

Research Article¹

The Impact of COVID-19 on Knowledge Economy Research: A Bibliometric Analysis, and Analytical Study at the University of Tlemcen, Algeria

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Abstract

The study aims to investigate the impact of the global pandemic COVID-19 on knowledge economy. The study is divided into two sections. In the first section, we analyzed the bibliometric data of the research published on the "Scopus" database during the COVID-19 pandemic, and after reviewing various statistics using the R and Vosviewer programs, the results revealed that Algeria is not among the countries interested in knowledge economy research during the COVID-19 pandemic. The study also found that there are four research areas that researchers are interested in in the field of knowledge economy during the COVID-19 crisis: knowledge and innovation, intellectual capital, university and knowledge creation, and e-learning and human capital to support the knowledge economy. In the second section of the study, we conducted an analytical study on a sample of 106 professors and researchers from the University of Tlemcen, Algeria, using a survey as a tool for data collection. The results revealed that the COVID-19 crisis had a negative impact on knowledge economy research, as we recorded a strong negative correlation between the COVID-19 crisis and partnership agreements, and a moderate negative correlation between the COVID-19 crisis and human capital, incentives and creativity. The study recommends giving more attention to research and researchers in the field of knowledge economy, especially during global pandemics similar to the COVID-19 crisis.

Keywords: knowledge economy, knowledge-based economy, Covid 19 crisis, bibliometric analysis, University of Tlemcen.

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1 Introduction

The term knowledge economy refers to describing trends in advanced economies toward increasing reliance on Knowledge, information, and highly skilled labour (OECD, 1996), and the field of the knowledge economy has received great interest from researchers (Isenberg., 2010), where 40,000 articles were published about Knowledge and the knowledge-based economy in 2010, and there are many terms used to describe similar concepts related to knowledge management (Davenport, 2001; Nonaka & Takeuchi, 1995), for example, the knowledge economy (Drucker, 1992; 1999), the knowledge industry (Machlup, 1962), the information economy (Porat & Rubin, 1977) and the network society (Castells, 1997).

Given the historical rooting of the knowledge economy, some researchers trace it back to the 1970s (Aparicio et al., 2021). Still, looking at previous research, we find, for example, the prominent Austrian economist (Fritz Machlup-1902-1983), the first economist to write about the new economic trend of industrialists. Politics in the production and distribution of Knowledge in the United States, where he (Fritz Machlup, 1962) touched on Knowledge and described the usefulness of Knowledge from a multifaceted perspective, especially about how it is used in production and the creation of the knowledge industry.

In 1970, Una Mansfield emphasized that education provides an important impetus in creating a society based on information and Knowledge for job creation. Promoting growth and the knowledge sector is increasingly important in particular. Una's writings have contributed to Mansfield) led to the emergence of a new idea of learning and discourse that could influence the economy, now known as the knowledge economy. (Choong et al., 2021).

(Drucker, 1969) referred to the term "knowledge workers" for the first time in his work (The Age of Discontinuity), where knowledge workers differ from previous manual workers and work mainly with their heads, not with their hands, and produce ideas, Knowledge, and information (Drucker, 1992) The emergence of knowledge workers has led to changes in social, political and economic factors in the United States (Choong et al., 2021).

Due to the intensification of competition and the huge scientific developments in the field of technology, there is an increased need for more scientific research in the field of knowledge economy. However, the spread of the COVID-19 virus, which caused a global health crisis, has created a high level of uncertainty. As a result, the efforts of most researchers have been directed towards conducting studies that link the global COVID-19 pandemic with other variables according to each researcher's field of specialization. Our study aims to reveal the impact of the global COVID-19 pandemic on knowledge economy research by conducting a bibliometric analysis of studies published on a database during the pandemic (from 2020 to 2022), highlighting the most important scientific research that addressed knowledge economy and the most relevant hot topics related to knowledge economy during the COVID-19 crisis, and also showing the impact of the global COVID-19 pandemic on knowledge economy research through an analytical study on a sample of professors and researchers at the University of Tlemcen in Algeria.

2 Literature review

2.1 The emergence of knowledge economy in Algeria

According to some researchers such as Djeflat (2012), Algeria began to take an interest in the subject of knowledge economy following the first Mers el-Kebir conference in 2003. A large delegation of officials and representatives from public institutions, primarily the Centre for the Development of Advanced Technologies (CDTA), and representatives from the Prime Minister's Office, as well as private sector, training, and consulting participated in the conference. After this conference, the process of institutionalizing the subject began with the organization of the second Mers el-Kebir conference in 2004. The main objective of this conference was to create an "intellectual foundation for the knowledge economy," an informal institution to follow up on activities related to the knowledge economy. In 2005, Tunisian authorities organized a meeting to assess the situation in the Middle East

and North Africa, in which the Algerian group for the knowledge economy, which was formed in 2005, participated. This was followed by a series of events, the most important of which was the first event that explicitly addressed the subject of knowledge for development during the tenth anniversary of the Maghtech network, also known as Maghreb Technology1.

Then, a series of scientific gatherings were organized most of the time in partnership with Algerian institutions, whether academic (universities, high schools and institutes) or non-academic (chambers of commerce, funding agencies, media). During this period, many other side events took place, which should not be underestimated because they made it possible to disseminate the concept of the knowledge economy on a wide scale, which led to the organization of the National Conference on Knowledge Economy on April 29-30, 2006. It was organized by the Maghtech network and the Algerian Association for Technology Transfer (A2T2) at the University of Mostaganem in western Algeria. The main theme was "A Knowledge-based Economy in the Service of Growth and Sustainable Development: Challenges and Opportunities for Algeria" and many stakeholders participated: training and research institutions, business leaders, university researchers. Table 01 summarizes the main events and activities that have contributed to the emergence of the knowledge economy in Algeria.

Table 01: Key events and activities that led to the emergence of the knowledge economy in Algeria

The events	The organizing Institutions	Dates and places	participants
the 10th anniversary of the Maghtech network	MAGHTECH	December 2004 Algiers	Scholars, students and representatives from administration
The round table on knowledge economy	Club CARE	Octobre 2004 Algiers	Essentially entrepreneurs
KE and firm's competitiveness Conference	University of Biskra and Maghtech	November 2004	Essentially students and lecturers
conference organized at the INPS	Institute of National Planning and Statistics	December 2004	Students – teachers - researchers
Round Table discussion	the National Polytechnic School of Algiers	November 2005	Students, teachers and researchers
Seminar on KE	The Algiers Chamber of Commerce	July 2005	The Presidents of the chambers of commerce of Algeria
the ISGP meetings	Higher Institute of Management and Planning		Students, staff
the meeting with economic journalists	organized by the Friedrich Ebert Foundation,	November 2005	Journalists

The first National Conference on knowledge economy in Algeria	The Maghtech Network and the Algerian Association for Technology Transfer	29/30 2006	Avril	Scholars, Researchers professionals representatives from central administration
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Source: Djeflat, A. (2012) "Knowledge Economy: foundations and emergence of the phenomenon in Algeria" in Office des publications Universitaires (OPU), Algiers, p 22

2.2 The linkages between higher education, scientific research technological development and knowledge economy

Algeria has relied on universities to move towards a knowledge economy, as the university is the main source of knowledge that can be converted into a knowledge-based product. The Algerian state has supported the higher education sector by providing many infrastructures, as the higher education and scientific research sector has experienced a significant development in terms of expanding the university network that currently includes 117 institutions, including 55 universities, 40 national higher schools, 13 higher education teachers' schools and 09 university centers. In the field of scientific research, there are currently 32 research centers, 48 research units, 1851 research laboratories, 41 experimental stations (mesrs,2025).

During the COVID-19 crisis, The sector great importance to epidemics and pandemics through the launch of a call for the national research entities to produce an artificial breathing device and opened doors for anyone with the capability to provide an addition. Some of the research entities affiliated with the sector were able to produce during the COVID-19 crisis, cleaning and disinfection means for the benefit of higher education and research institutions and university service facilities. They also designed protective masks according to international standards under an agreement between the University of Hajj Lakhdar Batna 1 and the University of Mustapha Benboulaïd Batna 2 and the Advanced Technology Development Center. Additionally, several applications were developed that rely on artificial intelligence to manage the COVID-19 epidemic. The sector also gave great importance to coordinating the efforts of researchers, economic and social partners, and also the relevant ministries with the aim of meeting the economic and social community's needs. Through an executive decree on March 5, 2021 which aims to implement a plan for the implementation of national programs for scientific research and technological development, which includes three priorities: food security, citizen health, and energy security, distributed over a period of time from 2021 to 2025. The project includes 750 research projects distributed across the previous national programs, with an average of 150 research projects per year, 50 for food security, 50 for citizen health, and 50 for energy security. (mesrs, 2022)

In the academic year 2024-2025, 1963 patent applications were registered, and 421 Research projects with socio-economic impact (mesrs, 2025)

However, despite all this, Algeria has not yet reached the level of advanced countries. The Global Innovation Index (GII) 2024 revealed that Algeria ranks 115 th out of 133 countries (WIPO, 2024,19)

3 Methodology, data, and tools

3.1 Methodology

The study is divided into two sections:

The first section of the study: we relied on the bibliometric analysis method so that this approach depends on the statistical analysis of scientific documents and relative citations. Nevertheless, this type of analysis allows us to determine the level of possible expansions in a particular research field and also identify future areas of research (Cucino et al., 2021); where after reviewing the most important statistics, we analyzed the bibliographic coupling analysis, as this technique allows the identification of "hot" research topics (Glänzel and Czerwon, 1996).

The second section of the study: We relied on the descriptive-analytical method, which is considered the appropriate method for this type of study.

3.2 Data, and tools

- *The first section of the study:*

We relied on the "Scopus" database as one of the largest search databases in the world. After entering the Scopus search database, we entered the following search words:

("knowledge-based economy*" or "knowledge-based economy*" or "knowledge-based economy*")

After excluding articles that do not belong to our field of specialization, we kept only the scientific articles published in English in the fields of "social sciences," "management" and "business", using the program (vosviewer), to display the statistics. The final study sample consisted of 602 scientific articles.

The second section of the study:

In order to complete the requirements of the study in its second part, we used the survey as a tool to collect information, which may be divided into two parts, the first part is dedicated to general information (gender, age, family status, scientific institution), the second part includes two sections, the first section is dedicated to the independent variable COVID-19 crisis (05 paragraphs), and the second section is dedicated to the dependent variable knowledge economy research (04 dimensions), the first dimension is human capital (03 paragraphs), the second dimension is stimulation and creativity (04 paragraphs), the third dimension is technological infrastructure (03 paragraphs), the fourth dimension is partnership agreements and patent registrations (04 paragraphs).

In the first section of the study, we relied on the program (vosviewer) to display statistics and analyze the data obtained, and in the second section we relied on the SPSS statistical analysis program.

4 Results:

4.1 *The first section of the study:*

- Co-Occurrence analysis

In the articles, the study sample used 3031 keywords. Among the 3031 keywords, 1000 keywords have a strong correlation, "knowledge economy" was used 191 times as a keyword, "innovation" 81 times, "knowledge management" 34 times, and "existing economy" On knowledge" 26 times. For the strength of the correlation, the program determined the correlation strength of the keyword "knowledge economy" with the rest of the keywords with 1219 (see Figure 1).

Figure 1. Co-Occurrence analysis

Source: authors calculation using Vosviewer

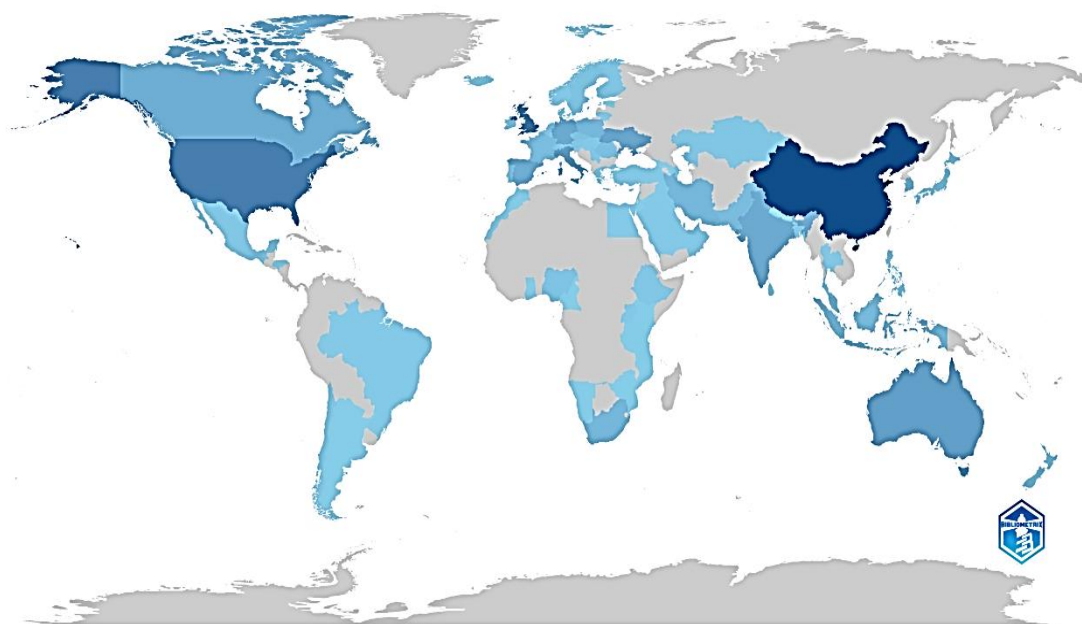
Switzerland is the best magazine with 35 articles cited 98 times, correlation strength with other magazines with 795 links, technological forecasting and social change with 16 articles, 244 citations, and 677 links (see Figure 2).

- Country Scientific Production (Most Countries):

The United States of America and the United Kingdom top the list of countries most interested in conducting research in the field of the knowledge economy during the epidemic crisis “Covid 19”, as the number of articles during this period is estimated at 71 articles, and the total correlation power for the United Kingdom is 5357. As for the U.S. states, it is estimated at 5357 (see Figure 3).

Figure 3. Most Countries interested in research in the knowledge economy

Country Scientific Production



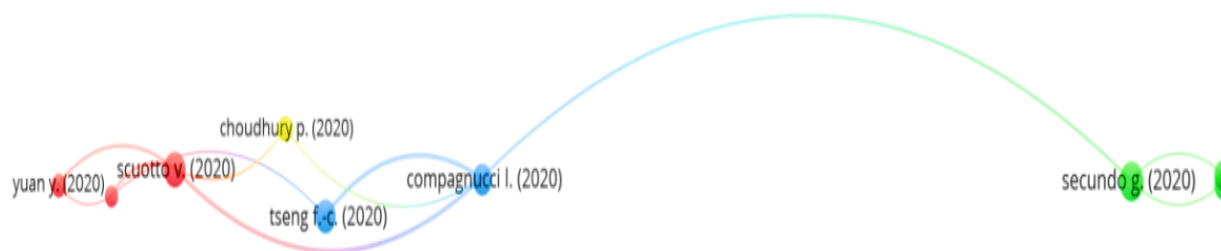
Source: authors calculation using R

- Bibliographic coupling analysis

Bibliographic coupling analysis helps identify “hot” research topics (Glänzel and Czerwon, 1996), which we adopted in our study (Di Stefano et al., 2010), where we set a minimum of 20 citations for each article, the outputs of the (Vosviewer) and I programs showed 11 scientific articles.

Among the 11 articles, two have no connection with the rest of the articles, i.e., the total correlation strength equals zero, and 09 articles are correlated with each other. Therefore, the program grouped these articles into 04 clusters (see Figure 4).

Figure 4. Bibliographic coupling analysis



Source: authors calculation using Vosviewer

- Red cluster: Knowledge and innovation

This cluster includes 03 researchers (Shahzad et al., 2021; Scuotto et al., 2020; Yuan et al., 2020).

(Scuotto et al., 2020) finds that in the current dynamic flow of the knowledge economy, business organizations are concerned about whether they will manage innovation centrally or through decentralized business units, and here two needs arise: ensuring organizational efficiency and effectively exploiting market opportunities which means Typically incorporating Knowledge into technology transfer that can be augmented through Knowledge sharing between parties, and based on the theory of planned behaviour (TPB), (Scuotto et al., 2020) proposes a small basic model for collaborative innovation and technology transfer using data that has been collected from the Community Innovation Survey (CIS) dataset (Scuotto et al., 2020).

(Shahzad et al., 2021) studied the impact of corporate green innovation (CGI) on the knowledge management process (KMP), as he developed a multi-dimensional framework based on the theory of resource-based presentation (RBV). The researcher concluded that the dimensions of knowledge management represented in (Acquisition, dissemination, and application) has significantly improved the environmental, economic, and social dimensions of sustainable development. The dimensions of sustainable development play an important role in achieving green innovation. The researcher emphasized that investing in and adopting the latest technologies and sustainable practices does not represent a value for success. Not only in the long run but also soft concerns such as organizational knowledge management are also essential in the current knowledge-based economy (Shahzad et al., 2021)

(Yuan et al., 2021), there are hidden "bullying" behaviours in the era of the knowledge economy based on "the power of knowledge." It is recommended to hide the bullying behaviour when carrying out the organizational knowledge transfer process because this behaviour negatively affects knowledge sharing (Yuan et al., 2021).

- The Green Cluster: Intellectual Capital:

Within this cluster, researchers highlight the role of human capital in the knowledge economy. Due to the transition from a manufacturing-based economy to a knowledge-based economy, the importance of intellectual capital has increased. There is a significant positive relationship between all three components of intellectual capital (structural, human, social and relational), and the value of business organizations in the era of knowledge economy (Salvi et al. et al., 2020),, supports this idea (Secundo et al. et al., 2020), as he sees that intellectual capital plays a strategic role in achieving development. The researcher also stresses international cooperation for sustainable regional development in the knowledge economy.

- Blue cluster: the university as a tool for creating Knowledge that enhances the knowledge economy:

The rapid development of technology and knowledge-based economies has drawn the attention of countries to the link between academic institutions and private industries, and given that the university is the main source of knowledge creation, many business organizations have sought to establish alliances and companies with university institutions to enhance their knowledge base and gain a competitive advantage. , supports this idea (Tseng et al. et al., 2020), which sees that the financing of cooperation between the university and industry has a direct role in the technological innovation of universities, as the mechanism of managing cooperation between the university and industry and the innovation climate within universities supports the financing of cooperation between universities and industry Miscellaneous. In addition, automated incentives directly affect university researchers' participation and contribution to technological innovation (Tseng et al. et al., 2020). This idea is supported by (Compagnucci et al. al., 2020) as they focus on the university's third and complementary mission. In "Contributing to Society," they consider that the third message is a multidisciplinary, complex, and evolving phenomenon linked to universities' social and economic mission in a broad sense (Compagnucci al et al., 2020).

- The yellow cluster: machine learning and human capital to support the knowledge economy

There is "great optimism about artificial intelligence and machine learning in their ability to improve people's lives by helping to solve some of the world's biggest challenges and inefficiencies." (Executive Office of the President, 2016). Leaders of modern organizations need to consider two characteristics of human capital, domain expertise and special skills, where domain expertise complements machine learning by (strategic) correction when inputs into a tool are incomplete. Machine learning and special skills ensure the ability to operate technology correctly (Choudhury et al., 2020).

4.2 The second section of the study

4.2.1 Description of the study sample

Table 02 below illustrates the results related to the statistical description of the study sample according to gender, age, type of institution and professional experience.

	Variables	Iteration	Ratio (c/o)
Sex	male	55	52.9
	female	49	47.10
Marital status	single	20	19.2
	married	84	80.8
Age	Less than 30 years old	01	1
	From 31 to 40 years	51	49.0
	From 41 to 50 years	37	35.6
	From 51 to 60 years	02	1.9
	More than 60 years	13	12.5
Type of institution	university	42	40.4
	Laboratory	14	13.5
	Laboratory and University	06	5.8
	Research Center	42	40.4

Source: The researchers based on the outputs of the SPSS program

There is a balance in the number of participants according to gender, where the percentage of male participants in the study is 52.9% compared to 47.1% of females. The majority of participants are also from the youth age group (88% of their ages between 31 and 50 years), more than 80% are married,

and in terms of the scientific institution they belong to, the results of the study revealed that 40.4% of the participants in the study belong to the university and we recorded the same percentage for participants who belong to research centers, with 13.5% from research agencies and 5.8% belong to universities and research agencies.

4.2.2 Hypotheses testing

The table number 03 below shows the coefficient of regression between the study variables, the independent variable is the COVID-19 crisis and the dependent variable is knowledge economy research (human capital, incentives and creativity, technological structure, and partnership agreements).

Table.03: Coefficient of regression between variables.

Model	Unstandardized Coefficients		Standardized Coefficients	T-test		F-test		R ²
	B	Std. Error	Beta	t	Sig.	F	Sig.	
(Constant)	5,808	,078		74,500	,000			
Human capital	-,152	,045	-,266	-3,397	,001			
Motivation and creativity	-,289	,024	-,754	-11,947	,000	57.622	0.0000	0.700
Technological structure	-,276	,070	-,362	-3,948	,000			
Partnership Agreements	-,071	,083	-,093	-,858	,393			

Dependent Variable: Covid19

Source: The researchers based on the outputs of the SPSS program

The results of the study revealed a strong negative correlation between the COVID-19 crisis and partnership agreements, and negative correlation between the COVID-19 crisis and human capital, incentives and creativity, and weak negative correlation with technological structure, where all recorded correlation are statistically significant. The value of the model quality test F is 57.622, which is a statistical function at the level of significance 0.000, indicating the presence of a relationship model between COVID-19 and the dependent variable of knowledge economy research (human capital, technological structure, incentives and creativity, and partnership agreements).

The value of R² also indicates 0.700, which means that the COVID-19 crisis affects knowledge economy research (human capital, incentives and creativity, technological structure, and partnership agreements) by 70%, with the remaining 30% explained by other factors that may have exposed the study participants or their close relatives to the COVID-19 virus. The T-test between the COVID-19 crisis and human capital, incentives and creativity, technological structure, and partnership agreements shows the values (-3.397), (-11.947), (-3.948), (-0.858) respectively, indicating that the negative impact of the COVID-19 crisis cannot reach zero. As for the relationship model, it can be written as follows:

The degree of impact of the COVID-19 crisis on knowledge economy research = $0.470 + x(0.893)$

5 Discussion

The results of the Co-citation analysis revealed that 31 articles were analyzed, of which 13 were not related to each other, and were classified within four ideologies. The Bibliographic coupling analysis was also conducted on 11 scientific articles that were classified in four research fields: knowledge and innovation, intellectual capital, university and knowledge creation, and cognitive education and human

capital to support knowledge economy. The number of articles is very small compared to other scientific studies. The results also revealed that there is no specific research on the knowledge economy in Algeria, as it was not mentioned among the countries interested in knowledge economy research during the COVID-19 crisis, which was confirmed by the field study. The results showed that the COVID-19 crisis had a negative impact on knowledge economy research (human capital, technological structure, creativity and partnership) in Algeria, despite all the opportunities provided by the country. This negative impact can be explained by the uncertainty imposed by the crisis, which is mainly represented by the fear of infection or infection with the virus that requires a time period of not less than 14 days to recover, in addition to other side effects that the virus may cause.

The results of the co-citation analysis revealed that 31 articles were analyzed, of which 13 were not related to each other, classified under four paradigms, and the bibliographic coupling analysis revealed 11 scientific articles classified through four research fields: knowledge and innovation, intellectual capital, university and knowledge creation, and e-learning and human capital to support knowledge economy. Considering the number of articles, it is very low compared to other scientific studies. Additionally, the results showed that there is no specific research on knowledge economy in Algeria, as the country's name is not among the countries interested in knowledge economy research during the COVID-19 pandemic, as confirmed by the field study. The results showed that the COVID-19 pandemic had a negative impact on knowledge economy research (human capital, technological structure, motivation and creativity, and partnership agreements) in Algeria, despite all the efforts the country is making to provide them.

In terms of the negative impact of the COVID-19 pandemic on knowledge economy research (technological structure), despite the efforts of the higher education sector to increase internet, Algeria has not yet reached the level of advanced countries in terms of technological structure. According to the 2021 Network Readiness Index, Algeria ranked 100th among 130 countries (Portulans Institute, 2021) due to the high cost of mobile phones and computers, and the inability of Algerian institutions to compete with international institutions in the field of technology.

Despite the active role and strong willingness of the state to overcome this gap, Where In terms of fixed internet the number of households connected to fixed internet has risen from 2 262 259 in 2015 to 6 881 245 in 2025,(see Table 04)

Table 04: Evolution of the number of households connected to fixed internet

year	2015	2016	2017	2018	2019	2020
Number of subscribers	2 262 259	2 859 551	3 202 505	3 063 835	3 580 456	3 789 128
year	2021	2022	2023	2024	2025	
Number of subscribers	4 175 372	4 175372	5 541 377	6 231 724	6 881 245	

Source: Ministry of Posts and Telecommunications. <https://www.mpt.gov.dz>

On the other hand the number of households connected with FTTH has risen from 43 115 in 2019 to 2 146 685 in 2025,(see Table 05)

Table 05: Evolution of the number of households connected to FTTH

year	2019	2020	2021	2022	2023	2024	2025
Number of subscribers	43 115	53 394	165 244	478 172	1 080 948	1 700 727	2 827 901

Source: Ministry of Posts and Telecommunications. <https://www.mpt.gov.dz>

This was accompanied by the lifting of the capacities of our country's international broadband, which has grown six (6) times more. Thus, the equipped capacity of the international

telecommunications network has currently recorded 9.8 Tbps while it was 1.5 Tbps in the onset of the Covid-19 crisis.

Table 06: Evolution of the international network capacity

year	2020	2021	2022	2024
Capacity (TB/S)	1.5	2.8	7.8	9.8

Source: Ministry of Posts and Telecommunications. <https://www.mpt.gov.dz>

Mobile Internet subscriptions have also witnessed an important development, as the number of subscriptions for the number of 3G+4G mobile subscriptions has moved from 31 460 534 in 2017 to 51 320 813 in 2024 (see Table 07).

Table 07: Evolution of the number of mobile internet subscribers

Year	2017	2018	2019	2020
Number of mobile subscriptions	31 460 534	36 342 601	36 911 428	38 772 562
Year	2021	2022	2023	2024
Number of mobile subscriptions	41 780 199	44 757 505	48 090 232	51 320 813

Source: Ministry of Posts and Telecommunications. <https://www.mpt.gov.dz>

The results of the study also revealed a negative impact of the Covid-19 crisis on motivation and innovation, and this result was in line with the global race indicators, where Algeria ranks 110 th out of 195 countries in the field of innovation (GkI, 2025).

6 Conclusion

In order to understand the impact of the COVID-19 crisis on knowledge economy research, we divided our study into two parts:

The first section used a bibliometric analysis approach to understand the development of knowledge economy research during the COVID-19 pandemic. We relied on scientific articles available on the Scopus database, and after reviewing various statistics, we identified four research areas that researchers in the field of knowledge economy focused on during the COVID-19 crisis : knowledge and innovation, intellectual capital, university and knowledge creation, and e-learning and human capital to support the knowledge economy.

In the second section of the study, we conducted an analytical study on a sample of 106 permanent researchers and professors at the University of Tlemcen (Algeria). The results revealed a strong negative correlation between the COVID-19 crisis and collaboration agreements, a negative correlation between the COVID-19 crisis, human capital and motivation, and creativity, and a negative correlation with technological structure.

Our study opens the way for many scientific studies related to the knowledge economy, specifically :

- Re-examining the knowledge economy and studying it from the perspective of the phenomena that have changed contemporary economy such as global pandemics, technological progress, digital transformation, globalization and modern political and sustainable development agendas.
- Highlighting the role of universities in knowledge creation and promoting the knowledge economy and how businesses can achieve a difficult-to-imitate competitive advantage by forming alliances and partnership agreements with universities.
- Studying the impact of some behaviors such as knowledge hoarding on knowledge management in businesses.

Our study recommends the need to increase attention to the knowledge economy by strengthening its basic pillars, especially human capital, and also recommends the need for universities to open up to their economic and social environment.

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