

Batmunkh, Altanshagai; Fekete-Farkas, Maria; Lakner, Zoltán

**Article**

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Article

# Bibliometric Analysis of Gig Economy

Altanshagai Batmunkh <sup>1,\*</sup>, Maria Fekete-Farkas <sup>2</sup> and Zoltan Lakner <sup>2</sup>

<sup>1</sup> Doctoral School of Economic and Regional Sciences, Hungarian University of Agriculture and Life Sciences (MATE), 2100 Gödöllő, Hungary

<sup>2</sup> Institute of Economic Sciences, Hungarian University of Agriculture and Life Sciences (MATE), 2100 Gödöllő, Hungary; farkasne.fekete.maria@uni-mate.hu (M.F.-F.); lakner.zoltan.karoly@uni-mate.hu (Z.L.)

\* Correspondence: batmunkh.altanshagai@phd.uni-mate.hu

**Abstract:** Technological advances such as smartphones, mobile applications, and online platforms have enabled a new form of economy, known as a gig economy, at a large scale, in which there is a free-market system allowing organizations (job providers) to hire independent contractors (job seeker). Unlike traditional employer and employee relationships, the gig economy creates opportunities for independent workers to seek short-term contract jobs and temporary positions. This article presents a systematic review of the literature associated with a bibliometric analysis of the global perspective of the gig economy. The study aims to present the analysis of published articles that explore the gig economy. Initially, 2297 documents were retrieved by gig economy as a keyword from Google Scholar, Scopus, and Web of Science between 2014 and 2022. After applying certain criteria, only 686 publications were selected for bibliometrics analysis. The selected articles were used to measure bibliometric indicators and evaluate the research work on the gig economy. Bibliometrics an R package for bibliometric and co-citation analysis was used to achieve the results. VOSviewer was also used to analyze the co-occurrence of the keywords. The results highlight the publication trends, top contributing authors and their countries, most cited articles, keywords, and most contributing journals to the research field.

**Keywords:** circular economy; platform economy; sharing economy; gig work; digital economy



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## 1. Introduction

As everything is moving to digital, any services or products can be delivered online or in hybrid ways such as news, banking, medical services, education, trade, etc. (Osburg 2017). More importantly, the technological advances (information and communication technology (ICT)) and the internet ushered in new forms of the economy such as “access economy”, “platform economy”, “sharing economy”, also “gig economy” (Scuotto et al. 2021). The gig economy is rapidly growing among all these new trends of the platform economy. However, the precise universal definition of the “gig economy” is still two-sided, and much remains unknown. The term “gig economy” is only a decade old. In particular, Airbnb, Uber, Lyft, TaskRabbit, and Upwork made it a popular so-called platform company and the reason for the rise of the gig economy (Vallas and Schor 2020). Although some have argued that “gig work” is not a new phenomenon since jazz musicians worked as “gigs” back in 1915 (Friedman 2014). Generally, gig work has existed since the industrial age, only the difference is that technology has brought it to another level.

Just a few years ago, short-term contracts or freelance jobs were considered part of the gig economy (Healy et al. 2017). Nevertheless, the concept of the gig economy has broader implications and inventions, not limited to only short-term contracts of transportation or food delivery but including all professions in digital or remote modes of work. Generally, it can be defined as where employers and employees meet on online platforms to accomplish specific tasks (Bunders et al. 2022). On one hand, ICT development, advances in blockchain technology, and individual readiness embarked on the gig economy (Malik et al. 2021).

In addition, the COVID-19 pandemic accelerated the adoption of the gig economy, where everybody needed to work remotely. During COVID-19, the average daily tasks/jobs increased, and it affected the gig economy positively (Umar et al. 2021).

The gig economy is expanding rapidly due to cultural changes toward embracing a flexible and independent work style and technological advances. Moreover, today's education system has also been disrupted by the new generation. Overall, 53% of gig workers, mostly aged 18–34, rely on gig work as their primary source of income. In fact, many people prefer working from home and have adapted to it. This desire and unemployment will certainly push more people into the gig economy. Likewise, businesses and corporations also prefer to hire gig workers. According to a Zippia survey, 84% of gig workers feel a positive view of their work, and 97% of them respond that they are happier than full-time employees. As for industries, most of the gig work is in art design (75%), and the software and IT sector. Overall, the gig economy has increased 15 times faster than the traditional labor market (Kolmar 2022). There are 70 million gig workers registered on the gig work platform globally, and this number grows by 26% annually (Heeks 2017).

It is clear that the labor market is changing, and full-time employment is being replaced by short-term contracts. The rise of independent contract workers and the corollary of a new form of work known as “gig work” are ultimately linked to the tax system. It is hard to differentiate between individuals working for their own business or just individual work. Therefore, individuals may face different tax treatments or different tax burdens (Adam et al. 2017). On the contrary, gig employment may lead to the issue of tax avoidance or taking advantage of tax breaks (Oyer 2020). From an empirical study by Wood et al. (Wood et al. 2019), it can be concluded that low-middle-income countries such as Nigeria, Malaysia, and the Philippines gained a positive outcome from the gig economy. Gig employment, while making employment and wages more flexible, shifts the risk of economic fluctuations onto the workers (Friedman 2014).

According to an International Labour Organization report, the number of digital labor platforms increased rapidly from 2007 to 2021, from 50 to 777 platforms based on data from 98 countries. Moreover, in many developing countries, self-employment accounts for almost 50% of the employees, while in developed countries, workers often perform gig work to earn supplementary income. Thus, a rise in gig work is expected to be expanded (ILO 2022). As for the popularity of work, programming, and IT (multimedia, web design)-related work account for more than 59% of the gig work. The second-most popular work is content writing or translation, which accounts for 15% of all freelance work. In contrast to the previous decade, gig workers are highly educated, as 32% of them have a bachelor's degree, and 45% of them have a postgraduate degree (Statista Research Department 2022). In addition, data engineers and IT project managers are particularly demanding jobs these days, which have increased by 23% and 31%, respectively (Hlebowitsh 2021). The study showed that all age groups participated in the gig economy regardless of their education level. As for the age group, those aged between 25 and 34 were the most active and had the highest participation among all age groups. Additionally, the study resulted in the conclusion that gender is not of decisive importance since, in some countries, male gig workers are dominated, while the UK and Italy, for example, have more female gig workers than males (Ostoj 2021).

Much research has focused on employment and temporary work arrangements in the last decade (Graham et al. 2017; Hardy and McCrystal 2022; Healy et al. 2017; Wood et al. 2019). Gig work is a part of platform work as categorized into four main types of platform work—namely, (1) highly skilled employees and independent contractors, (2) cloud-based consultants and freelancers, (3) gig workers (food delivery, home repair, and care work), and (4) entirely online tasks requiring little training and experience (Vallas and Schor 2020). In contrast, some argue that all kinds of occupations, from dog walkers to IT/business consultants and lawyers, can be employed as gig workers. Rather than skill or experience, gig work can only be distinguished by contract type or social relations of work regardless of technology or the type of work (Friedman 2014; Graham et al. 2017).

Furthermore, many researchers have highlighted the effects of gig work as a new type of employment (Healy et al. 2017). Due to the flexibility of the work, most people prefer working as gig workers rather than full-time employees. Both employers and employees can benefit from gigs such as helping to grow skillsets and enabling more opportunities. Employers can benefit by gaining access to skilled talents and hiring people for less money because they do not need to provide training or necessary equipment. Similarly, employees can benefit from having more independence, being able to work regardless of work permit/visa or geographic location, less discrimination (religion, ethnicity, or disability), and less occupational segregation. Overall, it gives more earning opportunities and keeps their work–life balance (Graham et al. 2017).

However, on the negative side of gig work, the relations based on digital platforms are still blurred and complex, such as being unable to modify the working conditions that workers must agree with (Rodrigues et al. 2021). Additionally, gigs often have low pay, uncertain income, risk of termination, poor remuneration, insecure work conditions, and low quality of entrepreneurial activities. Furthermore, studies have shown that gig work can result in social isolation, irregular working hours, overwork, and low pay with no social insurance and no retirement pensions (Hardy and McCrystal 2022; Scuotto et al. 2021). Nevertheless, the gig economy is a global trending phenomenon, expanding much faster than expected to double its size. Even though the gig economy has both positive and negative impacts, it is a new normal in work and employment relations. Only the challenges are how to adapt it sustainably and meet the social and political policies.

According to a Mastercard study, the global gig economy generated USD 204 billion in 2019 and is expected to reach USD 455 billion by 2023 (Mastercard and Kaiser Associates 2019). According to (Ahsan 2018), the gig economy sector is expected to reach USD 335 billion by 2025. In 2017, researchers' expectations were 9.2 million gig workers in the US by 2021 (Ahsan 2018), but the actual number has already reached 23.9 million occasional gig workers and 10.2 million part-time gig workers. The growth of gig workers between 2020 and 2021 in the US was 51% (Kolmar 2022). This means that the growth of the gig economy is more intense than expected, and it will grow even faster. Therefore, scholars and policymakers should develop programs to equalize incomes and shape entrepreneurship for societal benefits.

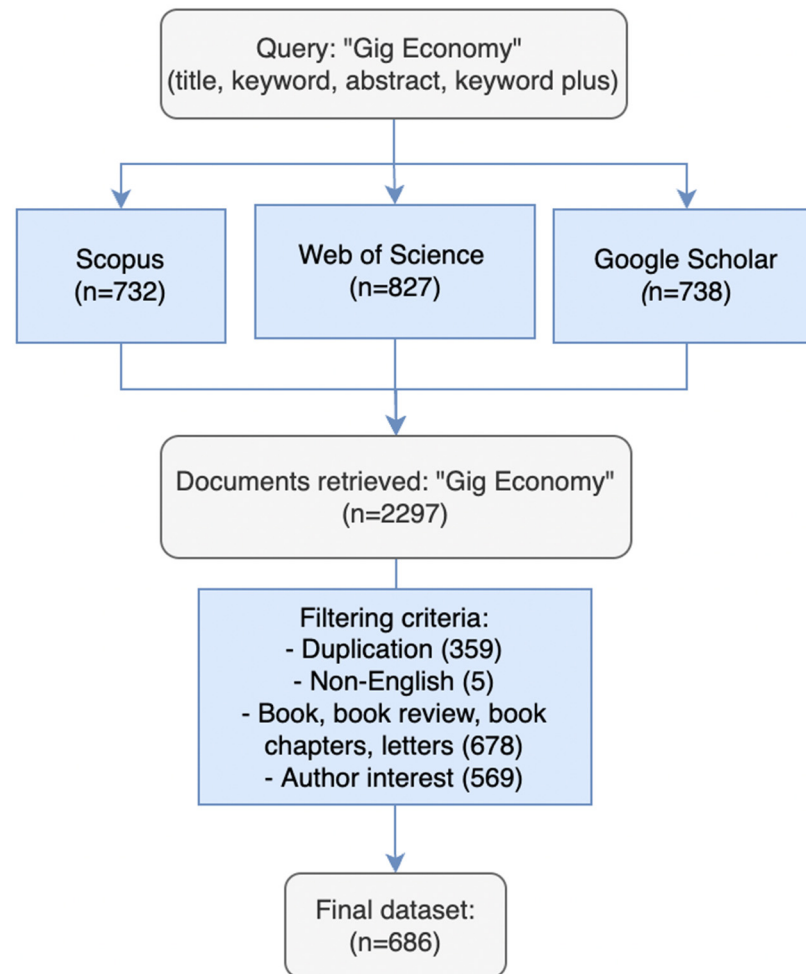
The goals of this study are to analyze the previously published articles based on keywords and to offer further research ideas in the near future. The objectives of the study are to review (1) the main sources where articles were mostly published, (2) authors who have highly contributed to the research field of the gig economy, (3) the countries that make a significant contribution, (4) the most frequently used keywords, keyword evolution, and clusters.

The structure of the study is as follows: Section 2 presents the data used in the research and explains the methodology to reach the results and the used software. Section 3 presents the results and findings that are a summary of the statistics of the data, top publishing journals, contributing authors who are highly cited, and the most productive authors and top countries that concentrated on this field. The last section presents the result of this study. The review methodologies and software are the main tools to implement a systematic review and bibliometrics analysis to broaden the objectives of the study (Boloy et al. 2021). Therefore, this study contributes to guidelines for future research.

## 2. Methodology

A systematic review of the literature on the gig economy was carried out and associated with bibliometric analysis. The two methodologies were combined to determine the results. A database search was performed through Google Scholar, Scopus, and Web of Science, and the documents till 2022 were examined. Since the gig economy is a less explored topic among scholars, the search strategy was simply using the keyword TS = ("gig economy"), which included titles, abstracts, keywords, and indexing fields.

By applying the keyword in the database, Scopus yielded 732 results, Web of Science, 827 results, and Google Scholar, 738 results, amounting to a total of 2297 documents found. The result dropped to 686 documents when applying exclusion criteria duplication, non-English, narrative literature reviews, duplicated articles, books, book reviews, conference papers, and letters to the editor. After that, all 686 documents were exported with full records and cited references and saved in Microsoft Excel as of March 2022. The analysis was performed based on 686 articles that were treated through RStudio software, an ideal software for bibliometrics analysis, and the selection procedure is shown below in Figure 1.



**Figure 1.** Article selection process.

Bibliometric analysis is a well-known and demanding method for exploring and analyzing scientific articles. It is used for collaboration patterns, trends, research constituents, and the intellectual structure of the domain (Donthu et al. 2021). It illustrates network analysis, collaboration, countries, authors, and keywords.

RStudio is free and open-source software that can be downloaded from <https://rstudio.com/products/rstudio/download/> (accessed on 18 February 2022). There are many open-source packages available to carry out the desired results in RStudio software. The bibliometrics package can be downloaded from <http://www.bibliometrix.org>, accessed on 18 February 2022, which is one of the main packages dealing with bibliometrics analysis (Abdallah et al. 2021). In this study, Biblioshiny and other functions in the bibliometrics package in RStudio software were employed to conduct the analysis. Additionally, co-occurrence is made up of VOSviewer, an open-source software tool for constructing and visualizing bibliometric networks. It can be downloaded from <https://www.vosviewer.com/>, accessed on 18 February 2022.

### 3. Results and Discussion

#### 3.1. General Characteristics of the Bibliometrics Analysis

Table 1 shows the main points of the analyzed articles based on the “gig economy” keyword research. The articles were elaborated on by 1186 authors and published in 401 sources between 2014 and 2022.

**Table 1.** Main information by RStudio.

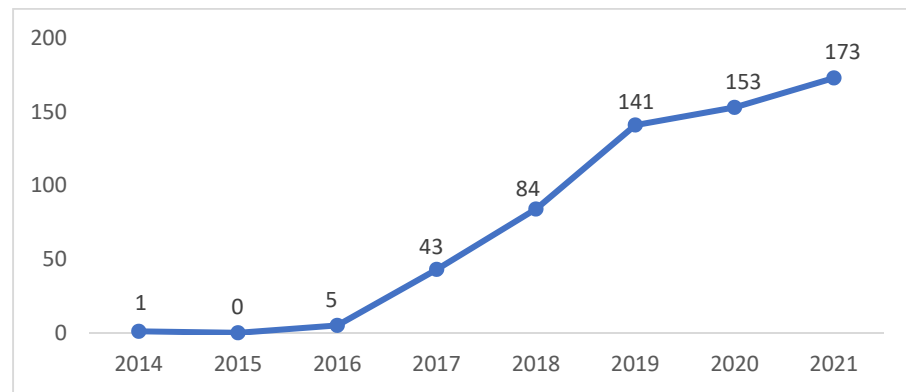
Description	Results
Timespan	2014:2022
Sources (Journals, Books, etc.)	430
Documents	686
Average years from publication	2.42
Average citations per document	8.952
Average citations per year per doc	2.475
References	27,775
Document Types	
article	456
article; book chapter	26
Article; early access	65
book	4
book review	15
correction	1
editorial material	33
editorial material; book chapter	7
meeting abstract	1
news item	1
proceedings paper	53
review	19
Keywords Plus (ID)	889
Author’s Keywords (DE)	1778
Authors	1309
Author Appearances	1591
Authors of single-authored documents	216
Authors of multi-authored documents	1093
Single-authored documents	242
Documents per Author	0.52
Authors per Document	1.91
Co-Authors per Documents	2.32
Collaboration Index	2.46

The growth in publication between 2014 and 2021 is illustrated in Figure 2. The annual percentage growth rate is 42.5, and the number of publications seems to be on an upward trend. In particular, the number of publications rapidly increased between 2017 and 2021 from 43 papers to 173 papers. During COVID-19, many changes occurred in the labor market and employment such as blended workforce and gig work (Minten et al. 2020; Mahato et al. 2021). Therefore, it may accelerate the production of scientific papers between 2019 and 2021. Furthermore, more than 70% of the published papers are about human resources or related to the labor market. In 2020, 59 million adults, roughly 36% of the US workforce, participated in the gig economy (Kolmar 2022).

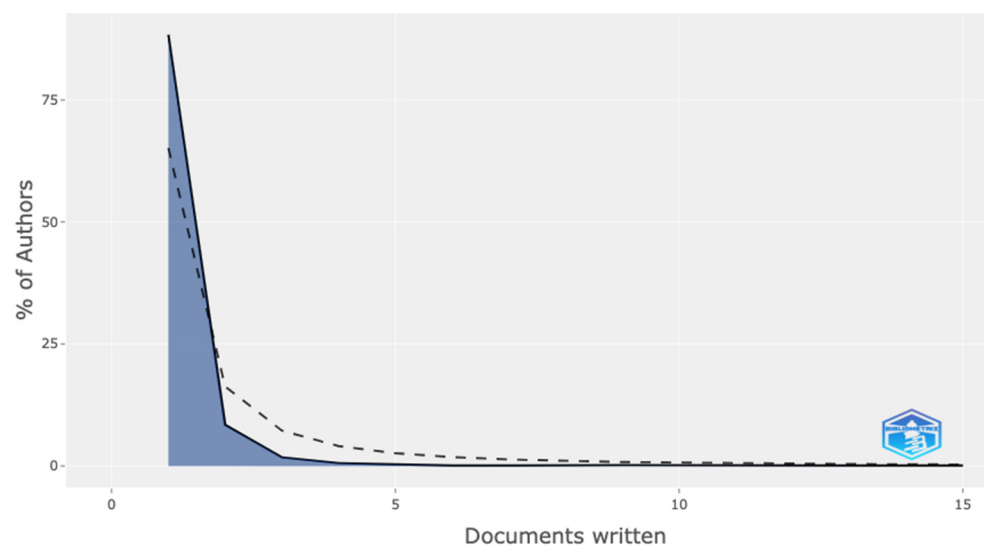
Lotka’s law estimates the productivity of scientific papers and measures the productivity of authors also called the “inverse square law of scientific productivity”. The formula is  $y = c/x^n$ , where  $y$  = percentage of authors,  $x$  = number of papers published by an author,  $c$  = constant, and  $n$  = slope of the log–log plot (Chang et al. 2010).

Based on RStudio, the results are  $c = 0.614453$ ,  $R^2 = 0.9066696$ ,  $p = 0.5412431$ . Figure 3 shows the curve of Lotka’s law.





**Figure 2.** Annual scientific production. Source: own elaboration based on RStudio.



**Figure 3.** Lotka's law curve. Source: RStudio results.

From the results, it is shown that only 10% of the total authors (27) have written two articles. Overall, 85.1% of authors have only one article published. Moreover, only 2% of the authors collaborated to publish three articles. Table 2 shows the number of authors published by the number of corresponding authors.

**Table 2.** The number of articles and frequency are based on Lotka's law using RStudio.

Number of Articles	Number of Authors	Frequency
1	229	0.8513
2	27	0.1003
3	7	0.0260
4	1	0.0037
5	3	0.0111
6	1	0.0037

In total, 686 documents have been produced since 2014 about the “gig economy”. Documents consist of 68.9% articles, 13% conference papers, 5.7% book chapters, etc. Almost 53% of the publications were about employment relations, the transformation of labor, and the negative, positive impacts of gig work since 2014.

### 3.2. Source

There is a total of 456 articles published from 2014 to 2020. The top three journals by impact and the number of published articles are *New Technology Work and Employment*, *Work Employment and Society*, and *Journal of Industrial Relations*. The journal *New Technology Work and Employment* has the highest number of published articles (20 articles) on the gig economy.

The journals' classification is shown in Tables 3 and 4, along with the number of articles and top-ranked journals. *h\_index* measures the productivity and citation impacts of journals. As shown in Table 3, the "Work Employment and Society" journal has the highest *h\_index* and the highest citation (582 citations) among all journals.

**Table 3.** Journal classification is based on their impact.

Source	h_Index	g_Index	Citation	Start Year
Work Employment and Society	8	14	582	1984
Journal of Industrial Relations	7	11	142	2018
New Technology Work and Employment	7	14	262	2018
Economic and Labor Relations Review	5	9	253	2017
Journal of Managerial Psychology	5	5	118	2019
New Media and Society	5	5	126	2018
Antipode	4	4	61	2019
Management Science	4	4	180	2018
Transfer-European Review of Labor and Research	4	6	311	2017
Capital and Class	3	5	26	2019

**Table 4.** The most relevant sources according to the publication number. Source: RStudio results.

	Journal	Number of Articles
1	New Technology Work and Employment	20
2	Work Employment and Society	16
3	Journal of Industrial Relations	14
4	Economic and Lab Our Relations Review	11
5	European Labor Law Journal	10
6	New Media and Society	9
7	Capital and Class	7
8	Environment and Planning A-Economy and Space	7
9	International Journal of Human Resource Management	7

### 3.3. Authors

The number of publications has increased from 2018, and compared with 2017, it is almost doubled. Authorship is fragmented—a total of 1309 authors have been found. Overall, 18.4% of the total authors had single-authored documents (242), while 81.6% of them had multi-authored articles. Additionally, the collaboration index is 2.46, and the documents per author are 0.524. An average of authors per document resulted in 1.91. The author Graham ranked first by its dominance factor that counts the rate of several articles, both single and multi-authored.

Similar results are depicted in Figure 3, with the most productive authors over time. It shows the highest productive authors who contributed to the field the most. Graham, Lehdonvirta, and Gandhi are the top three authors. Similarly, as for the number of citations, Wood, Graham, and Lehdonvirta have the highest citation at 227, and their collaborated articles have 222 citations as well. Therefore, Graham and Lehdonvirta are the top authors in this field. The larger and darker circle indicates the number of publications and citations per year. The darker means more citations, as shown in Figure 3. Figure 4 illustrates the plots of the authors' production (citations and publications per year) over time.



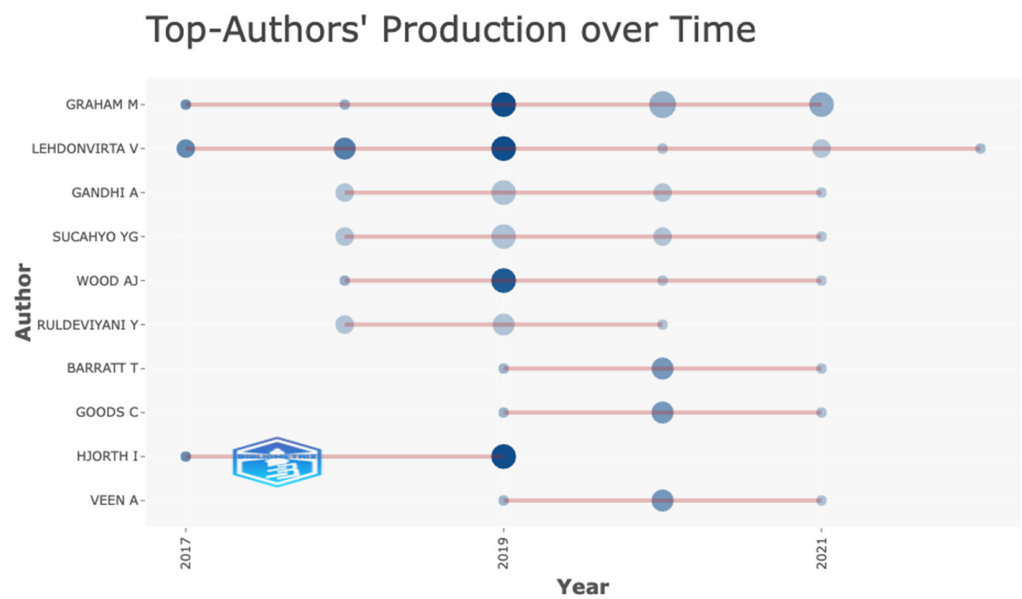


Figure 4. The authors’ productiveness. Source: RStudio results.

### 3.4. Countries

The majority of authors who published articles about the gig economy are from most developed countries. The primary country is the USA, where most start-ups and gig works were established. After that, the UK and Australia follow, with 114 articles and 56 articles, respectively. Table 5 lists the top 10 countries by the number of articles. This analysis provides an overview of the collaboration and research communities. Countries and authors are considered units of analysis. The USA has the highest number of single country publications, while the UK has the highest number of multiple country production. Italy and Poland have both similar results, with 13 articles, 12 single-country publications, and per MCP\_ratio. The gig economy has developed in those countries that may also be impacted the scientific work, especially the USA, UK, Australia, and Canada.

Table 5. Corresponding authors’ countries and scientific production.

Country	Articles (SCP + MCP)	Freq	Single Country Publication (SCP)	Multiple Country Publication (MCP)	MCP_Ratio
USA	161	0.27013	145	16	0.0994
UK	114	0.19128	79	35	0.307
Australia	56	0.09396	49	7	0.125
Canada	25	0.04195	22	3	0.12
Spain	21	0.03523	19	2	0.0952
China	20	0.03356	12	8	0.4
Germany	18	0.0302	15	3	0.1667
India	14	0.02349	13	1	0.0714
Italy	13	0.02181	12	1	0.0769
Poland	13	0.02181	12	1	0.0769

Figure 5 presents the country’s scientific production, and it was generated through “Biblioshiny” using RStudio software. The density of blue color indicates different productivity rates such as dark blue denotes the high productivity and grey represents no articles (Fusco et al. 2020).



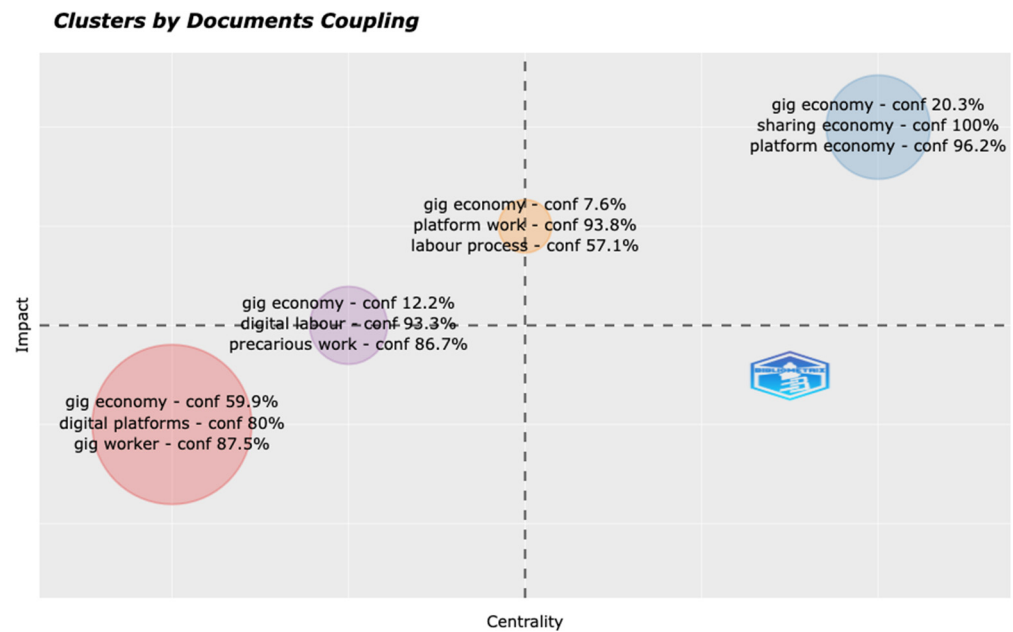


Figure 7. Cluster coupling is evaluated by the authors’ keywords. Source: RStudio results.

As shown in Figure 8, labor and gig economy are the rising topic since 2017, which means those keywords are the main interest among scholars and researchers. After that, work and employment are the second rising keywords, which also increase during those years since the employment sector is highly impacted by the gig economy.

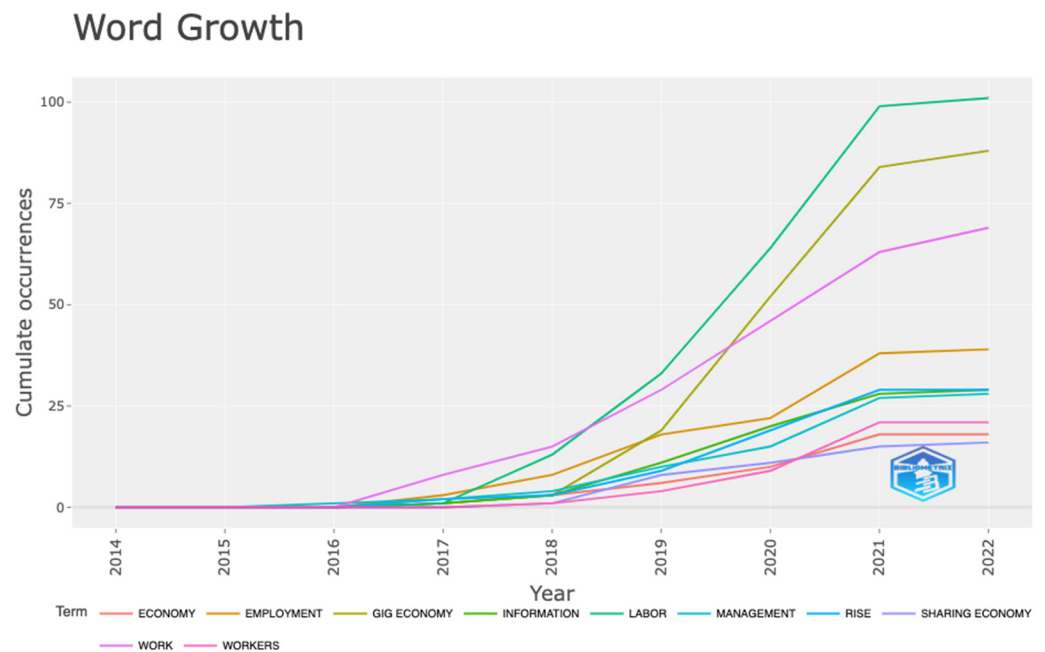


Figure 8. Keywords dendrogram using a hierarchical clustering method. Source: R studio results.

The dendrogram aims to estimate the approximate number of clusters to assist in further discussion (Secinaro et al. 2020). The topic dendrogram in Figure 9 represents hierarchical order and the relationship between keyword groups generated by hierarchical clustering. Multiple correspondence analysis was applied, and authors’ keywords were selected. Clusters of 3 and 15 terms were used in the dendrogram analysis. The dendrogram

shows a large difference between crowdsourcing and digital labor versus that of gig work, COVID-19, uber, work, gig economy, and platform work.

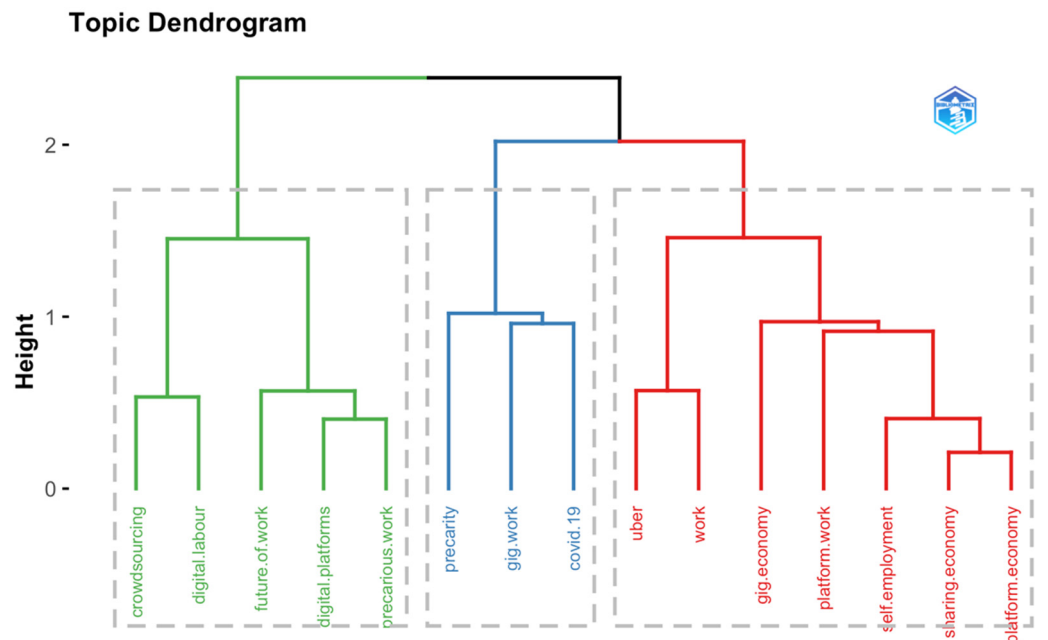


Figure 9. The dendrogram.

The co-word analysis aims to map the conceptual structure of a framework using the word co-occurrences (Aria and Cuccurullo 2017). The result of the conceptual structure map is shown in Figure 10. Multiple-correspondence analysis methods were applied.

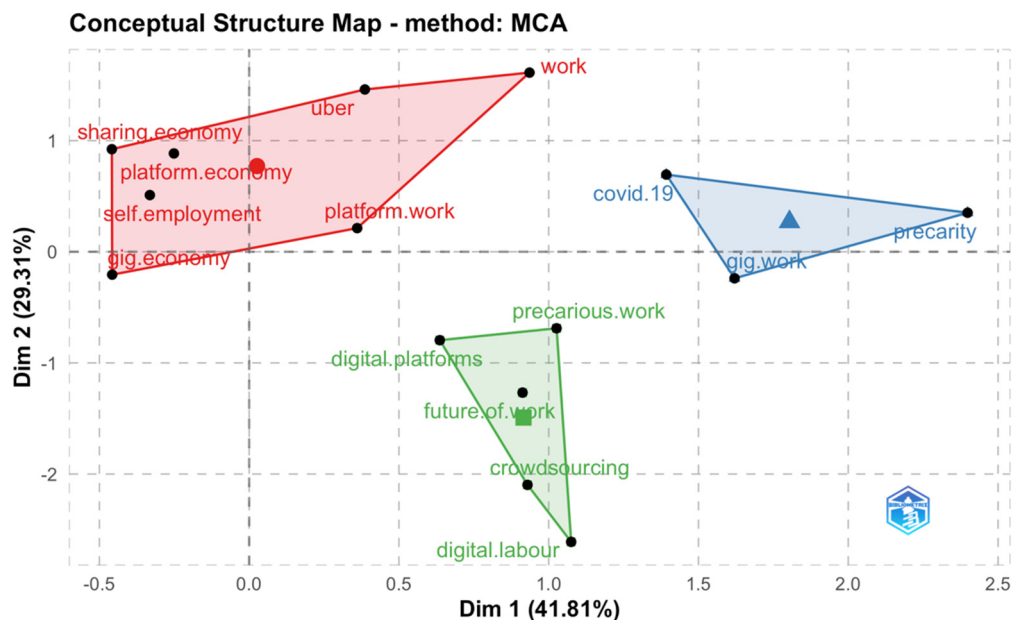


Figure 10. Conceptual structural map.

According to tree mapping, labor and gig economy are the most frequently used words, appearing 116 and 105 times, respectively. After that, work, employment, and management are the second most-used keywords. To analyze the co-occurrence of authors' keywords, VOSviewer software was used, as shown in Figure 11.

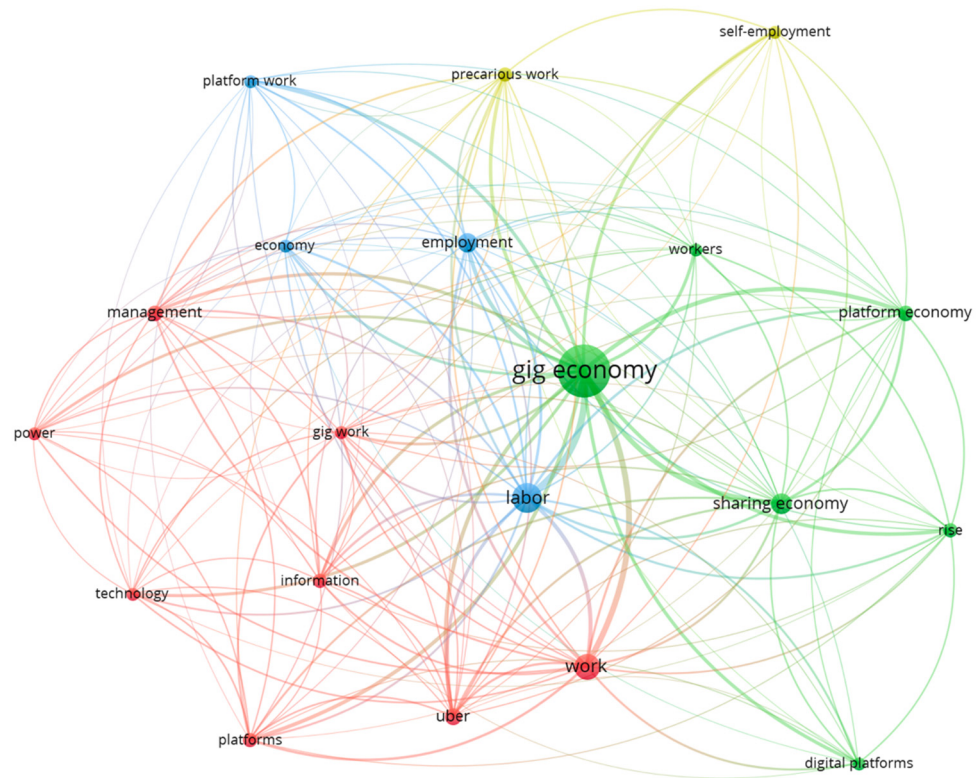


Figure 11. Author keyword co-occurrence.

Uber drivers and the on-demand economy were the main topics in 2018. Then, the gig economy and sharing economy became the highlighted topics between 2018 and 2020. By 2020, platform economy and gig-worker-related topics became trending topics. Generally, topics can be divided into three main categories, as shown in Figure 12—namely, (1) Uber, food delivery; (2) digital labor, human resource, global gig, and gig workers; (3) platform economy, sharing economy, and the gig economy.

### Trend Topics

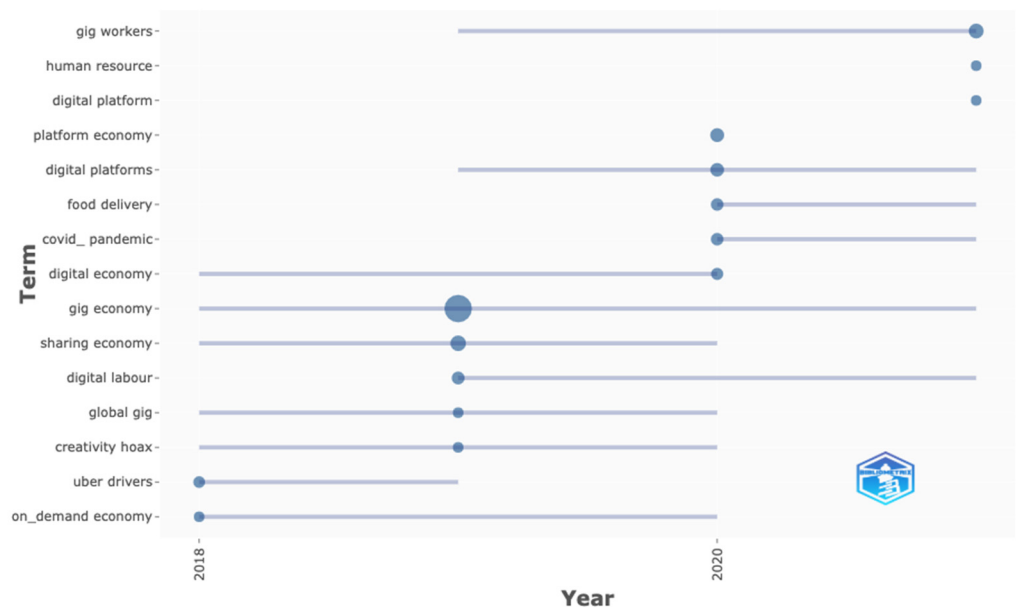


Figure 12. Trending topics.

Globalization has made it possible for companies to expand their business operations across the nation or to other countries and for individuals to work and travel in other countries. Transnational and multinational corporations enhanced globalization and played important roles in the global economy. At the same time, digitalization accelerated the global expansion of multinational corporations and international trade in communication and transportation. In today's business world, digitalization has brought globalization to another level. The growth of advanced technologies affected companies' ability to hire talents online, without traveling, and has opened new income opportunities for individuals. The gig economy is one such example. As for digital gig work, companies based in the USA and the UK mostly hire from Asian developing countries such as Pakistan, India, and the Philippines. From the gig work perspective, globalization made it possible to work for multinational companies, while digitalization (digital gig work) enabled working opportunities regardless of physical location. Therefore, the gig economy is one of the corollaries of globalization and digitalization, and a new form of employment.

#### 4. Conclusions

This study presented a statistical analysis of the global scientific literature on the gig economy. Through bibliometric analysis, the articles were analyzed considering the main characteristics of articles, authors, co-authorship between countries, keywords, most-cited articles, and co-occurrences. It also investigated the relationship between the title and keywords analysis. Based on the analysis, developed countries are active in this research field and show essential cooperation. Regarding publications, the USA, UK, Australia, and Canada presented the higher number of publications about the Gig economy. Recently, studies were mostly concerned with digital platforms and human resources. From the analysis, employment is the most impacted by the gig economy since most articles were focused on the relationship between employer and employee.

Current debates relating to employment and gig labor include (1) new types of organizations (e.g., algorithmic control and managerial oversight); (2) new nature of work (e.g., weak social and legal protection); (3) new status of employees (e.g., distinguishing between employees and independent contractors) (Tan et al. 2021; Marquis et al. 2018; Keith et al. 2019; Behl et al. 2021; Hudek et al. 2021). Even though there are pros and cons, employers and freelancers can both benefit from gig work. The benefits of having a digital labor platform are that it is cheaper, quicker, and can be recruited anywhere in the world. This means that clients can have a specialized workforce globally at a lower cost. The drawbacks of gig work are low pay, uncertain income, risk of termination, and poor remuneration. Platform workers need third-party support to review service contracts and enforce their rights (Hardy and McCrystal 2022).

The majority of studies analyzed in this paper have explored gig working conditions, COVID impact, gig workers' demographic data, and gig employment. Taxation, ethics, social, welfare protection, and performance control are also critical since those are not yet regulated and are less investigated areas. Some of the challenges that platform or gig work presents are physical environment, surveillance, performance appraisal, contracts, employer determination, and data protection. The findings presented in this study will support further analysis in this field. This study will help researchers and scholars to analyze currently available articles and promote better scientific knowledge.

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