuela	2501	2464	2436	2042	1555	31	11029
Costa Rica	1615	1914	1969	1917	1644	41	9100
Puerto Rico	1392	1791	1656	1514	1377	43	7773
Panamá	867	905	973	941	988	18	4692
Paraguay	409	526	637	605	623	18	2818
Bolivia	627	605	527	499	507	24	2789
Guatemala	373	364	454	382	391	3	1967
Nicaragua	171	177	240	212	169	6	975
Honduras	144	122	183	208	227	11	895
El Salvador	174	151	192	184	151	4	856
Dominican Republic	97	99	97	124	179	4	600

Table 2. Scientific output of Latin American countries during the period 2015 – 2020. Source: (Clarivate, 2020, Advanced Search Section).

According to this number of records, it is noted that Brazil is the Latin American country with the most records during the period 2015 – 2020 (444797) on the Web of Science



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platform, followed by Mexico, Argentina, Chile, Colombia and Cuba. Ecuador ranked 7th on the list, showing 4.68% of Brazil's total number of records, followed by Peru, Uruguay, Venezuela, Costa Rica, Puerto Rico, Panama, Paraguay, Bolivia, Guatemala, Nicaragua, Honduras, El Salvador and Dominican Republic.

Table 3 shows the position of countries in scientific production for each database.

Position	Main collection of Web of Science	Current Contents Connect	MEDLINE	SciELO Citation Index	KCI – Korean Journal Database	Russian Science Citation Index
1	Brazil	Brazil	Brazil	Brazil	Brazil	Mexico
2	Mexico	Mexico	Mexico	Colombia	Mexico	Brazil
3	Argentina	Argentina	Argentina	Mexico	Argentina	Colombia
4	Chile	Chile	Chile	Chile	Chile	Argentina
5	Colombia	Colombia	Colombia	Argentina	Colombia	Cuba
6	Ecuador	Perú	Perú	Cuba	Ecuador	Chile
7	Perú	Ecuador	Ecuador	Perú	Venezuela	Venezuela
8	Cuba	Uruguay	Uruguay	Ecuador	Perú	Uruguay
9	Uruguay	Puerto Rico	Puerto Rico	Costa Rica	Paraguay	Paraguay
10	Venezuela	Venezuela	Venezuela	Venezuela	Panamá	Puerto Rico
11	Puerto Rico	Cuba	Cuba	Uruguay	Cuba	Ecuador
12	Costa Rica	Costa Rica	Panamá	Bolivia	Uruguay	Costa Rica
13	Panamá	Panamá	Costa Rica	Paraguay	Puerto Rico	Honduras
14	Paraguay	Bolivia	Paraguay	Panamá	Costa Rica	El Salvador
15	Bolivia	Paraguay	Guatemala	Puerto Rico	Guatemala	Dominican Republic
16	Guatemala	Guatemala	Bolivia	Guatemala	Bolivia	Nicaragua
17	Nicaragua	Nicaragua	Dominican Republic	Honduras	Honduras	Perú
18	Honduras	Honduras	Nicaragua	El Salvador	El Salvador	Panamá
19	El Salvador	El Salvador	Honduras	Dominican Republic	Dominican Republic	Guatemala
20	Dominican Republic	Dominican Republic	El Salvador	Nicaragua	Nicaragua	Bolivia

Table 3. Scientific output of Latin American countries in different databases during the period 2015 – 2020. Source: (Clarivate, 2020, Advanced Search Section).

According to the data obtained on the Web of Science platform, Brazil is the country in Latin America that has the largest number of records in the Main Collection of Web of Science (387464), Current Contents Connect (191285), MEDLINE (161923), SciELO Citation Index (90537) and Korean Journal Database (664), for which it ranks 1. Meanwhile, Mexico has more records in Russian Science Citation Index (85).



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Ecuador, with respect to the other 19 Latin American countries, is ranked 6th in the Web of Science Main Collection records, 7th in Current Contents Connect, 7th in MEDLINE, 8th in SciELO Citation Index, 6th in Korean Journal Database and 11th next to Costa Rica, Nicaragua, Honduras, El Salvador and Dominican Republic in the Russian Science Citation Index.

6. Discussion of the results

With the data obtained in the results, the difference between Brazil, Mexico, Argentina, Chile and Colombia with respect to Ecuador is significant. Although the records obtained place Ecuador at number 7 on a list of 20 countries in the period 2015 -2020, this comparison has only been made in Latin American countries and not in Europe.

In relation to the databases from which the results were collected, Brazil stands out in almost all of them. However, in Korean Journal Database (KCI) and Russian Science Citation Index, Latin American countries show a low number of records, this is maybe due to a shortage of partnerships or collaborations with scientific research groups in these countries or researchers who talk these languages.

During the period 2015 – 2020, Ecuador ranks 6, 7 or 8 in the different databases obtained on the Web of Science platform, indicating that academic production is present in the different databases; thus, Ecuadorian scientific or academic publications are being disseminated or used in other researches worldwide and are part of international databases.

Finally, the comparison made on scientific production during the periods 2006 – 2008 and 2015 – 2020, indicate a considerable improvement of Ecuador, because it moves from position 12 to position 7. In addition, the growth rate for 2006 compared to 2019 is 907.44 %. It may be due to the reform on the accreditation of Higher Education Institutions in 2008 and by the impact of Information and Communication Technologies (ICTs) in all academic and research areas.

7. Conclusions

Academic output occurs mostly in the higher education institutions of countries as it represents a commitment to society. In this way, the research and dissemination of the results contribute to the social and economic development of countries.

Despite the economic, social and political conflicts experienced by Latin American countries, the rate of scientific output in recent years has increased considerably due to the changes or reforms of the government of each nation and the intervention of institutions that focus on the academic development.

Today, in the country's IES, scientific production and its importance has been more prioritized. However, there is a lack of knowledge about the production and drafting of academic texts by students, given by the Ecuadorian educational paradigm in which writing is not seen as a transversal axis in the formal education, and the results in higher education are not optimal.

Ecuador ranks 7th out of 20 Latin American countries according to the data extracted from the Web of Science platform. In Ecuador, there is little importance to scientific production. On the other hand, this research has only been carried out by comparing records in Latin American and not in Europe. Countries considered as first world have higher records in



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scientific production and it would be important to make another study on this topic to analyze the situation of Ecuador on a global scale.

Ecuador has improved significantly in terms of scientific production at the Latin American level from 2006 to the present day. From 2008 on, a new mandate was established with regard to the accreditation of Higher Education Institutions. "The scientific publications of IES professors and which, in principle, are supposed to present the progress and scope of their research activities" (CEAACES, 2014, p. 143). The scientific publications of professors were then established as a fundamental factor in determining the quality of education. According to the results, these guidelines have positively influenced the scientific and academic development of the country, as importance has been given to research in all areas of knowledge and its dissemination.

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