



In China and Latin America, university research networks contribute to innovation

The twenty countries of Latin America and the Asian giant have universities, especially public ones, committed to identifying the elements to follow the path of innovation. In this region of the world, Brazil and Mexico are leading the way. The results of a study on the production, impact, and structure of innovation research are presented.

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In China, the studies conducted by universities, especially public ones, are part of the elements used by the authorities to formulate national and regional policies in science, technology, and innovation.

In Latin America (Latam), a region that includes 20 countries, the largest scientific production is also held by public universities, and Brazil leads it. However, unlike China, the results do not have the same consideration in public affairs, and the volume of investigations is not as high.

The bibliometric study by Professor Julián Cortés, from the School of Business Administration of the Universidad del Rosario, and Xiaolei Lin, assistant professor in the Faculty of Data Sciences of the University of Fudan (China), reveals that in both places, universities are at the forefront of innovation research. They reviewed scientific production in three areas of science, related to innovation, in the eastern country and in Latam, to establish the type of research being carried out, people involved, and purpose of research.

Bibliometrics uses quantitative methods to identify certain aspects of the scientific literature, such as its volume of production, impact, and structure.

Innovation in China and Latin America, bibliometric observations in business, management, accounting, and decision sciences

is the project in which the two professors worked. The project was presented to the Institute for the Development of Fudan University, an entity that with Latin American universities, like U. Rosario and Andes, forms the Flauc Consortium (Fudan - Latin America University Consortium) for academic collaboration, publications, and student and professor mobility, among other actions.

For more than five years, Cortés has been working on issues of scientometrics (the science that studies scientific production to measure and analyze it), and therefore, he conducts bibliometric studies. His approach focuses on the local and regional, especially in Latam, although he also seeks to conduct comparative studies of this region with China. This is because the importance of the Asian giant is clear not only because of its economic power but also because of its relevance in terms of political and scientific leadership in the global arena, as it is the world leader in net production, surpassing the United States.

“Considering this context and the opportunity to participate in the Flauc consortium, I decided to formulate a proposal in which this type of bibliometric studies were conducted applied to research in innovation in business administration and decision sciences but adding the specific case of China. Those, basically speaking, are the lines of previous work and the opportunities that arose to start this research,” states the professor.

Regarding the main findings of this extensive study, he mentions some related to three aspects: The net production and the actors involved in it, the collaboration between academy and organization, and the issues being investigated.

Regarding the net production, the researcher reveals that he used two bibliographic databases: Scopus and Web of Science (WoS). When analyzing what is the net production of articles on innovation in business and administration that have been published in China and Latam using the Scopus database, the professors found that China published 1,300 articles between 1996 and 2018, while Latam, with 20 countries, only reached 1,000.

When reviewing the actors involved in the production of these articles, by making a kind of “Top 5” for both China and Latam, the first concentration is in the universities, most of which are public. In case of the region, the leader is the University of São Paulo, followed by the State University of Campinas, the Fed-



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← Xiaolei Lin, a professor at Fudan University (China), highlights that her country's spending on science and innovation research reached 2.5 percent of its total GDP in 2019, spurring rapid growth in research publications.

eral University of Rio Grande do Sul, and the Getulio Vargas Foundation. After Brazilian control, it followed the TEC de Monterrey (Mexico).

In China, the case is similar, with public institutions such as Zhejiang University and Tsinghua University, but there are also other types of organizations that are not necessarily universities, such as the Chinese Academy of Sciences, which is also an important actor in this production.

Regarding the collaboration between universities and companies, the authors indicated that it constitutes less than 1 percent of the articles reviewed in the last 10 years. For this reason, it could be said that the university-

company collaboration format is still in its infancy; however, they recognized that it is diverse and has a lot of potential.

For example, they found committed companies. In case of China, some of European-origin companies such as BMW or VTT Technical Research Center of Finland and Accenture (one of the most important consulting firms in the world).

“When we look at China, we see that there are public and private organizations of great importance at the regional level, and one of those that are included in this type of collaboration is Petrobras, which is essentially one of the largest and most important public companies of Latin America. There are also public institutions such as central banks, for example, the Banco Ventral de Chile (Central Bank of Chile.)” adds Cortés.

The researchers analyzed the areas of study in innovation and found that both regions have a defined agenda, with some priority issues and others that are shared. In the Asian country, on one hand, they specify, research is focused on innovation applied to industry, technological innovation processes, and development and/or improvement of goods or services. In addition, it emphasizes electronic commerce, which in its concept is interesting.

In Latam, on the other hand, the agenda is marked by the leading role of Brazil, which directs its research toward biotechnology and sustainable development. There are also issues that the region shares with China, such as technological development, new products or processes for the manufacturing of those products, and competitiveness or competition.

Chinese perception

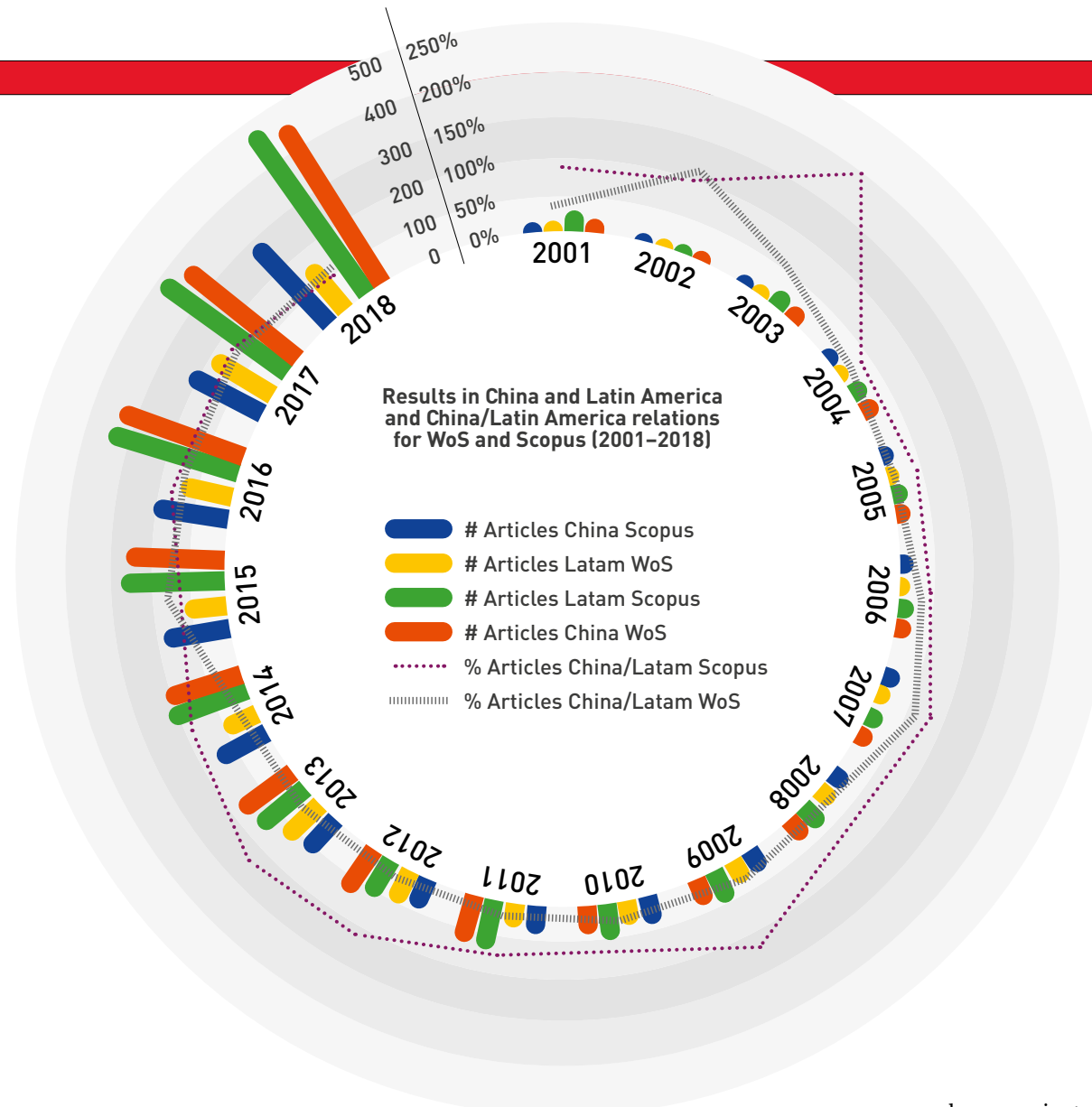
Xiaolei Lin highlights other conclusions for China, such as the fact that this country's spending on research in science and innovation reached 2.5 percent of its total GDP in 2019, which stimulated rapid growth in research publications.

She adds that in 2018, China surpassed the United States in terms of the total volume of published scientific papers, although scientists were slow to be cited, which takes longer to collect the information. Furthermore, the average number of authors per article has increased over time, which means a more collaborative behavior. This nation has large and diverse networks in terms of co-authorship and collaborative citations on research innovation.

Cortés indicates that the same is not happening in Latin America, although steps are being taken toward building research networks. “We are talking about seven investigations where authors from Latin America and China participated in the same study; however, these congregate 26 institutions. For this reason, when saying that although [the collaboration] is in its infancy, it is also broad and diverse in terms of the integration of different entities because there are not only from Latin America and China but also from the United States, Europe, and Australia,” he assures.

For example, apart from Latin American and Chinese universities, some of the European organizations involved are the School of Finance and Administration of Frankfurt (Germany), National University of Ireland, University of Deusto in Spain, and University from Newcastle in Australia.

In the particular case of Colombia, the professor maintains that if only the five leading universities in the country are considered, none of them is present in the “Top 5” of China and Latin America; although there are some cases of Colombian



Source: Author's calculations based on WoS (2018) and Scopus (2018). The figure indicates the total production and the China/Latam ratio for both WoS and Scopus for 2001-2018. During 2001-2005, production was limited to single digit figures in both regions. There is a clear upward trend in both regions, where China has been the top producer almost every year based on both WoS and Scopus.

universities such as Externado, which is in these collaboration networks, and Universidad del Rosario, which is participating more and more actively.

In this sense, the authors are concerned about how to proceed to recognize Latin American universities that are being protagonists and achieve the linking of others in regional collaboration.

According to the professor, some universities that stand out in this collaboration network are the TEC de Monterrey, the Universidad Alberto Hurtado (Alberto Hurtado University) of Chile, and the Universidad Nacional Autónoma of Mexico. “So, if we want to be part of it, perhaps one of the strategies that we can advance is to go to some local universities like these three and not necessarily go to universities in China. Talk to them, make an inventory of what resources are available, financial or not. One of the great advantages that we would have is the language in common,” emphasizes Cortés.

Another issue that the researcher indicates is that China and Latin America have different interests for research. “To give an example, although it is not part of this research, but it can shed light, the priorities that China may have for sustainable development, research, and innovation in the coming years may be

much more oriented to the energy sector, and therefore, more resources and more intellectual and financial muscle are allocated to this sector,” states the professor from Universidad del Rosario.

He recalls that China currently consumes the most energy in the world and that one of its priorities is to analyze the use of renewable energy to put aside the intensive use of thermoelectric plants powered by coal. It is urgent for the country and the future of research and innovation in sustainable development.

In Latin American countries such as Colombia, where 70 percent of the energy comes from hydroelectric plants, the point of reflection is different: The provision of water resources, geographical and geological hazards, among other issues, which correspond to the particularity of each country. In this sense, the researcher maintains that both regions, or in this case, both countries have different priorities, resources, and intellectual muscle, which will eventually pose differences in the research on innovation or, in this case, on innovation for sustainable development. ■