

Digital transformation and COVID 19: contrasts in Latin America

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Abstract

A documentary review was carried out on the production and publication of research papers related to the study of the digital transformation variable and COVID 19 in Latin America. The purpose of the bibliometric analysis proposed in this document is to know the main characteristics of the volume of publications registered in Scopus database during the period 2020-2021 in Latin American countries, achieving the identification of 62 publications. The information provided by this platform was organized by means of tables and figures, categorizing the information by Year of Publication, Country of Origin, Area of Knowledge and Type of Publication. Once these characteristics were described, the position of different authors regarding the proposed topic was referenced by means of a qualitative analysis. Among the main findings of this research, it is found that Mexico and Brazil, with 18 publications, are the Latin American countries with the highest production. The areas of knowledge that made the greatest contribution to the construction of bibliographic material related to the study of digital transformation and COVID 19 in Latin America were Social Sciences and Computer Sciences with 31 published documents, and the type of publication that was most used during the period mentioned above was the journal article, representing 51% of the total scientific production.

Keywords: digital transformation, COVID 19.

1. INTRODUCTION

Digital transformation is a process by which in recent years has been increasingly implemented the use of information and communication technologies in business, educational and social aspects in order to adapt all these processes to what the digital era demands. This change has been seen more accelerated since 2020 when a health crisis was declared by COVID 19 which forced society to change the way to interact, so most procedures were digitized in order to comply with the measures imposed by the government to protect public health. Thanks to these measures, authors say the world is in the middle of a cultural change by modifying from how to access services to how marketing.

Digital transformations are all those actions carried out by companies, institutions and organizations that seek to implement ICT as a way to make their operations more inclusive and have a more effective execution. The problem of

digital transformation in Latin America lies in the large percentage of digital illiteracy that occurs especially in older adults who have not adapted to the use of digital tools, in addition to the shortcomings in connectivity and availability of digital tools in several vulnerable areas that do not allow to implement these innovations completely.

The greatest benefit of this digital transformation in Latin America is the adaptation of processes according to what the 4.0 society demands through the automation of processes, which allows to have access to a large amount of information in a matter of seconds, in addition to revolutionizing the pedagogical models increasingly implementing online classes where it is no longer necessary to enter a physical resource to access education, but this can be done from anywhere at any time. Even so, Ramírez-Montoya (2020) considers that the digital transformation of universities presents challenges in terms of infrastructure,

connectivity and digital training. The case studies agreed that the challenges they faced with the contingency were the training in digital skills, both students and teachers, as well as the availability of computer equipment and internet access in urban and remote areas; so, in Latin America in recent years there has been great progress in the implementation of ICT in business, education, service delivery, etc.

There are still several challenges to be faced for being in line with what the new digital era demands. Therefore, it is important to know in terms of bibliographic resources, the current state of research on digital transformation and COVID 19 in Latin America, so a bibliometric analysis is proposed on the scientific production registered in Scopus database during the period 2020-2021 to answer the question: How has been the production and publication of research papers related to the study of the variable digital transformation and COVID 19 in Latin America during the period 2020-2021?

2. General Objective

To analyze from a bibliometric and bibliographic perspective, the production of high impact research papers on the digital transformation variable and COVID 19 in Latin America during the period 2020-2021.

3. Methodology

Quantitative analysis of the information provided by Scopus is performed under a bibliometric approach on the scientific production related to digital transformation and COVID 19 in Latin America. Also, from a qualitative perspective, examples of some research papers published in the area of study mentioned above are analyzed from a bibliographic approach to describe the position of different authors on the proposed topic.

The search is performed through the tool provided by Scopus and the parameters referenced in Table 1 are established.

3.1 Methodological design

Table 1. *Methodological design.*

	PHASE	DESCRIPTION	CLASSIFICATION
PHASE 1	DATA COLLECTION	Data was collected using the Scopus web page search tool, through which a total of 62 publications were identified.	Published papers whose study variables are related to digital transformation and COVID 19. Research papers published during the 2020-2021 period. Limited to Latin American countries. Without distinction of area of knowledge. Without distinction of type of publication.
PHASE 2	CONSTRUCTION OF ANALYSIS MATERIAL	The information identified in the previous phase is organized. The classification will be made by means of graphs,	Word Co-occurrence. Year of publication Country of origin of the publication.

		figures and tables based on data provided by Scopus.	Area of knowledge. Type of publication
PHASE 3	DRAFTING OF CONCLUSIONS AND FINAL DOCUMENT	After the analysis carried out in the previous phase, the study proceeds to the drafting of the conclusions and the preparation of the final document.	

Source: Own elaboration (2022)

4.1 Co-occurrence of words

Figure 1 shows the co-occurrence of keywords within the publications identified in the Scopus database.

4. Results

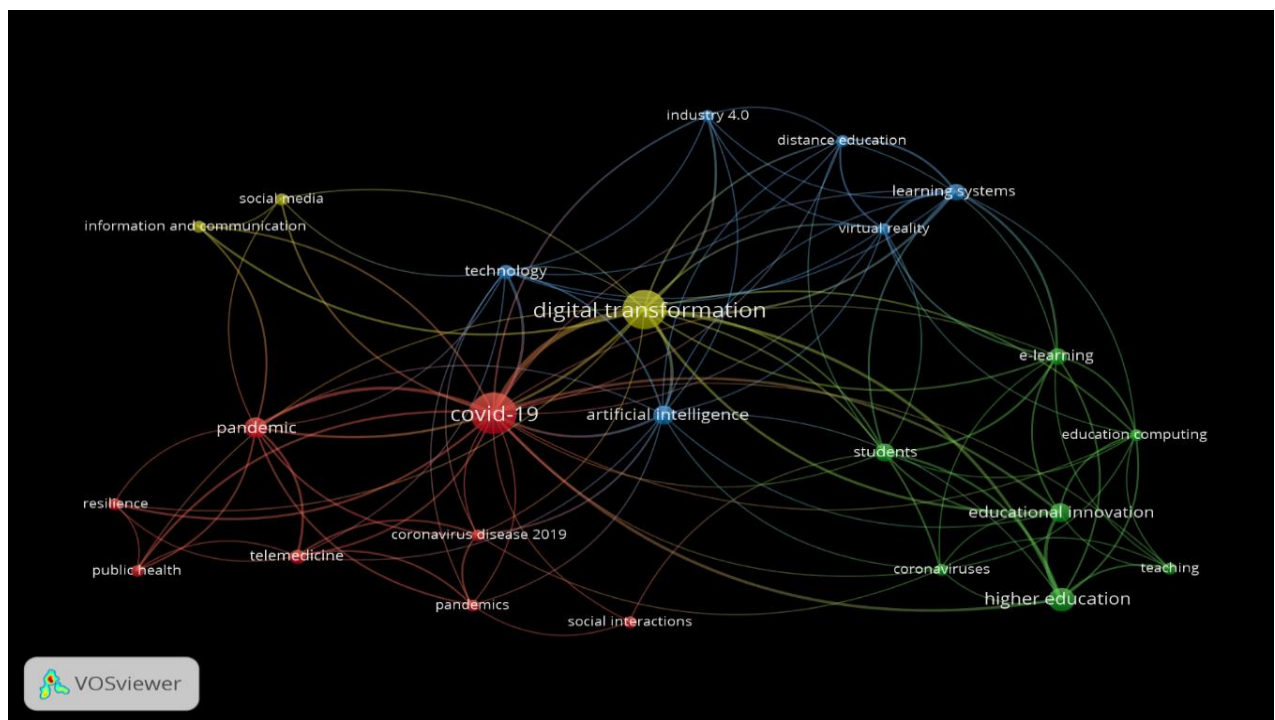


Figure 1. *Co-occurrence of words*

Source: Own elaboration (2021); based on data provided by Scopus.

As shown in Figure 1, the most used keyword is digital transformation, which is one of the variables under study as it refers to the innovations that industries, companies and educational institutions have implemented in technology in order to make their processes more accessible by implementing information

and communication technologies, allowing them to automate and improve their processes by having the latest generation of technology that allows them to optimize their processes. In second place is COVID 19 which is the reason why this transformation was carried out in an accelerated way, forcing to change most of the

processes, implementing ICT to be able to stay in touch. There are also keywords such as social interactions, educational innovation, technology and industry 4.0 which are related to the changes that became more noticeable because of COVID 19 where the way in which people relate as a society changed, making this possible only through technological tools, in addition to changing the educational models from the classic classroom model to distance mediated education and the change in the realization of most processes making as many processes as possible 100% digital.

4.2 Distribution of scientific production by year of publication.

Figure 2 shows how scientific production is distributed according to the year of publication, taking into account the period from 2020 to 2021.

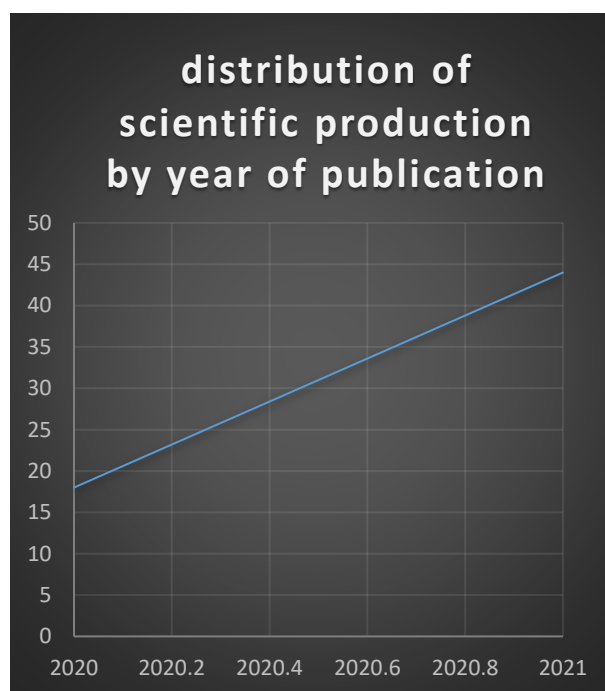


Figure 2. *Distribution of scientific production by year of publication.*

Source: Own elaboration (2022); based on data provided by Scopus.

2021 is the year with the highest number of publications registered in Scopus related to the variables under study, with a total of 44 documents, among which is “COVID-19, consumer behavior, technology and society: literature review and bibliometric analysis” (Cruz-Cárdenas et al., 2021). This document studies how, due to COVID, consumer-supplier

relationships have changed since the implementation of information and communication technology. Through a literature review, 70 documents related to the topic were identified in Scopus, where the new ways of relating and how marketing had changed its strategies were elaborated and studied in depth. It was concluded that technological and digital formats mark consumer behavior, companies must incorporate digital transformations in their process.

The year 2021 is in second place presenting 18 documents published in Scopus, among which is “Industry 4.0: an integrated distance learning solution” (S. & J.M., 2020). In this research, a review of the current state of reality is made and proposes an integrated distance learning solution with three intertwined domains: people, processes and technology and how these changes have occurred. Now more than ever, Industry 4.0 and the set of new technologies are enabling a digital transformation in the education sector so it is proposed to strengthen these innovative measures in order to go according to Industry 4.0 in the preparation of professionals according to what is demanded by the market, strengthening skills to adapt to new standards.

4.3 Distribution of scientific production by country of origin.

Figure 3 shows the distribution of scientific production according to the nationality of the authors.

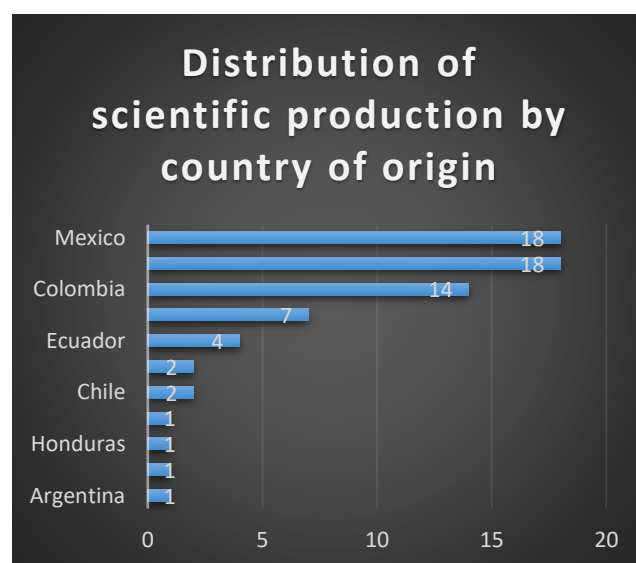


Figure 3. *Distribution of scientific production by country of origin.*

Source: Own elaboration (2021); based on data provided by Scopus.

Mexico and Brazil are the countries with the greatest contribution to research related to digital transformation in Latin America in the framework of COVID 19, presenting 18 papers each, in the papers presented by Brazil we can identify “COVID-19: Reflections on the Crisis, Transformation and Interactive Processes in Development” (Moura et al., 2021). The processes of human development are studied, mobilizing reorganizations in life trajectories and also discusses the possible implications of the new perceptual fields and the production of meanings with the repositioning of the body using digital tools as a way to stay in touch

without putting public health at risk, which forces to transform most of the processes making them increasingly digital.

At this point, it should be noted that the production of scientific publications, when classified by country of origin, presents a special characteristic and that is the collaboration between authors with different affiliations to both public and private institutions, and these institutions can be from the same country or from different nationalities, so that the production of an article co-authored by different authors from different countries of origin allows each of the countries to add up as a unit in the overall publications. This is best explained in Figure 4, which shows the flow of collaborative work from different countries.

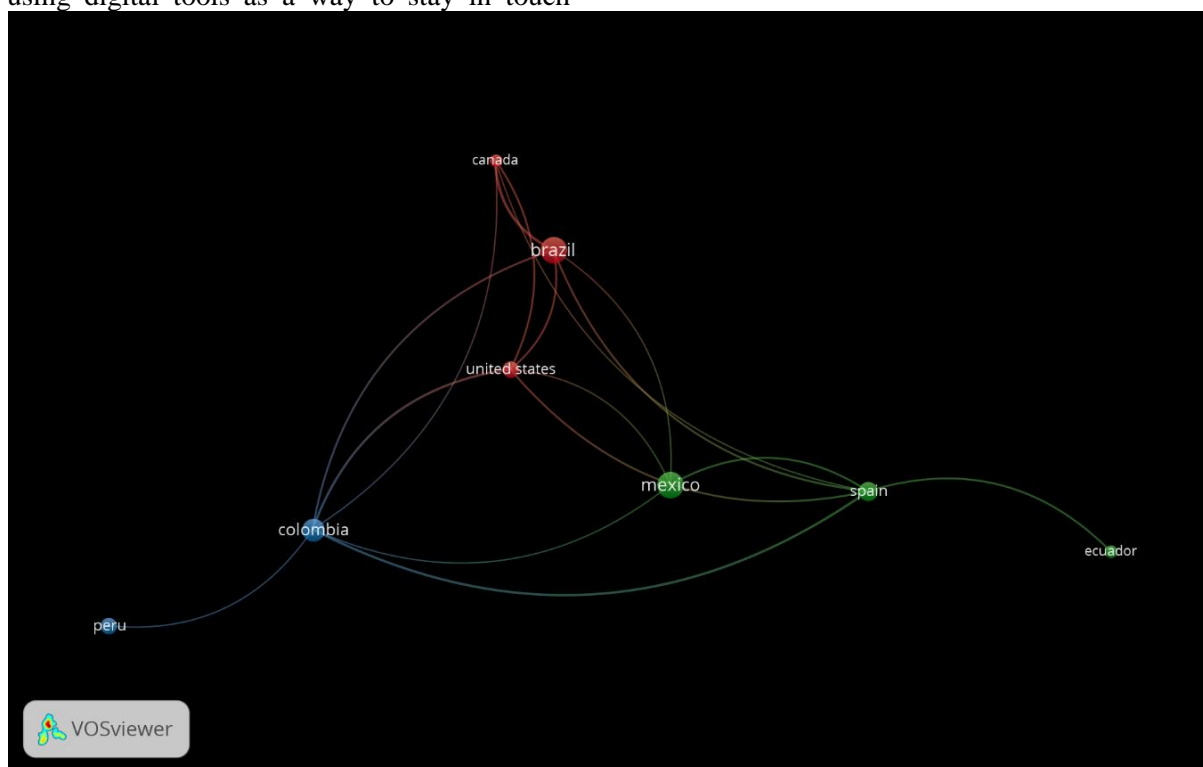


Figure 4. *Co-citations between countries.*

Source: Own elaboration (2021); based on data provided by Scopus.

As shown in Figure 4, Mexico and Brazil are the two countries with the highest number of publications registered in Scopus, with some documents co-authored with Spain, Ecuador and Canada, which demonstrates the interest of countries outside Latin America in learning about how digital transformation is developing in Latin America within the framework of COVID 19. In third place is Colombia which presents 14 documents, some of them in

collaboration with authors from the United States and Peru, within these publications is “COVID-19, the challenges of sustainable development in Latin America and the Caribbean and the potential drivers for a recovery based on the SDGs” (Gonzalez-Perez et al., 2021). Its main objective is to examine the impact of COVID-19 in the Latin America and the Caribbean (LAC) region and discuss the imperative drivers for possible regional

recovery taking into account that it is an area where it is very common to find problems such as digital inequality, environmental degradation, erosion of democracy and financial debt. Therefore, certain alternatives are proposed for these countries to resiliently adapt to the changing global realities and the harsh local contexts to resiliently adapt to the changing global realities and the harsh local contexts to achieve regional recovery through the use of technologies.

4.4 Distribution of scientific production by area of knowledge

Figure 5 below shows how the production of scientific publications is distributed according to the area of knowledge through which the different research methodologies are executed.

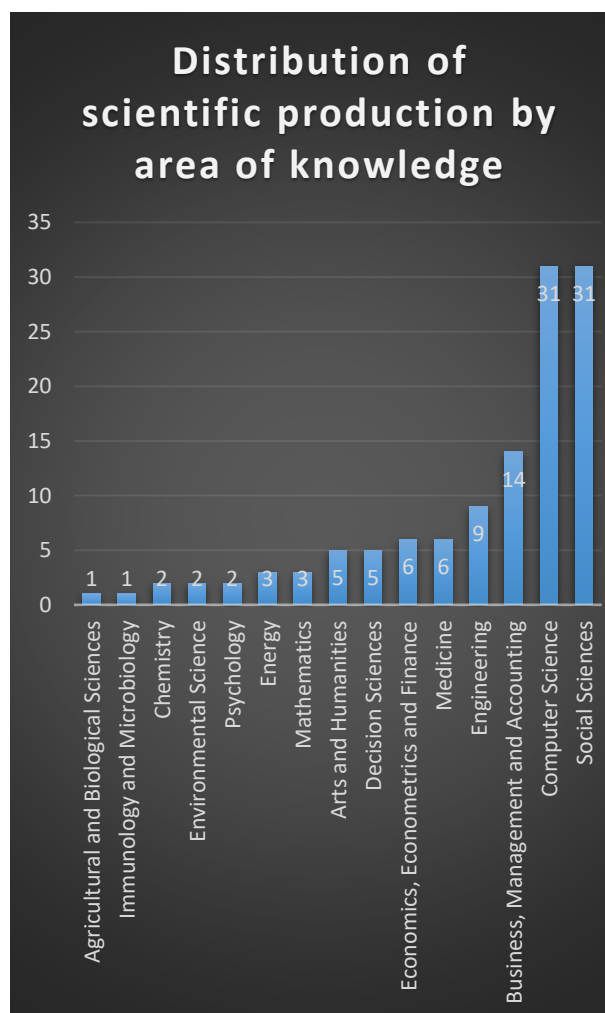


Figure 5. *Distribution of scientific production by area of knowledge.*

Source: Own elaboration (2021); based on data provided by Scopus.

The areas of knowledge with the greatest contribution to research related to the variables under study are social sciences and computer sciences, with 31 publications each, in the documents belonging to the social sciences we can identify “University Digital Transformation Plan through the implementation of Digital Resources: The case of the Technological University of Panama” (Villarreal et al., 2021). This document analyzes the new challenges in higher education in terms of the use and integration of new technologies. Taking into account the role of the university in society as a transforming entity in charge of training integral professionals, the need to innovate according to what society demands arises, so this document provides elements to support the implementation of a Digital Transformation Plan for the Technological University of Panama. Therefore, it concludes with the approach of an educational platform that aims to implement new technologies in the educational system.

In the identified documents belonging to the knowledge area of computer science, the article entitled “Student satisfaction with the quality of online learning in higher education: an empirical study” is found (C, et al., 2021) where it is possible to identify the elements that influence student satisfaction and allow HEIs to establish strategies to ensure the quality of digital transformation through surveys applied to 1430 students of the Faculty of Medicine where it was found that the quality of the technical service must be improved to implement the digital transformation in online learning as a result of the restrictions generated by COVID-19 in a satisfactory way.

4.5 Type of publication

Figure 6 shows how the bibliographic production is distributed according to the type of publication chosen by the authors.

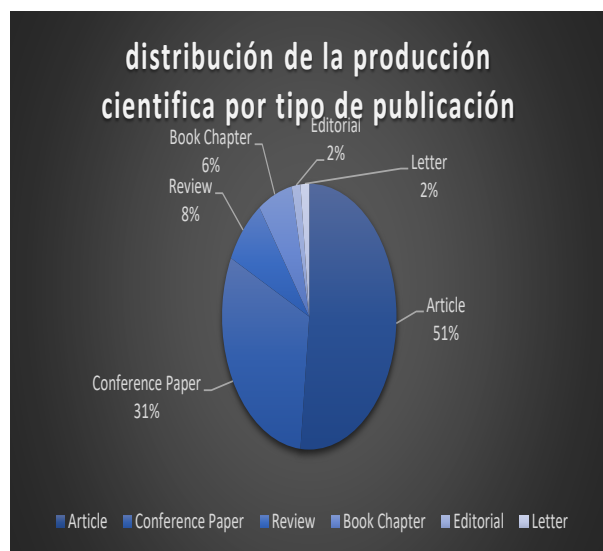


Figure 6. *Type of publication*

Source: Own elaboration (2021); based on data provided by Scopus.

As shown in Figure 6, within the different types of publications, 51% of the total number of documents identified through Phase 1 of the Methodological Design, correspond to Journal Articles, among which is the one entitled “Evaluation of the impact of COVID-19 on the adoption of virtual care in general practice in 20 countries (inSIGHT): protocol study and justification” (Neves et al., 2021) which has as its main objective to review the impact that remote care had on primary care settings and reevaluate its possible future role, this research was conducted through an online cross-sectional questionnaire completed by physicians distributed in 20 countries from June 2020 to September 2020 where it was possible to determine the availability of virtual care technologies, the perceived impact on quality and safety of care and risk factors. The study concluded with the need to create future research that aims to identify the main lessons from this unexpected transformation and use them to inform policy decisions and the design of health services.

In second place are the conference proceedings which represent 31% of the documents identified in this study, among which is “Rethinking an ICT-mediated teaching strategy during the COVID-19 pandemic” (Manrique-Losada & Manrique-Losada, 2021). This document presents an ICT-mediated teaching

strategy for the University of Medellin (Colombia) and its adaptation to the curricular innovation model of the institution. Due to COVID 19 there was a rapid transition to virtuality, which brought with it the birth of new problems in the virtual aspect of education, which concludes with a reflection on the needs of teachers and students in virtual learning environments.

5. Conclusions

Thanks to the bibliometric analysis proposed in this research, it can be determined that Brazil is the Latin American country with the largest number of bibliographic records in Scopus database during the period between 2015 and 2020 with a total of 126 documents. The scientific production related to the study of digital transformation and COVID 19 in Latin America, has presented a significant growth during the aforementioned period, from 18 publications in 2020 to 44 units in 2021, i.e. a large increase in the creation of bibliographic records was obtained in a period of 2 years, which indicates the importance that digital transformation represents in the innovation of business, industrial and educational processes, managing to include ICT in these environments, making them more inclusive.

The digital transformation is a process of change that in Latin America has been seen with greater force in recent years, and a rapid transition was made from 2020 where social distancing measures were implemented because of COVID 19 which forced to find new ways to communicate, so ICT have been included in most procedures changing how to access health services, procedures, access to education, communication etc. This digital transformation aims to bring society in line with industry 4.0, which has automated most of its processes using new technologies in order to optimize its operation. So, the digital transformation is all the innovations that organizations have taken to make their processes easier, transparent and accessible. In Latin America there are still problems in the implementation of these new strategies because of the high rate of digital illiteracy, which does not make it fully inclusive, in addition to the restricted access that some populations have to the Internet and technological tools. All of the above allows this

article to conclude by highlighting the importance of studying the latest strategies implemented by companies and institutions in their transition to processes that use information and communication technologies. That is why it highlights the need for studies such as the one presented in this document, which make a tour of those texts that address the above topic, in order to give the reader a broad view of the current status of the literature on digital transformation and COVID 19 in Latin America.

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