# Tracing Economic Shocks: A Bibliometric Analysis of Historical Pandemics and Their Impact

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**KEYWORDS**

**ABSTRACT**
The economic impact of historical pandemics encompasses significant disruptions to productivity, trade, labor markets, and wealth distribution, resulting in long-term transformations in economic structures and societal resilience. This bibliometric analysis, conducted using Biblioshiny and VOSviewer software with data from the Scopus database, examines research from 1991 to 2023. The analysis highlights an increasing trend in annual scientific production, with a notable surge following the COVID-19 pandemic. Prominent authors and sources, such as PLOS ONE, play a central role in disseminating key findings. Countries like the United States, United Kingdom, and China dominate scientific output and collaborations, emphasizing their leadership in pandemic research. Keyword trends reveal a shift towards contemporary issues like "COVID-19," "health economics," and "pandemics," reflecting the field's responsiveness to global challenges. The thematic map categorizes research into motor, basic, niche, and emerging themes, showcasing the interdisciplinary scope of this field. Co-occurrence analysis identifies clusters of socio-economic, health, and historical themes, highlighting their interconnected nature. Citation analysis underscores the influence of recent works addressing the COVID-19 pandemic's global impact. Furthermore, international collaborations have intensified, signifying the global commitment to understanding and mitigating pandemics' economic consequences. This analysis offers critical insights into the evolving landscape of pandemic research and its implications for future policy and interdisciplinary studies.

## 1. Introduction

Pandemics have been a recurring phenomenon in human history, shaping societies and economies in profound ways(Goksoy et al., 2023). From the Black Death in the 14th century to the Spanish Flu of 1918, pandemics have disrupted economies, altered trade patterns, and redefined labor markets(Sapelli, 2023). The economic impact of such crises often extends beyond immediate health concerns, influencing the structure and function of economies for decades(Geloso et al., 2022). Analyzing these historical pandemics provides valuable insights into the interplay between disease and economic stability, offering lessons for contemporary societies grappling with similar challenges(Neshige et al., 2021).

The immediate economic effects of pandemics are often characterized by a sharp contraction in productivity and commerce(Zhuang, 2020). During the Black Death, for instance, Europe witnessed a significant reduction in its workforce, as nearly one-third of the population succumbed to the plague(Álvarez-Nogal et al., 2020; Jedwab et al., 2022). This labor scarcity drove up wages for surviving workers, disrupted agricultural production, and created a shift in economic power dynamics(Sakhbieva et al., 2021). Similarly, during the Spanish Flu, industries experienced large-scale absenteeism, resulting in decreased industrial output and supply chain disruptions(SU, 2021).

Long-term impacts of pandemics are equally significant, influencing economic policies and societal structures(Galiani, 2022). Historical pandemics have often led to shifts in wealth distribution, as decreased population levels increased per capita resource availability for survivors(Geloso et al., 2022). For example, the post-Black Death economy in Europe saw the decline of feudalism and the rise of wage-based economies, reshaping the economic landscape. These pandemics also spurred innovation in public health systems and labor practices, driven by the need to mitigate the effects of future outbreaks(Caldwell et al., 2015).

Pandemics have also played a role in redefining global trade and commerce(De Marco et al., 2021). The plague of Justinian in the Byzantine Empire weakened trade networks across the Mediterranean, leading to economic fragmentation and regional self-sufficiency. Similarly, the Spanish Flu disrupted global trade routes and commerce, further exacerbating the economic downturn associated with World War I(Karlsson et al., 2014). These disruptions highlight the vulnerability of interconnected

economies to widespread health crises and the importance of adaptive trade and supply chain strategies(Qobo et al., 2022).

Finally, the economic impact of pandemics extends to government policies and societal resilience(Al-Thaqeb et al., 2022). Historically, governments have responded to pandemics by investing in healthcare infrastructure and implementing economic stimulus measures to support recovery. The Spanish Flu saw governments across the globe introduce public health initiatives and welfare programs to address both health and economic needs(Schwartz, 2018). These efforts underscore the crucial role of policy interventions in mitigating the long-term economic consequences of pandemics(Grishin et al., 2020).

By studying the economic impacts of historical pandemics, policymakers and economists can better understand the resilience and vulnerabilities of modern economies. Historical precedents reveal patterns of economic disruption and recovery, highlighting the importance of preparedness and adaptability(Mehmood, 2021). The lessons gleaned from these events can guide societies in navigating the economic challenges posed by future pandemics, ensuring sustainable development and stability in the face of global health crises(Jordà et al., 2022).

The economic consequences of pandemics have been a focal point of scholarly inquiry, reflecting their far-reaching impacts on societies and economies(Davies, 2020). A bibliometric analysis provides a systematic and quantitative approach to understanding how this field of research has evolved, identifying key trends, influential studies, and gaps in knowledge(Anish et al., 2024; Bales et al., 2020; Bota-Avram, 2023). By analyzing publications, citations, and research patterns, this method sheds light on the interdisciplinary nature of studies addressing the economic ramifications of pandemics, ranging from historical case studies to contemporary economic modeling.

Pandemics have historically disrupted societies, economies, and global systems, creating profound and lasting impacts on productivity, labor markets, trade, and wealth distribution. Understanding the economic ramifications of these crises provides crucial insights for policymakers, researchers, and stakeholders aiming to mitigate future shocks. Bibliometric analysis offers a systematic approach to examining the evolution of research in this field, uncovering trends, key contributors, and collaborative networks(Donthu et al., 2021; Herrera-Viedma et al., 2020). By analyzing large datasets of academic publications, this method highlights the intellectual structure of the topic and identifies emerging areas of inquiry(Cobo et al., 2015).

This study utilizes Biblioshiny and VOSviewer, two powerful bibliometric tools, to analyze data from the Scopus database on the economic impacts of historical pandemics(Husain & Mustafa, 2023; D. Kumar et al., 2023). Biblioshiny provides descriptive and analytical visualizations, allowing researchers to explore metrics such as keyword co-occurrence, author productivity, and journal impact (Fahamsyah et al., 2023; Guleria & Kaur, 2021; Thangavel & Chandra, 2023; Waghmare, 2021). VOSviewer complements this by creating detailed network maps that visualize connections between authors, institutions, and research topics(Abbas et al., 2021; R. Kumar et al., 2024; Kuzior & Sira, 2022; Van Eck & Waltman, 2010). These tools collectively enhance understanding of the evolution of digital history as an academic discipline, emphasizing key works, emerging themes, and identifying literature gaps that require further investigation (Guofang et al., 2024; D. Kumar et al., 2023).Spanning research from 1991 to 2023, the analysis examines annual scientific production, influential authors and sources, thematic trends, keyword co-occurrences, citation patterns, and international collaborations. The findings not only provide an overview of the current state of research but also identify critical gaps and opportunities for interdisciplinary collaboration. Through this comprehensive approach, the study aims to enhance understanding of the economic dimensions of pandemics and inform future research and policy development in this globally significant area.

## 2. Materials and Methods

Scopus was chosen as the primary source of bibliographic data because of its extensive coverage of high-quality journals, offering a broader range of materials than other databases. (Baas et al., 2020; Gavel & Iselid, 2008; Harzing & Alakangas, 2016). We conducted a search using specific keywords such as “Economics”, “History”, and “Pandemics”. The search was conducted without limiting it to any specific language, and the data encompassed articles from peer-reviewed journals, book chapters,

and conference papers. We collected a total of 168 articles from 149 different sources, covering the period from 1991 to 2023. The results were saved as a CSV file, and we performed a bibliometric analysis of the data using VOSviewer version 1.6.19 and Bibloshiny software.

## 3. Results and Findings

### 3.1. Main aspects of investigation

The bibliometric analysis of research on the economic impact of historical pandemics (1991–2023) demonstrates a growing academic interest, reflected in an annual growth rate of 9.05% and 168 documents sourced from 149 journals, books, and other outlets. With an average document age of 4.83 years and 35.33 citations per document, the research is contemporary and impactful. A total of 6,909 references and 1,876 Keywords Plus indicate comprehensive and diverse thematic coverage, supported by 565 specific keywords from authors. Collaboration is a defining feature, with 683 authors contributing, an average of 4.1 co-authors per document, and 23.21% involving international co-authorships, while single-authored works remain limited to 45. The majority of contributions are journal articles (133), supplemented by conference papers (24) and book chapters (11), showcasing diverse dissemination methods for this globally relevant topic.

*Table 1. Main aspects of investigation*

| Description | Results |
|---|---|
| MAIN INFORMATION ABOUT DATA | |
| Timespan | 1991:2023 |
| Sources (Journals, Books, etc) | 149 |
| Documents | 168 |
| Annual Growth Rate % | 9.05 |
| Document Average Age | 4.83 |
| Average citations per doc | 35.33 |
| References | 6909 |
| DOCUMENT CONTENTS | |
| Keywords Plus (ID) | 1876 |
| Author's Keywords (DE) | 565 |
| AUTHORS | |
| Authors | 683 |
| Authors of single-authored docs | 45 |
| AUTHORS COLLABORATION | |
| Single-authored docs | 45 |
| Co-Authors per Doc | 4.1 |
| International co-authorships % | 23.21 |
| DOCUMENT TYPES | |
| article | 133 |
| book chapter | 11 |
| conference paper | 24 |

### 3.2. Annual Scientific Productions

Figure 1 shows the annual scientific production, illustrating a fluctuating but increasing trend over time, with significant growth in recent years. Early years, such as 1991 and 1992, had minimal contributions, with only one article each. From 1993 to 1998, no publications were recorded, indicating a lack of focus during that period. Sporadic contributions occurred from 1999 to 2019, with occasional peaks, such as 5 articles in 2014 and 4 articles in 2016, but the numbers remained relatively low overall. However, there was a dramatic surge in publications starting in 2020, likely driven by the COVID-19 pandemic, with 34 articles in 2020, peaking at 53 in 2021, followed by 32 in

2022 and 16 in 2023. This sharp increase highlights the global interest in understanding pandemics' economic impact, reflecting the relevance of contemporary events in shaping scientific inquiry.

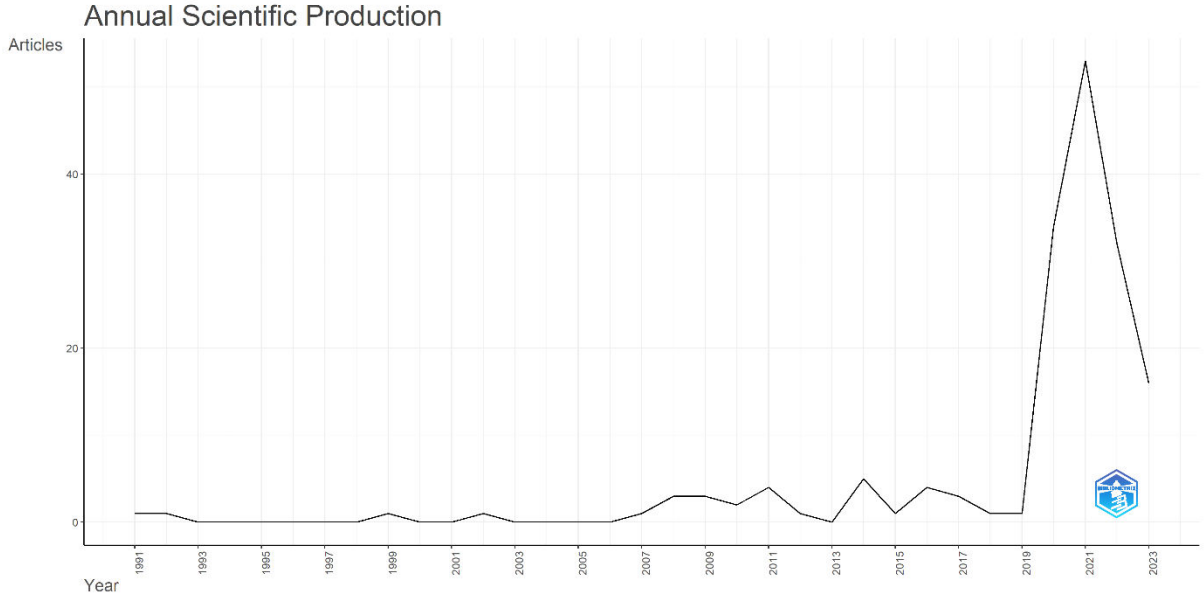


*Figure 1. Annual scientific productions*

### 3.3. Most Relevant Authors

Table 2, showcasing the most relevant authors in the field of research on the economic impact of historical pandemics, reveals that a small number of authors have contributed multiple articles. AKILLI, ERMAN; GUNES, BURAK; JIT, MARK; MARTINI, MARIANO; and TAUSCH, ARNO each have contributed 2 articles, indicating a significant engagement with this topic. The remaining authors, such as AARANAN, P.; ABDUL RAHMAN, LUQMAN HAKIM; and others, have each contributed 1 article, reflecting broader but less frequent participation in this area. This distribution suggests that while a few authors are deeply focused on the topic, the field also benefits from a diverse set of contributors.

*Table 2. Most relevant authors*

| Authors | Articles |
|---|---|
| AKILLI, ERMAN | 2 |
| GUNES, BURAK | 2 |
| JIT, MARK | 2 |
| MARTINI, MARIANO | 2 |
| TAUSCH, ARNO | 2 |
| AARANAN, P. | 1 |
| ABDUL RAHMAN, LUQMAN HAKIM | 1 |
| ABOUD, N. | 1 |
| ABRAMO, GIOVANNI | 1 |
| ADEDOYIN, FESTUS FATAI | 1 |

### 3.4. Most relevant sources

Figure 2 highlights the most relevant sources contributing to research on the economic impact of historical pandemics. PLOS ONE is the leading source with 9 articles, showcasing its prominence in disseminating research in this area. BMJ OPEN follows with 3 articles, indicating its relevance to the topic, likely due to its focus on public health and medical research. Several other sources, including ACM International Conference Proceeding Series, BMC Infectious Diseases, Clinical Infectious Diseases, and Nature, have each contributed 2 articles, demonstrating a diverse range of disciplines involved, from medicine and public health to environmental and computer sciences. This distribution

reflects an interdisciplinary approach, with contributions spanning general science journals, conference proceedings, and specialized medical and environmental research publications.

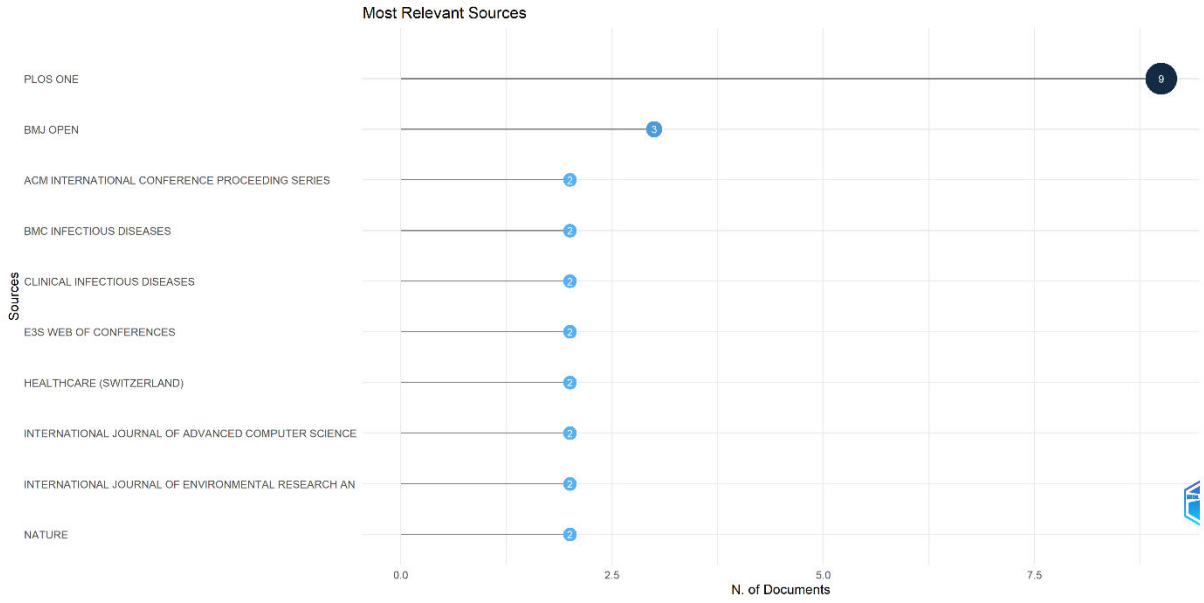


*Figure 2. Most relevant sources*

### 3.5. Country Scientific Production

Figure 3 illustrates the global distribution of research contributions on the economic impact of historical pandemics. The United States is the leading contributor, indicated by the darkest shading, suggesting a high volume of publications. Several European countries, such as the United Kingdom, Germany, and France, also show substantial contributions, as well as some countries in Asia like China and India. The map further highlights that research on this topic is not uniformly distributed, with fewer contributions from Africa, the Middle East, and parts of South America. Overall, the visualization underscores the dominance of North America and Europe in scientific research, with notable contributions from selected countries in other regions, reflecting an uneven global engagement with this topic.

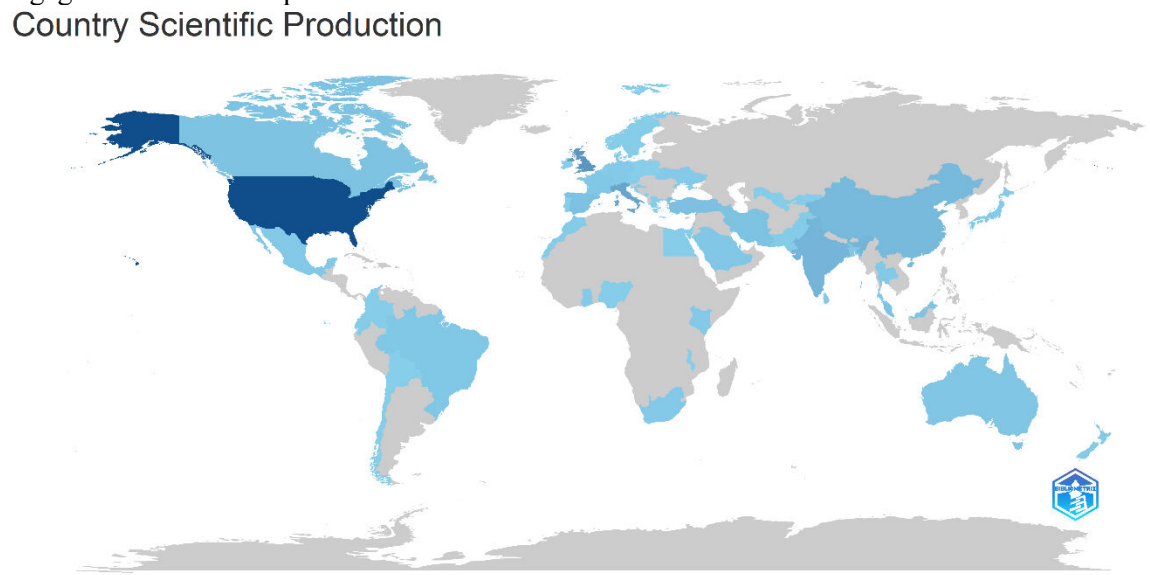


*Figure 3. Country scientific production*

### 3.6. Trend Topics

Figure 4 displays the trending topics over time in research related to the economic impact of historical pandemics, with term frequencies represented by the size of the dots. Early research, from the 1990s to the mid-2000s, focused on broad terms like "health," "economic factors," and "viral diseases," reflecting foundational work in understanding the intersection of health and economic implications. From 2010 onwards, more specific themes, such as "health economics," "cost-benefit analysis," and "mental health," began to emerge, signaling a deeper exploration of economic and social dimensions. Notably, after 2020, terms like "COVID-19," "pandemic," and "decision making" dominate, illustrating the significant impact of the recent pandemic on research trends. The rise of terms like "policy," "education," and "history" highlights a multidimensional approach, integrating economics, governance, and historical analysis. The visualization underscores the evolution of research focus, with a sharp increase in specificity and relevance to contemporary global challenges in recent years.

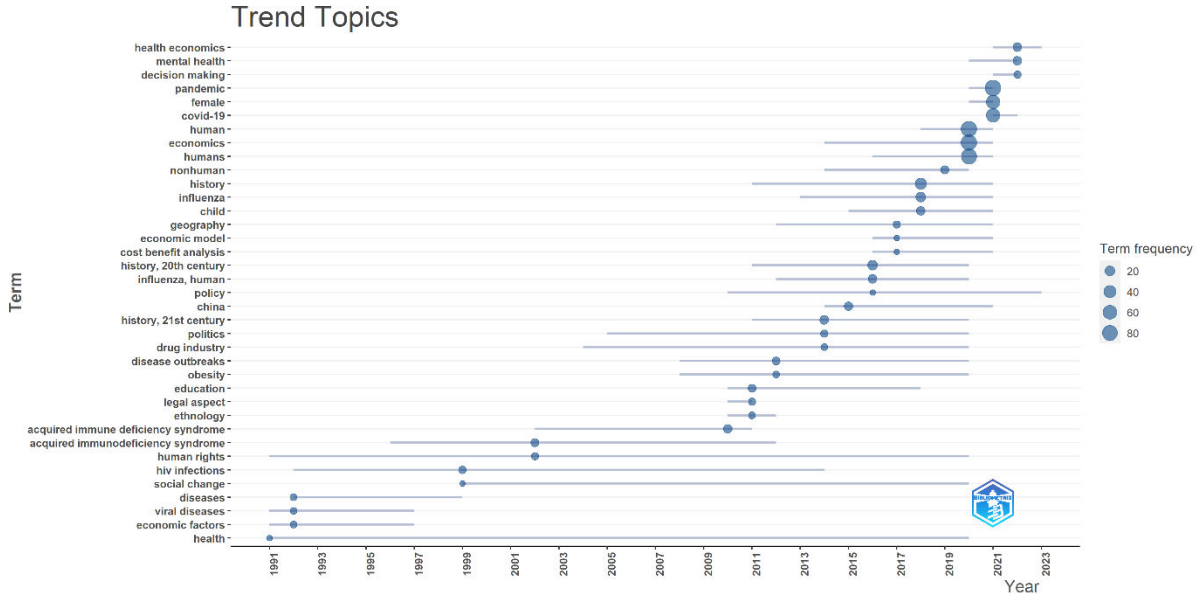


*Figure 4. Trending topics in the realm of research*

### 3.7. Thematic Map

Figure 5 visualizes the thematic map that categorizes topics related to the economic impact of historical pandemics based on their centrality (relevance to the overall field) and density (level of development). In the Motor Themes quadrant, topics such as "COVID-19 pandemic," "pandemic," and "health economics" are highly relevant and well-developed, making them central to current research. These themes drive the field forward, reflecting their importance in understanding the economic implications of pandemics and the role of health systems in mitigating their effects. Their prominence indicates a direct response to the recent COVID-19 crisis, highlighting the field's timely focus on contemporary issues. In contrast, the Basic Themes quadrant features topics like "economics," "education," "China," "sustainability," and "influenza," which are fundamental to the research field but have not yet been deeply explored. These provide a strong foundation for understanding broader economic impacts and policy implications. The Niche Themes quadrant includes specialized but less connected areas such as "art," "cultural heritage," and "environment," which, while developed, represent peripheral interests. Lastly, the Emerging or Declining Themes quadrant, featuring "artificial intelligence," "machine learning," and "smart cities," suggests these topics are either new and gaining traction or declining in relevance within this context. This classification underscores the field's responsiveness to contemporary challenges while identifying areas for future interdisciplinary exploration, such as integrating technology and sustainability into pandemic studies.

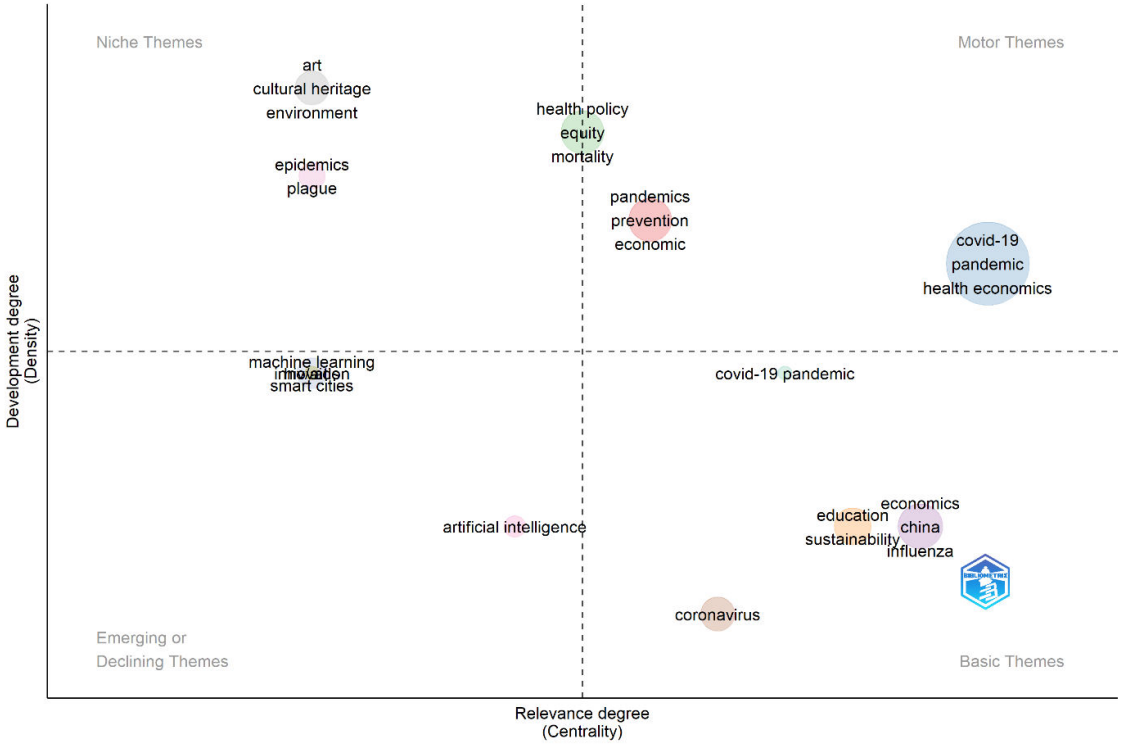


*Figure 5. Thematic visualisation of author keywords*

### 3.8. Citation of Documents

Figure 6 visualizes citations for documents with a minimum citation threshold of 2, highlighting the most influential works in the field. Out of the 168 documents analyzed, 118 met this criterion, indicating that a significant portion of the research has garnered notable attention. The size of each node represents the number of citations, with larger nodes signifying higher influence. The most prominent nodes include works by authors such as Chakraborty (2020) and Goldstein (2020), reflecting their significant contribution to the discourse on the economic impacts of historical pandemics. The color gradient, ranging from purple (older citations) to yellow (recently cited works), indicates the temporal evolution of citation activity. This pattern reveals that research from 2020 onwards, particularly during the COVID-19 pandemic, has gained substantial attention, underscoring its relevance in contemporary discussions. Additionally, clusters of nodes suggest thematic or topical interconnections among cited works, demonstrating the collaborative and cumulative nature of the field.

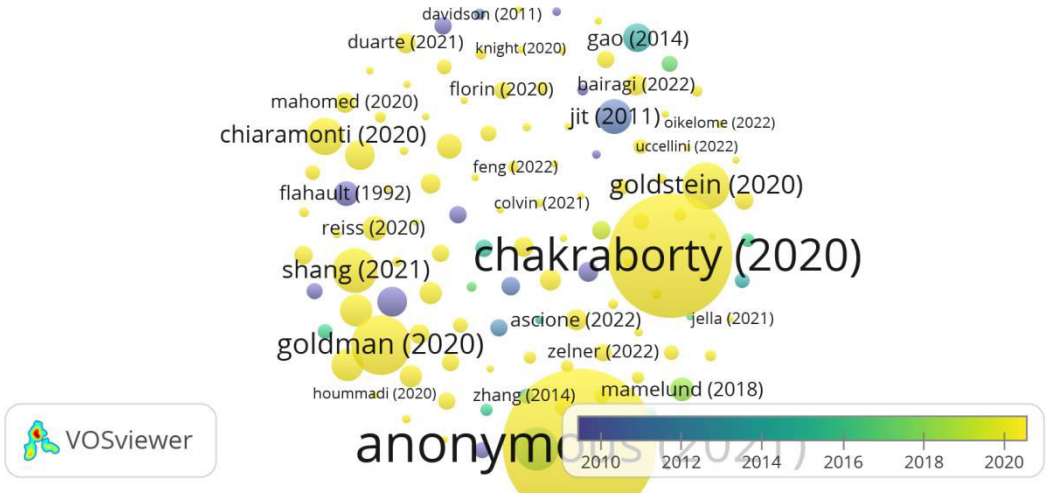


*Figure 6. Citation of documents*

### 3.9. Co-occurrence of keywords

Figure 7 illustrates the co-occurrence network of keywords in research on the economic impact of historical pandemics, revealing four distinct clusters, each representing thematic groupings based on keyword frequency and interconnections. With a minimum occurrence threshold of 5, 149 out of 2,273 keywords formed the network. Cluster 1 (Red, 56 keywords) focuses on socio-economic and historical dimensions, with terms like "economics," "history," "education," "sustainable development," and "industrial economics." This cluster highlights the broader institutional and societal impacts of pandemics, emphasizing the role of international cooperation and organizational responses. Cluster 2 (Green, 45 keywords) centers on health demographics and psychological impacts, with keywords such as "female," "male," "adult," "depression," and "cohort analysis," reflecting studies on the health and mental well-being of different population groups during pandemics.

Cluster 3 (Blue, 36 keywords) is centered on pandemics' direct health and economic implications, dominated by keywords like "COVID-19," "coronavirus disease 2019," "vaccination," and "health economics." This cluster underscores the significant research focus on COVID-19 and its global impact. Cluster 4 (Yellow, 12 keywords) is the smallest and addresses specific technical and medical themes, including "coronavirus infections," "medical history," and "isolation and purification." The strong interconnections across clusters demonstrate the interdisciplinary nature of pandemic research, where economic, demographic, historical, and healthcare themes are interwoven. The prominence of COVID-19-related keywords further highlights the recent surge in research interest, driven by its global significance and economic repercussions.

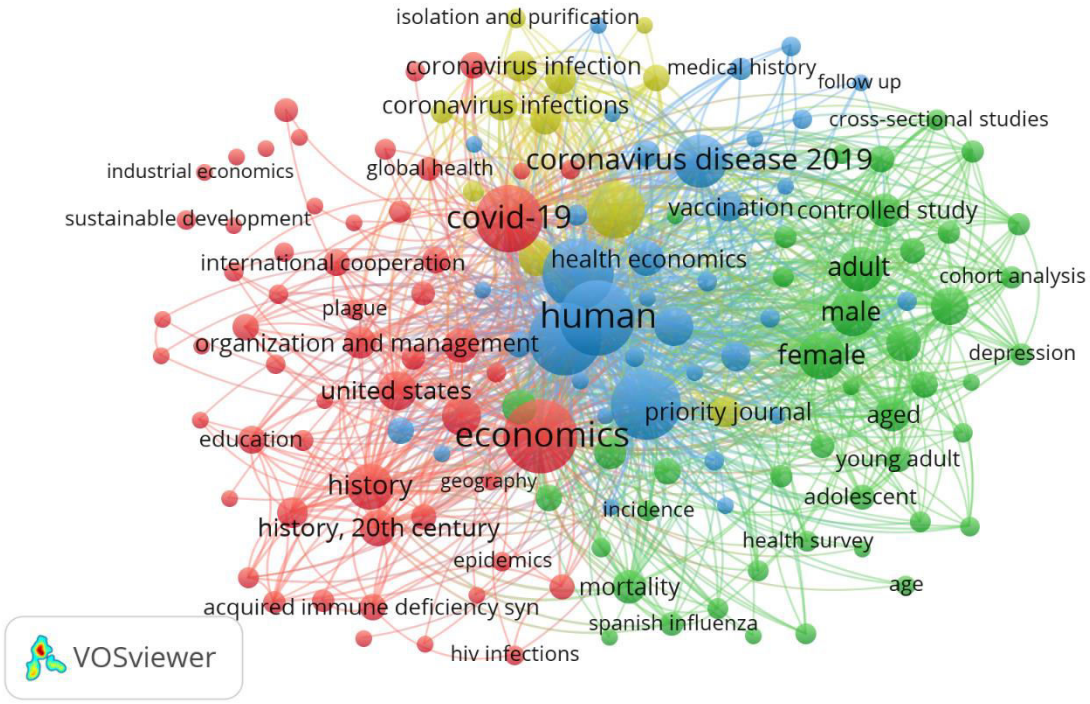


*Figure 7. Co-occurrence of all keywords*

### 3.10. Countries Collaborations

Figure 8 illustrates the international collaboration network for research on the economic impact of historical pandemics, focusing on countries with at least two published documents. Out of 61 countries analyzed, 31 met this criterion, creating a network that highlights key collaborative relationships. The size of each node represents the number of documents from that country, while the links between nodes indicate collaborative research efforts. The color gradient displays the timing of these collaborations, with yellow nodes representing recent contributions (post-2020) and blue nodes denoting earlier collaborations (2016).

The United States has emerged as the central hub for collaborations, partnering with countries such as the United Kingdom, China, India, Canada, and Italy. The United Kingdom also serves as a significant secondary hub, collaborating extensively with India, Pakistan, and Saudi Arabia. There are notable regional collaborations among European countries, such as Italy, Belgium, Spain, and Switzerland, as well as among Latin American nations like Brazil and Mexico. This network highlights the global and interdisciplinary nature of pandemic research, as countries pool their expertise to address economic impacts. Additionally, the visualization emphasizes how the COVID-19 pandemic has intensified these collaborations, evidenced by a recent surge in partnerships among key nations.

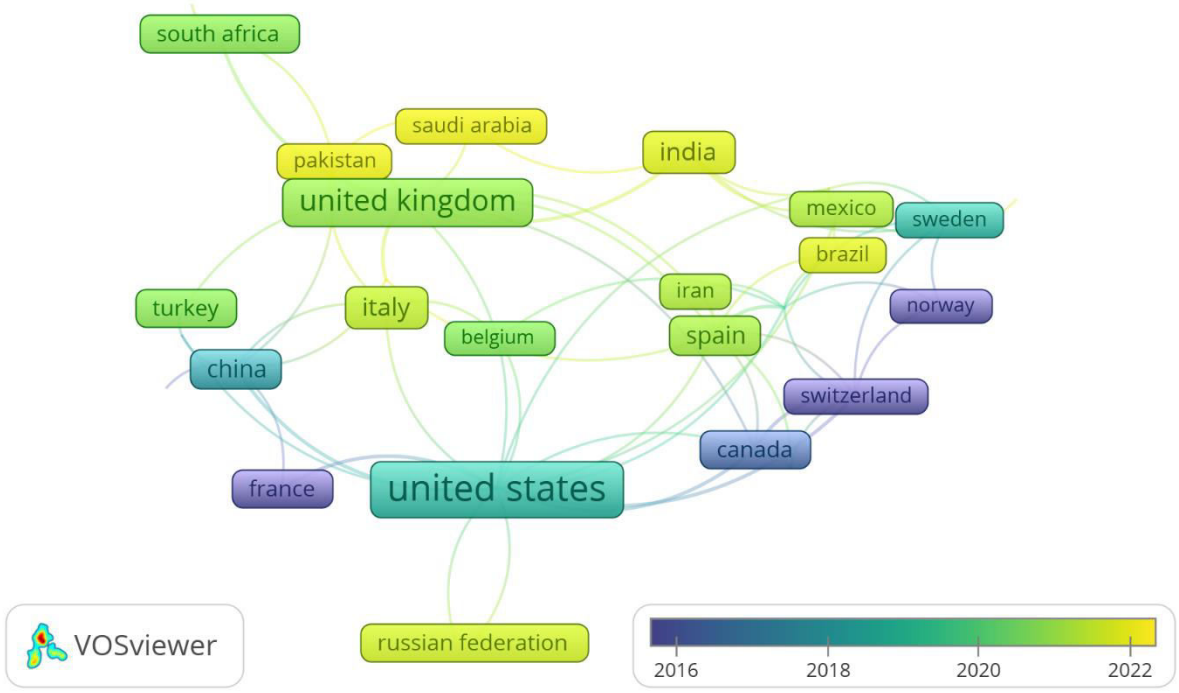


*Figure 8. Countries collaborations*

## 4. Discussions

The bibliometric analysis of the economic impact of historical pandemics reveals several key findings. The increasing academic interest in this field is evident, with a 9.05% annual growth rate in publications, significantly driven by the COVID-19 pandemic, which caused a surge in research from 2020 onward. The majority of documents are journal articles, supported by a strong citation network, indicating the impactful nature of the research. The co-authorship patterns reveal a high level of collaboration, with 23.21% of papers featuring international contributions, reflecting the global relevance of the subject. Furthermore, keyword analysis identified "COVID-19," "health economics," and "pandemic" as central themes, underscoring the contemporary focus on health policy and economic resilience.

The thematic analysis highlights the diversity of topics, ranging from foundational areas such as economic and historical studies to specialized niches like cultural heritage and emerging technologies like artificial intelligence. Additionally, country collaboration data underscores the United States as the central hub for research partnerships, with strong ties to the United Kingdom, China, and India, among others. The trend in collaborative efforts and the emergence of multidisciplinary research clusters point to the necessity of global and interdisciplinary approaches to understand and mitigate the economic effects of pandemics. These findings not only map the intellectual landscape of pandemic economics but also identify research gaps, suggesting a need for more comparative studies and integrated policy-focused research.

## 5. Conclusion

The bibliometric analysis of the economic impact of historical pandemics reveals a growing body of research driven by global health crises, particularly the COVID-19 pandemic. The findings underscore the interdisciplinary nature of the field, integrating socio-economic, health, and historical dimensions while highlighting key contributions from leading authors, journals, and countries. The analysis also demonstrates the significance of international collaborations in advancing understanding and formulating responses to pandemic-induced economic disruptions. Despite notable advancements, there remain gaps in comparative studies across pandemics and insufficient exploration of policy interventions.To address these gaps, it is recommended that future research prioritize cross-comparative analyses of pandemics to identify consistent patterns and lessons applicable to current and future crises. Additionally, researchers should focus on integrating technological innovations, such as artificial intelligence and machine learning, to model and predict economic impacts more effectively. Finally, policymakers and researchers are encouraged to collaborate on interdisciplinary studies that bridge health, economics, and public policy to design resilient economic frameworks capable of mitigating future pandemic shocks. These steps will enhance the preparedness and adaptability of global economies in the face of future health emergencies.

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