ORIGINAL RESEARCH ARTICLE

Bibliometric Analysis of The Impact and Collaboration of The Worldwide Scientific Production of Social Network Addiction During the COVID -19 Pandemic

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A B S T R A C T

Background: To analyze bibliometrically the impact, collaboration, and quantity of scientific production on addiction to social networks during the COVID-19 pandemic.

Methods: The publications provided by Scopus were taken to the virtual platform SciVal (Elsevier), then they were taken to the Microsoft Excel program and analyzed by indicators such as published journals, authors, countries, academic production, impact, quartile of the publication by means of tables.

Result: A total of 200 articles were obtained together with their corresponding metadata after the search, where the inclusion and exclusion criteria were applied. It was found that the largest number of 107 articles were published in the year 2021, and most of these were in the Q2 quartile (top 26%-50%). Being their majority published in China, United States and United Kingdom.

Conclusion: The scientific production related to the topic of addiction to social networks and COVID-19 is higher in the country of China, followed by United Kingdom. The highest number of scientific publications was in the year 2021.

Keywords: Bibliometric analysis, COVID-19, Social Network Addiction

Introduction

The pandemic caused by the SARS-COV-2 virus known as COVID-19, was notified in March 2020 by the World Health Organization[1], bringing with it several changes in people's lifestyle. In order to control infection with this virus, certain changes were implemented: use of masks, social distancing, quarantine, among others; mainly affecting the development of social relationships in person.[2] Consequently, the internet and social networks gained greater importance, being within all these, WhatsApp, the social network which authors point out that it is first in eligibility, followed by Facebook and Instagram; these networks facilitate long distance contact at any time.[3] Therefore, it was found that in some cases the use of these social networks could become an addiction, because the human being is a sociable being and has a predilection for human contact, but in a state of estrangement only social networks remain to develop interpersonal relationships having in the end an addictive potential.[4]

It is defined as a misuse or problematic use of the Internet when it affects the daily activities of a person's life, including social networks. Reviewing scientific productions, it is found that 7% of the world population has sufficient characteristics to determine a diagnosis of Internet addiction and it is more frequent in young adults exposed to stressors.[5-8] During the development of the pandemic, the media were taken as an escape from reality and a way to continue interpersonal relationships, sometimes being used as an alternative to manage anxiety and stress. In 2020 a study was conducted in Switzerland which evaluated the pre and post pandemic use in adolescents, finding an increase in the use of social networks, which rose to 40.5% in males and 33% in females above the average value, with 90% of cases being the use of mobile devices.[9] The Spanish newspaper Expansion, refers that "almost 60% of the world's population, 4,660 million people, are Internet users, which is 7.3% more than a year ago. In addition, there are now 4.2 billion users of social networks, which represents a year-on-year growth of more than 13%", which shows the increase in the consumption and use of social networks, with a higher frequency in young adults.[10]

Consequently, it was decided to conduct the following study with the aim of bibliometrically analyzing the impact, collaboration and amount of scientific production of articles on addiction to social networks during the COVID-19 pandemic, because with this type of study it is possible to address an important issue and measure the impact had in the scientific world, and this is achieved by the number of times an article has been cited in other different scientific publications[11,12], thus providing us with a diversity of articles from which we can rescue the institutions that are most interested in a specific topic, the countries with more production, affiliations and authors.

Therefore, the aim of this bibliometric study is to analyze the worldwide scientific production on social network addiction during the COVID-19 pandemic.[13,14]

Methodology

A retrospective and descriptive bibliometric analysis of the articles was performed. On March 1, 2022, a search was carried out in the Scopus server. A total of 200 articles were found, which were reviewed manually to exclude those that were not related to the study. Finally, 5 articles related to COVID-19, but not to social network addiction, were excluded. (Figure 1)

For the article search the key terms used were: "adicción a redes sociales" y "COVID-19", in addition, key terms and synonyms were searched for using Emtree (Embase) and MeSH (PubMed). The following formula was finally created: TITLE-ABS-KEY("Addiction Disorder, Internet" OR "Addiction Disorders, Internet" OR "Disorder, Internet Addiction" OR "Disorders, Internet Addiction" OR "Internet Addiction Disorders" OR "Internet Addiction" OR "Addiction, Internet" OR "Addictions, Internet" OR "Internet Addictions" OR "Social Media Addiction" OR "Addiction, Social Media" OR "Addictions, Social Media" OR "Media Addiction, Social" OR "Media Addictions, Social" OR "Social Media Addictions" OR "Smartphone Addiction" OR "Addiction, Smartphone" OR "Addictions, Smartphone" OR "Smartphone Addictions" OR "Internet Gaming Disorder" OR "Disorder, Internet Gaming" OR "Disorders, Internet Gaming" OR "Gaming Disorder, Internet" OR "Gaming Disorders, Internet" OR "Internet Gaming Disorders" OR "pathological social media use" or "problematic social media use" OR "social media disorder" OR " social network site addiction" OR "Technology Addictions" OR "Mobile Phone Addiction" OR "Addiction, Mobile Phone" OR "Addictions, Mobile Phone" OR "Phone Addiction, Mobile" OR "compulsive internet usage" OR "compulsive internet use" OR "excessive internet usage" OR "internet over-use" OR "online media addiction" OR " problematic internet usage") AND TITLE-ABS-KEY("Covid 19" OR "SARS Coronavirus 2" OR "Coronavirus 2, SARS" OR "Coronavirus Disease 2019 Virus" OR "2019 Novel Coronavirus" OR "2019 Novel Coronaviruses" OR "Coronavirus, 2019 Novel " OR "Novel Coronavirus, 2019" OR "Wuhan Seafood Market Pneumonia Virus" OR "SARS-CoV-2 Virus" OR "SARS CoV 2 Virus" OR "SARS-CoV-2 Viruses" OR "Virus, SARS-CoV-2" OR "2019-nCoV" OR "COVID-19 Virus" OR "COVID 19 Virus" OR "COVID-19 Viruses" OR "Virus, COVID-19" OR "Wuhan Coronavirus" OR "Coronavirus, Wuhan" OR "COVID19 Virus" OR "COVID19 Viruses" OR "Virus, COVID19" OR "Viruses, COVID19" OR "Severe Acute Respiratory Syndrome Coronavirus 2" OR "COVID-19 pandemic" OR "2019 new coronavirus" OR "2019 severe acute respiratory

syndrome coronavirus 2" OR "coronavirus SARS-2" OR "HCoV-19" OR "SARS-2-CoV" OR "SARS2 (virus)" OR "Sever acute respiratory syndrome coronavirus 2" OR "Severe acute respiratory coronavirus 2" OR " Severe acute respiratory syndrome coronavirus 2" OR "Severe acute respiratory syndrome 2 coronavirus").

Inclusion Criteria: Publications that possess the key terms and that these are found in the Scopus database. Publications from different regions/countries that have the key terms. Publications in any language that have the key terms and are in Scopus.

Exclusion Criteria: Publications that do not have the key terms or synonyms found during the search. Articles published after the date of the search. Publications that have not been published during the COVID-19 context.

For data collection, the search strategy was used with the key terms: "addiction to social networks" and "COVID-19", in the same way synonyms were obtained through Emtree (Embase) and MeSH (PubMed) that were added to the search, after which it was taken to the Scival platform (Elsevier). This platform has four different components: overview allows us to have an overview of research performance in terms of output, impact, and collaborations; benchmarking allows us to compare the institution and research teams with others in reference to performance metrics; collaboration allows us to identify and analyze opportunities for existing collaborations and trends allows us to explore new areas and investigate patterns. Thus, providing the following data: institutions, groups, publications, countries, authors, research areas, among others. Finally, this data set is taken to the Microsoft Excel platform for tabulation, where 200 articles were found.

The articles provided by Scopus are taken to the virtual platform SciVal (Elsevier) thus providing bibliometric indicators such as: Source Normalized Impact paper (SNIP) that provides the impact of a citation in a journal in relation to the citation potential in a given area, Field weighted citation impact indicates the number of citations made and the expected total based on the average, H Index that allows measuring the quality of the author based on the number of citations that have had their publications, academic production gives us the total number of publications made by author, journal or institution; SCImago Journal Rank (SJR) gives us the average number of citations according to the source; Cite Score indicates the knowledge of the impact of a scientific journal and citations per author that allows us to know the number of citations that have been made per author. They were then transferred to the Microsoft Excel program.
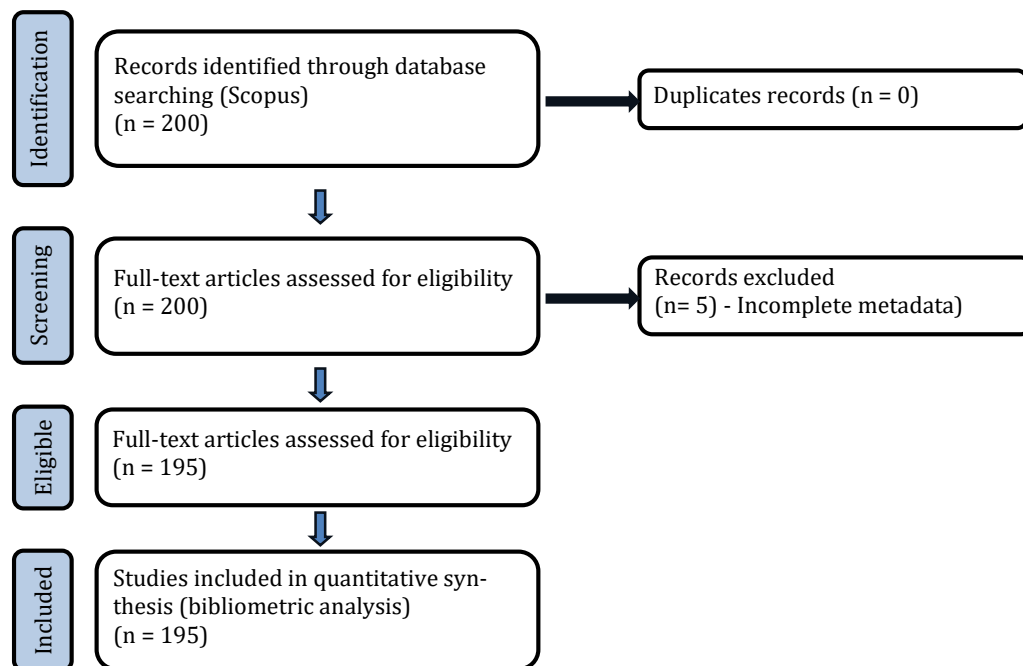
Figure 1: Study Flow diagram

RESULTS

A total of 200 articles were collected during the Scopus search, where the following characteristics were found:

When analyzing the co-occurrence by keyword, four major cultures were found, which were represented by "Coronavirus disease 2019" (purple cluster), "Covid-19" (yellow cluster), "Cross-sectional study" (green cluster) and "Mobile phone addiction" (red cluster). These clusters were the most representative and agglomerated the highest co-occurrence in this topic. (Figure 2)

The top 10 journals with the highest scientific production are listed in Table 1. In first place is the journal Frontiers in Psychiatry with 22 publications (269 citations and 12.2 citations per publication); however, the Journal of Affective Disorders which is in fifth place with 4 journals has a higher number of citations and citations per publication on the topic of addiction to social networks during the COVID-19 pandemic (338 citations and 84.5 citations per publication).
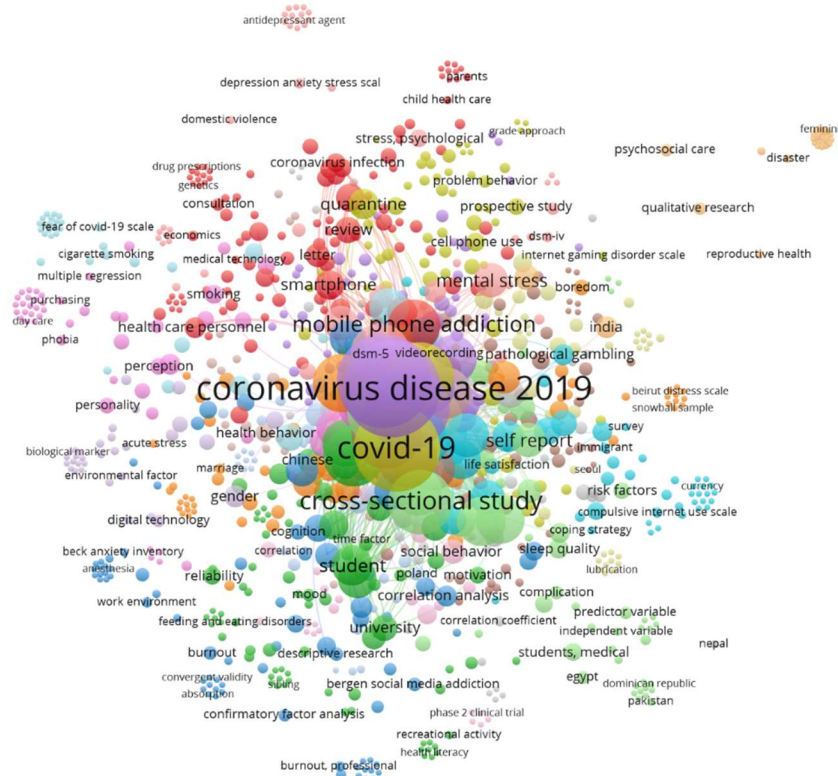

**Figure 2: Co-occurrence by keyword**

Table 1: Top 10 Journal Publications

Scopus	Publications	Citations	Authors	Citation per publication	SNIP	Cite Score 2020	SJR
Frontiers in Psychiatry	22	269	155	12.2	1.2	3.5	1.3
International Journal of Environmental Research and Public Health	21	86	129	4.1	1.3	3.4	0.7
Addictive Behaviors Reports	6	91	27	15.2	1.3	4.1	1.1
Asian Journal of Psychiatry	5	28	11	5.6	1.2	4.7	0.7
Journal of Affective Disorders	4	338	43	84.5	1.7	6.3	1.8
Addictive Behaviors	4	23	16	5.8	1.5	6.4	1.5
Journal of Behavioral Addictions	4	41	20	10.3	2.0	9.8	2.2
Acta Pediatrica, International Journal of Pediatrics	3	24	4	8	0.9	3.7	0.7
American Journal on Addictions	3	155	31	51.7	0.9	4.4	0.9
Journal of Addictive Diseases	3	12	10	4	0.7	1.5	0.4

Note: SNIP: Source Normalized Impact per Paper; SJR: SCImago Journal Rank

Table 2: Top 10 Subjects by Academic Production

Publication by subject area	Scholarly output	Publication share (%)	Field-Weighted Citation Impact	Prominence percentiles
Internet Use; Addiction; Gaming	133	2.4	3.3	99.8
Psychological Support; Mindfulness; COVID-19	47	0.3	6.3	99.9
Pathological Gambling; Sports Betting; Casino	3	0.1	1.6	99.1
Ergonomics; Musculoskeletal Diseases; Computer Workstations	2	0.1	0.8	95.5
Cognitive Behavioral Therapy; Mental Health; PHQ	2	0.0	5.7	99.5
Hypochondriasis; Cognitive Behavioral Therapy; Anxiety	2	0.8	0.3	91.3
Cyberbullying; Crime Victims; Workplace Bullying	1	0.02	0	99.7
Brain Depth Stimulation; Tic Disorders; Chronic Motor Tics	1	0.1	4.0	96.5
Sleep Initiation & Maintenance Disorders; Insomnia; Sleep Hygiene	1	0.05	0	98.9
Automutilation; Suicide Attempt; Harm to Self	1	0.05	0	98.9

PHQ - Patient Health Questionnaire
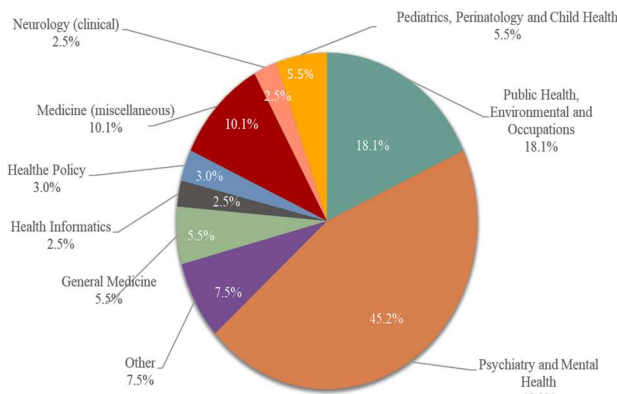
Graph 1: Publications by area
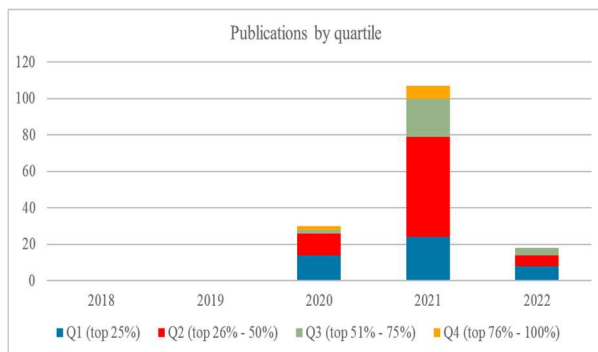
Graph 2 Publications by Quartile

The topic with the highest academic production was "Internet Use; Addiction; Gaming Use" with 133 articles also having the highest percentage of 2.44% (Table 2).

Graph 1 shows the areas with the highest number of publications of articles related to addiction to social networks, the majority being the area of Psychiatry and Mental Health with 45.2%; in second place is Public Health, Environment and Occupations with 18.1% and in smaller proportion with 2.5% both are Clinical Neurology and Health Informatics.

The author with the highest scientific production is Griffiths, Mark D. in the development of articles on addiction to social networks during the COVID-19 pandemic with 11 articles: being the most cited author with 462 citations and 42 citations per publication, as well as the author with the highest impact (Table 3).

Table 4 shows the top ten universities with the highest scientific production in social network addiction during the COVID-19 pandemic. Hong Kong Polytechnic University (Hong Kong /China) and Nottingham Trent University (United Kingdom) are institutions with the highest scientific production; the former having 208 citations and 18.9 citations per publication, and the latter having 462 citations and 42 citations per publication. The third place is occupied by National Cheng Kung University (Taiwan) with 130 citations and 16.3 citations per publication.

Table 3: Top 10 most academically productive authors

Name	Academic Production	Most recent publications	Citations	Citations by Publication	Field-Weighted Citation Impact	H-index
Griffiths, Mark D.	11	2022	462	42	11.0	97
Lin, Chung-Ying	9	2022	206	22.9	6.9	35
Pakpour, Amir Haji Agha	7	2022	186	26.6	6.7	35
Chen, Chaoying	5	2021	92	18.4	7.1	11
Chen, I. Hua	5	2021	92	18.4	7.1	12
Meng, Shiqiu	4	2022	158	39.5	10.1	15
Sun, Yan	4	2022	158	39.5	10.1	11
Bao, Yanping	4	2022	158	39.5	10.1	35
Shi, Jie	4	2022	158	39.5	10.1	29
Ahorsu, Daniel Kwasi	4	2022	39	9.8	4.1	9

Table 4: Top 10 Institutions/Universities

Institution	Country/ Region	Scholarly Output	Citation	Authors	Citation per publication	Field-Weighted Citation Impact
Hong Kong Polytechnic University	China	11	208	8	18.9	5.8
Nottingham Trent University	United Kingdom	11	462	2	42	11.0
National Cheng Kung University	Taiwan	8	130	2	16.3	6.4
Peking University	China	7	171	35	24.4	7.1
Jönköping University	Sweden	7	186	2	26.6	6.7
University of Rome La Sapienza	Italy	6	229	13	38.2	10.9
Monash University	Australia	5	38	16	7.6	5.7
Jahangirnagar University	Bangladesh	5	45	12	9	3.8
Qazvin University of Medical Sciences	Iran	5	115	5	23	5.5
China Medical University	China	4	243	18	60.8	13.5

Table 5: Type of collaboration

Metric	%	Scholarly Output	Citation	Citations by Publication	Field-Weighted Citation Impact
Internacional collaboration	32.3	51	1009	19.8	6.8
National collaboration	36.1	57	725	12.7	4.0
Institutional Collaboration only	26.0	41	169	4.1	2.9
Sole authorship (no collaboration)	5.7	9	40	4.4	1.7

In Table 5 it was found that the majority being 57 (36.1%) of the articles had only National collaboration, with 725 citations and 12.7 citations per publication; followed by international collaboration of 51 articles (32.3%), Institutional collaboration with 41 articles (26%) and finally finding Single authorship without collaboration with only 9 articles (5.7%) on all the scientific production of the addiction to social networks in COVID-19 pandemic.

Figure 2 shows the quartile by journal where the articles on social network addiction were published during the pandemic by COVID-19, this being an indicator that positions a journal within the total number of journals in its area, according to the relative importance of each one. Most articles are found within the Q2 quartile (top 26%-50%) with 73, then in Q1 (top 25%) with 46 articles, Q3 (top 51-75%) with 27 articles and finally Q4 (top 76-100%) with 9 articles overall. It is also observed that the highest academic production was during the year 2021 with 107 publications, most of them within the Q2 quartile.

DISCUSSION

Since social networks have become an increasingly vital and indispensable resource for establishing social relationships, during the pandemic, an increase in their use has been observed, in some cases reaching the point of addiction.[15] Therefore, it was decided to develop this study in order to know and analyze the academic production on this topic, allowing us to know the number of publications and the relevance it occupies in the scientific literature.

This study allowed us to perform a quantitative analysis of the research activity on the topic of social network addiction during the pandemic. Although the total number of articles used was not a large number due to the fact that it is a new topic, it allowed us to know certain characteristics that helped us during the analysis, an example of this: in the year 2020 with 30 publications, few due to the novelty of the topic; with the passage of time they were increasing being the highest number of publications in the year 2021 with 107 publications, moment in which the research on mental health and COVID-19 increased; and finally 18 publications during the year 2022, although the analysis is performed since the year 2018 no previous study was found since these started after the development of the pandemic by COVID-19. As can be seen there was a rapid increase in the number of articles published in recent years, a study on the increase in scientific production on COVID-19 emphasizes that the rapid increase in research was given by the little knowledge about the disease and the need to know more about the subject; as well as the need to know the effects that it is leaving by causing significant changes in the lifestyle of people.[16]

It was found that the countries with the highest number of publications are countries with higher development and income, with China at the top, followed by the United States and the United Kingdom, which have the highest rate of academic production. In this study, China is in first place with 32 articles, the United States with 25 articles and the United Kingdom with 22 articles. Likewise, the most addressed topics were Internet use, addiction, and gambling, these being among the first research topics in the early stages of the COVID-19 pandemic. In China, as pointed out by studies conducted in Taiwan, a 24.4% prevalence of internet addiction was found in a sample of high school students in that locality; this was compared with preliminary studies of high schools in other countries such as Japan, Greece, United States, among others; finding an increase in the prevalence of internet addiction that was associated with the outbreak of COVID-19. In the general population of China, an increase in the prevalence of internet addiction was also found during the pandemic, with 36.7%, compared to previous studies where they showed a prevalence of internet addiction from 8.1% to 31%..[17,18] This study shows that China continues to be one of the countries that contributes the most scientific publications on COVID-19, and this may well be attributable to the high prevalence of this virus in that country during the first outbreak, where research was carried out even in the area of mental health, finding Internet addiction to be the most frequent topic.[19]

We can also evaluate that the area that carried out the greatest number of investigations was Psychiatry and Mental Health followed by Public Health. In a bibliometric study conducted in 2021, a similar result was found, with Psychiatry being in the lead, having a significant difference in terms of publications.[20]

A total of 200 articles were found during the search. These publications complied with the inclusion of the search terms with which the corresponding bibliometric analysis was performed. In addition, it was decided to perform a manual review of the 200 articles as they were not a large number to determine if they were related to the topic of addiction to social

networks in pandemic by COVID-19, where it was found that 5 of these articles did not meet our inclusion criteria even though they did contain the keywords.

LIMITATIONS

The following study had certain limitations. Being the following, since only the articles within the Scopus database were evaluated, it was possible to omit the retrieval of articles that were in another database or that were not attached, also the search could not have all the synonyms of the key terms that could limit the number of articles, the search can be refined or improved if more synonyms are added and finally if new studies were added recently, they will not be part of the data of the study. Nevertheless, we found that the data provided by this research allow us to see more broadly the panorama of social network addictions during the pandemic and to know the increase in scientific production on this topic.

CONCLUSION

It was concluded that the publication of articles in relation to addiction to social networks during the pandemic by COVID-19 started from the year 2021 being this the year with the highest number of publications, increasing in the number of research in Psychiatry and Mental Health. In addition, the author with the highest scientific production is from the United Kingdom, while the country with the highest production is China.

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