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# Entrepreneurship and the gig economy: A bibliometric analysis

## *Emprendimiento y economía gig: un análisis bibliométrico*

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## ARTICLE INFO

## ABSTRACT

There is an increasing number of academic publications on studying the impact of the gig economy and digital platforms. Some of them involve entrepreneurship and business models. However, there is a lack of a global picture depicting the scientific structure of knowledge regarding the gig economy and entrepreneurship. This paper presents a conceptual, intellectual, and social bibliometric overview, using Bibliometrix and Biblioshiny (R-packages). To this end, total of 345 published articles were analyzed, covering 245 sources, 44 countries and 751 authors. There are several important findings: five main clusters emerged from the study (Self-employment and social economy; Sharing economy and sustainable development; Entrepreneurship and innovation; Gig economy and platform economy; and Digitalization); the main themes that emerge deal with sharing, gig, and platform economy, digitalization, teleworking, career participation and platforms; finally, gig workers are key for developing strategies, policies, and actions to achieve a social welfare through entrepreneurship in the platform ecosystem. It is also important to highlight the role of communities and social capital in the development of sustainable collaborative initiatives through digital entrepreneurship.

*Keywords:* Gig Economy, Digital Entrepreneurship, Sharing Economy, Bibliometric Analysis, Platform Economy, Nascent Entrepreneur.

## RESUMEN

Existe un número cada vez mayor de publicaciones académicas sobre el estudio del impacto de la economía gig y las plataformas digitales. Algunos de ellos incluyen el espíritu emprendedor y el modelo de negocio. Sin embargo, como falta una imagen global que describa la estructura científica del conocimiento con respecto a la economía gig y el emprendimiento, este artículo presenta una descripción bibliométrica conceptual, intelectual y social, utilizando Bibliometrix y Biblioshiny (paquetes R). Para ello, analizó un total de 345 artículos, que abarcan 245 fuentes, 44 países y 751 autores. Hay varios hallazgos importantes: cinco grupos principales surgieron del estudio (Autoempleo y economía social; Economía compartida y desarrollo sostenible; Emprendimiento e innovación; Economía Gig y economía de plataformas; y Digitalización); los principales temas que surgen tratan sobre el intercambio, la economía gig y las plataformas, la digitalización, el teletrabajo, la participación profesional y las plataformas; finalmente, los trabajadores gig son clave para desarrollar estrategias, políticas y acciones para lograr un bienestar social a través del emprendimiento en el ecosistema de las plataformas digitales. También es importante destacar el papel de las comunidades y el capital social en el desarrollo de iniciativas colaborativas sostenibles a través del emprendimiento digital.

*Palabras clave:* Economía gig, Emprendedor Digital, Economía Colaborativa, Análisis Biométrico, Economía de las Plataformas, Emprendedor Naciente.

# 1. INTRODUCTION

The emergence of digital platforms (DPs), based on gig work, has spawned new business models mainly focused on the intermediation of peer-to-peer interaction (Cho & Cho, 2020). Independently of the business domain activity, examples such as Airbnb, Uber, TaskRabbit or Upwork have been occupying space in the market in recent years, projecting a disruptive path through digital innovation (Anwar, 2018; Scheepers & Bogie, 2020; Tae *et al.*, 2020). According to Broda (2021), the gig economy (GE) will move 455 billion US dollars until the end of 2023, and already in 2021, this number is 346.8 billion USD in gross volume transactions.

The GE is based on short term contracts aimed at intermediation of peer-to-peer business interactions (Pankov *et al.*, 2019; Schmidt, 2017). Used for exchanging services or products, this model which is utilized by different DPs is constantly associated with the sharing, collaborative, and platform economies (Chalmers & Matthews, 2019; Klarin & Suseno, 2021), and has impacted not only the life individuals, but also the business ecosystem at a macroeconomic level (Burke & Cowling, 2019; Sinchaisri *et al.*, 2019).

The GE is characterized by the opportunities provided to individuals to access the labor market as autonomous independent contractors (Ravenelle, 2019; Schwellnus *et al.*, 2019). Consequently, it divides opinions: on one hand, there are those who posit that the GE fosters entrepreneurship through solutions for resources constraints (Berger *et al.*, 2019; Damian & Manea, 2019; Laukkanen & Tura, 2020) and, on the other hand, there are those who have concerns about how the GE can negatively impact the traditional labor relationship (Klofsten *et al.*, 2020; Martin, 2016; Rosenblat & Stark, 2016). Also, there are some emerging criticisms about low-quality entrepreneurship, disempowering people who find work through those platforms (Ahsan, 2020; Yang *et al.*, 2020).

There is a consensus that there is a relationship between the gig economy and entrepreneurship, and that the influence of the GE platforms on entrepreneurial activity has captured the attention of scholars and policymakers worldwide, evidencing a correlated growth pattern (Barratt *et al.*, 2020; Burke *et al.*, 2020; Burtch *et al.*, 2018). Those working on GE platforms are frequently referred to as micro-entrepreneurs and nascent entrepreneurs (Burke & Cowling, 2020; Kuhn & Maleki, 2017), due to their influence on the development of autonomy and individual management skills (Aroles *et al.*, 2020; Dvouletý & Orel, 2020). Moreover, GE platforms are also known for minimizing the costs and risks in the start-up of small businesses, while enabling the development of entrepreneurial individuals (Bellesia *et al.*, 2019).

The GE is also referred as a tool for promoting entrepreneurial initiatives. It contributes to achieving the global goals for sustainable development (United Nations, 2020), for instance diminishing poverty, promoting gender equality, and reducing inequalities (Berg *et al.*, 2018; Öberg, 2018; Paik *et al.*, 2019; He, 2019). Furthermore, despite considering that the economic outcomes are different depending on the levels of development of different regions, empirical results show that the GE: has a positive influence in global/local communities (Geissinger *et al.*, 2019); has a positive influence of entrepreneurial activities (Barrios *et al.*, 2020); and increases employment growth, enterprise growth and innovation levels in industry (Audretsch *et al.*, 2015).

In short, at an individual level, entrepreneurship through GE is largely associated with educational and practical processes that, molded by experiences, contribute to the pursuit of goals, development of skills and well-being (Burke & Cowling, 2020; Hernández-Sánchez *et al.*, 2020; Wiklund *et al.*, 2019). Moreover, it enables peer-to-peer interaction through disruptive collaborative digital innovation tools, which have a tremendous impact on both individuals, as entrepreneurs, and businesses, as part of the GE ecosystem (Browder *et al.*, 2019; Josserand & Kaine, 2019).

Taking into account the lack of a focused review on GE and entrepreneurship, since the only ones were developed through a legal approach based on a traditional narrative with no detailed methodology (Stewart & Stanford, 2017; Todolí-Signes, 2017), research in this field remains highly exploratory (Ravenelle, 2019). Moreover, it is mandatory for an understanding of the relationship between both subjects (Burke *et al.*, 2019), as the gig economy is constantly associated with entrepreneurship in these studies. Therefore, this bibliometric paper seeks to answer the following research questions (RQs):

RQ1. Which are the most relevant authors, journals, countries, institutions and documents in the gig economy and entrepreneurship literature?;

RQ2. What are the main trends and keywords associated with the study on the gig economy and entrepreneurship?;

RQ3. What are the emerging topics in the discussion regarding the gig economy and entrepreneurship?

Based on those RQs, a bibliometric research was carried out and the following objectives were defined:

— To describe the evolution of the research about the theme, stating: the main journals; authors; affiliations; countries and documents;
— To classify and identify the main content on research through citations and keywords;
— To identify the main conceptual and thematic evolution/structure.

# 2. METHODOLOGY

In order to keep abreast of the state of the art on the gig economy and entrepreneurship, a bibliometric analysis was carried out searching the Web of Science (WOS) and Scopus databases. Therefore, based on an implementation plan, shown in Figure 1, this work follows two stages: first, investigating the domain; and second, mapping the state of the art and identifying patterns in entrepreneurship and the gig economy.

This first stage, investigating the domain, is focused on finding out information related to output, sources, authors, affiliations, countries, and documents. It makes use of different metrics to depict the route of science on this theme through a measurable and assertive method (Merigó *et al.*, 2016; Cancino *et al.*, 2020). To achieve the core objective of this article, the following indicators will be used: Bradford's law, H-index, M-index, disambiguation and Lotka's law.

In the second stage, mapping the state of the art, the objective is to identify patterns and discover trends. To this end, a knowledge structure was sought by using bibliometric techniques such as co-word, co-citation, and thematic maps (Valenzuela-Fernández *et al.*, 2020).
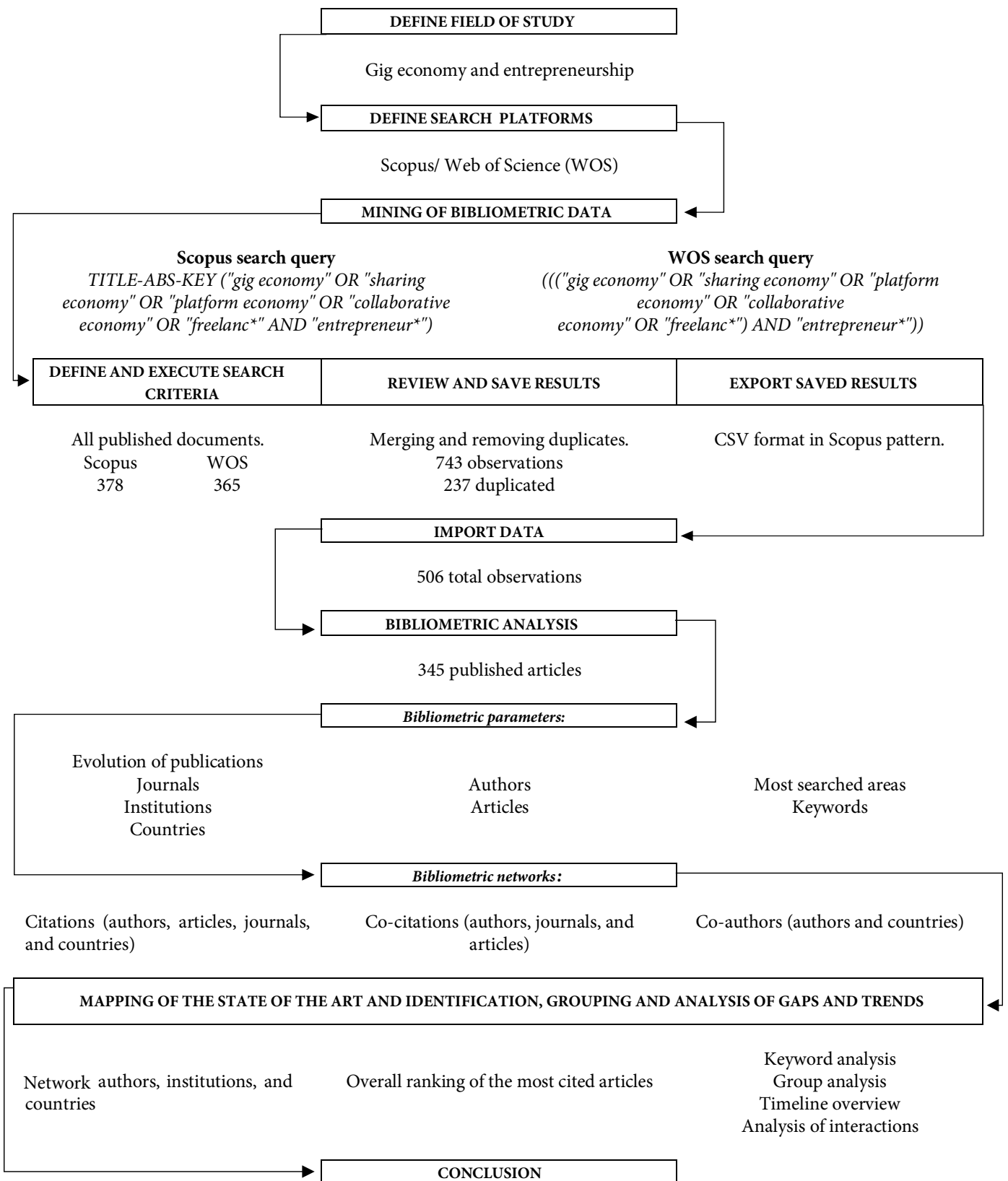
**DEFINE FIELD OF STUDY**

Gig economy and entrepreneurship

**DEFINE SEARCH  PLATFORMS**

Scopus/ Web of Science (WOS)

**MINING OF BIBLIOMETRIC DATA**

**Scopus search query**
*TITLE-ABS-KEY ("gig economy" OR "sharing economy" OR "platform economy" OR "collaborative economy" OR "freelanc*" AND "entrepreneur*")*

**WOS search query**
*(((("gig economy" OR "sharing economy" OR "platform economy" OR "collaborative economy" OR "freelanc*") AND "entrepreneur*"))*

| **DEFINE AND EXECUTE SEARCH CRITERIA** | **REVIEW AND SAVE RESULTS** | **EXPORT SAVED RESULTS** |
| --- | --- | --- |

All published documents.
Scopus          WOS
378               365

Merging and removing duplicates.
743 observations
237 duplicated

CSV format in Scopus pattern.

**IMPORT DATA**

506 total observations

**BIBLIOMETRIC ANALYSIS**

345 published articles

*Bibliometric parameters:*

Evolution of publications
Journals                              Authors                    Most searched areas
Institutions                          Articles                        Keywords
Countries

*Bibliometric networks:*

Citations (authors, articles, journals, and countries)

Co-citations (authors, journals, and articles)

Co-authors (authors and countries)

**MAPPING OF THE STATE OF THE ART AND IDENTIFICATION, GROUPING AND ANALYSIS OF GAPS AND TRENDS**

Network authors, institutions, and countries

Overall ranking of the most cited articles

Keyword analysis
Group analysis
Timeline overview
Analysis of interactions

**CONCLUSION**

Figure 1
**Stages of the method**
*Source:* Author's own elaboration.

This bibliometric method allows a complete view of the knowledge structure to be depicted, enabling a full understanding of the scientific dynamic aspects of a specific area of literature (Ellegaard & Wallin, 2015). Therefore, through the representation of social and thematic connections, the theme in evidence is structured through nodes of knowledge, designing clusters of trends. In sum, these structures are used to identify what science has been discussing; what the main trends are; how authors and institutions interact between them regarding the theme; and the influence of the authors in the researched field.

### 2.1. Data collection

The keywords used in the initial search query were based on previous knowledge of the literature on the topic; however, for a better understanding of the contemporary knowledge, on May 21st, 2021, a preliminary search on the Scopus database was carried out to find words closely related to "gig economy". The results confirmed the following keywords as most used and closely related ones for our search: "*gig economy*", "*sharing economy*", "*platform economy*", "*collaborative economy*" *and* "*freelancer*". As such, in order to complete the Boolean search query with the term "*entrepreneur\**", they were included in the search, as shown in Figure 1.

After defining the keywords to be included in the search, the Scopus and Web of Science databases were used as the sources for the bibliometric analysis, as they are (Merigó *et al.*, 2015):

— The largest databases presenting worldwide content related to business and economics;
— Reliable sources in which most of the documents found are indexed through a scrutinized quality standard;
— Sources for accurate, consistent, and solid research in the academic and scientific world.

The search returned 378 and 365 results from the Scopus and WOS databases, respectively. The merged results totaled 743 observations; however, the total number of observations was reduced to 506 after removing 237 duplicated documents.

Table 1
**Types of documents in the data**

| Document types | Results |
| --- | --- |
| Article | 345 |
| Book | 11 |
| Book chapter | 23 |
| Conference paper | 43 |
| Conference review | 4 |
| Editorial | 2 |
| Editorial material | 1 |
| Letter | 1 |
| Note | 5 |
| Proceedings paper | 45 |
| Review | 20 |
| Short survey | 1 |

*Source:* Author's own elaboration.

As shown in Table 1, from 1991 until 2021, 345 published articles, 20 reviews, 43 conference papers, and 45 proceedings papers were found within these 506 documents. The publications came from 381 different sources, including journals, books, conferences, etc. With a total of 24,975 references, the total of average citations per document is 9.91, and the average citations per year, per document is 2.15, as presented in Table 2.

Table 2
**Main information about the collected data**

| Description | Results |
| --- | --- |
| Timespan | 1991:2021 |
| Sources (Journals, Books, etc) | 381.000 |
| Documents | 507.000 |
| Average years from publication | 3.380 |
| Average citations per documents | 9.907 |
| Average citations per year per doc | 2.146 |
| References | 24.975 |

*Source:* Author's own elaboration.

### 2.2. Data analysis and visualization

In order to analyze the collected data, the open-source software R studio was utilized, using the Bibliometrix R package 3.0.5 and applying the Biblioshiny version for data visualization (Aria & Cuccurullo, 2017). Both bibliographic metrics and demographic indicators were accessed through this research, such as citations, productivity growth, author's contributions, keywords, and articles references. The visualization features provided by this application were used to find both the knowledge structure and the conceptual development (Palácios *et al.*, 2021). The co-words network maps are based on the proximity of each word appearing together in each document, followed by a factor analysis reducing the data's dimensionality through multiple correspondence analysis (MCA) (Kraus *et al.*, 2020; Palácios *et al.*, 2021). Furthermore, the following main indicators were used: total citations, describing the total of citations received; H-index, which includes productivity and influence; M-index, which, in addition to influence and productivity, considers the distribution of citations; and G-index, which includes volume per year in the mentioned indicators.

Bradford's law was applied to investigate the source relevance. It is a systematic mechanism that, through a scattering process, allows an estimation of the diminishing returns of searching for references in academic journals to detect relevant bibliography (Shenton & Hay-Gibson, 2009). It refers to the exponential distribution of documents in three groups following a standardized proportion to 1: n: n². Equally, Lotka's law, disambiguation and co-occurrence techniques were used. Lotka's law describes the frequency of publication in a determined field. Disambiguation contributes to the robustness of the results, avoiding conflicts between previously covered data (for this, the algorithm was based on the following logical approach: *If TRUE and Field = "Author_Affiliation" then "Disambiguation"*). The co-occurrence network is based on betweenness and centrality by measuring the frequency of terms used by authors in keywords, keywords plus, title and abstract, grouping them into clusters of similarity, using a Louvain clustering algorithm (Aria *et al.*, 2020).

## 3. RESULTS

This section of the paper presents the bibliometric data describing the evolution of the theme, considering indicators such as: annual scientific production/citations; most relevant sources and authors, and their impact; most relevant affiliations and their intra/inter country collaboration; country's productivity and performance; most relevant documents and their performance through the years; keyword analysis and structures of knowledge. However, as a parameter for eligibility, only peer-reviewed published articles were considered, referring to the most reliable scientific contributions to the knowledge structure under study.

### 3.1. Retrieved literature and productivity

As seen in Table 3, 345 published articles were accessed from 245 different sources with a total of 19,150 references. These articles were published between 1991 and 2021 with an average of 3.22 publications per year, an annual average citation of 12.72 per document and a mean of 2.67 citations per year per document.

Figure 2 shows that the volume of publications has been growing exponentially during the last decade, with the highest output between 2012 and 2021. 327 articles were published in this period, corresponding to 94.78% of all publications. Also, during the same time period, the average annual total citation increased considerably, with cumulative high peaks in 2003, 2009, 2014, 2016, 2017 and 2020. However, this demonstrates that 63.59% of the annual average citations were achieved in the same interval. Furthermore, it is important to note that the highest productivity was in 2020 with a total of 89 publications (25.80%).

Table 3
**Main information about articles collected**

| Description | Results |
|---|---|
| Timespan | 1991/2021 |
| Sources (Journals, Books, etc) | 245.000 |
| Documents | 345.000 |
| Average years from publication | 3.220 |
| Average citations per documents | 12.720 |
| Average citations per year per doc | 2.673 |
| References | 19,150.000 |
| Keywords Plus | 700.000 |
| Author's Keywords | 1,259.000 |
| Authors | 751.000 |
| Author Appearances | 809.000 |
| Authors of single-authored documents | 101.000 |
| Authors of multi-authored documents | 650.000 |
| Single-authored documents | 105.000 |
| Documents per Author | 0.459 |
| Authors per Document | 2.180 |
| Co-Authors per Documents | 2.340 |
| Collaboration Index | 2.710 |

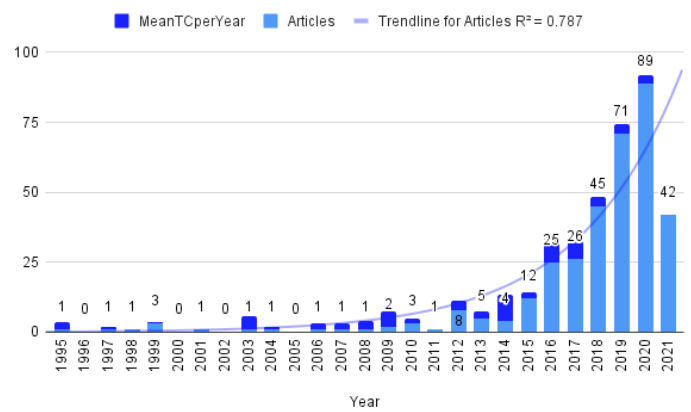*Source:* Author's own elaboration.



Figure 2
**Annual scientific production and cumulated citations per year**
*Source:* Author's own elaboration.

### 3.2. Sources

Based on Bradford's law algorithm test (Brookes, 1969), three clusters were found. They are based on the cumulative frequency of citations and publications and comprise 245 journals. Applying Bradford's law, the most relevant cluster consists of 33 journals covering 114 articles, followed by a second cluster with 99 journals covering 118 articles and a third cluster containing 113 sources with 345 articles, as represented in Table 4.

Table 4
**Cluster of interest (Bradford's law distribution)**

| Clusters | Number of Journals | Number of Articles | Cumulative Number of articles | Percentile |
|---|---|---|---|---|
| 1 | 33 | 114 | 114 | 9.57% |
| 2 | 99 | 118 | 232 | 28.70% |
| 3 | 113 | 113 | 345 | 32.75% |

*Source:* Author's own elaboration.

As Table 4 shows, the first cluster, consisting of 33 documents, contains a higher number of cumulative frequency of publications/citations than other clusters. Accordingly, if a researcher subscribes to/reads this 9.57%, one-third of the information requirements for the field research on entrepreneurship and the gig economy would be fulfilled.

Also, for a better comprehension, cluster 1, shown in Table 5, was ranked based on the Hirsch index (H-index), which reflects the impact of a scientist in the field, taking into account his/her productivity and citations (Merigó *et al.*, 2015). This index aims to indicate the performance of an author in a determined area; yet, it has been accessed by different authors in different fields to study the impact factor of sources (Mingers *et al.*, 2012). Therefore, when associated with a journal, this index can be related to a journal performance factor, contributing to an understanding of the relevance of the journal.

Based on the H-index, the most relevant top ten journals by citation, number of publications and impact are: *Small Business Economics, New Media and Society, Sustainability (Switzerland), Technological Forecasting and Social Change, Journalism Practice, International Review of Entrepreneurship, Creativity and Innova-*

*tion Management, Environment and Planning A, Business Horizons* and *Journal of Business Research*.

### 3.3. Authors

751 authors were identified with an average of 0.459 articles per author and 2.18 authors per document. Considering the most relevant authors, with an H-Index equal to or greater than 2, as shown in Table 6, the following authors have the highest impact on this field: Bouncken, R; Kraus, S; Bgenhold, D; Cohen, B; Burke, A; Cowling, M; Damian, D; Dvouletý, O; Noonan, D and Akhavan, M. Following a different perspective, only four authors have a number of citations higher than 100: Kraus, S; Cohen, B; Ghezzi, A and Muoz, P.

Table 5
**Source Impact**

| R | Source | H | G | M | BF | TC | NP | Year |
|---|---|---|---|---|---|---|---|---|
| 1 | *Small Business Economics* | 5 | 10 | 0.83 | 16 | 109 | 16 | 2016 |
| 2 | *New Media and Society* | 5 | 5 | 0.50 | 48 | 122 | 5 | 2012 |
| 3 | *Sustainability (Switzerland)* | 4 | 7 | 0.80 | 32 | 50 | 8 | 2017 |
| 4 | *Technological Forecasting and Social Change* | 4 | 6 | 0.80 | 38 | 194 | 6 | 2017 |
| 5 | *Journalism Practice* | 4 | 5 | 0.33 | 43 | 86 | 5 | 2010 |
| 6 | *International Review of Entrepreneurship* | 3 | 5 | 0.43 | 24 | 31 | 8 | 2015 |
| 7 | *Creativity and Innovation Management* | 3 | 3 | 0.19 | 59 | 122 | 3 | 2006 |
| 8 | *Environment and Planning A* | 3 | 3 | 0.60 | 62 | 56 | 3 | 2017 |
| 9 | *Business Horizons* | 2 | 4 | 0.40 | 52 | 112 | 4 | 2017 |
| 10 | *Journal of Business Research* | 2 | 4 | 1.00 | 56 | 30 | 4 | 2020 |
| 11 | *Geoforum* | 2 | 3 | 0.33 | 65 | 106 | 3 | 2016 |
| 12 | *Management Decision* | 2 | 2 | 0.29 | 71 | 8 | 3 | 2015 |
| 13 | *Marketing and Management of Innovations* | 2 | 2 | 0.50 | 74 | 6 | 3 | 2018 |
| 14 | *Small Enterprise Research* | 2 | 3 | 0.29 | 77 | 13 | 3 | 2015 |
| 15 | *Sociological Review* | 2 | 3 | 0.50 | 80 | 20 | 3 | 2018 |
| 16 | *Academy of Management Discoveries* | 2 | 2 | 0.40 | 82 | 45 | 2 | 2017 |
| 17 | *Business Strategy and The Environment* | 2 | 2 | 1.00 | 88 | 5 | 2 | 2020 |
| 18 | *California Management Review* | 2 | 2 | 0.33 | 90 | 77 | 2 | 2016 |
| 19 | *Cambridge Journal of Regions, Economy and Society* | 2 | 2 | 0.40 | 92 | 114 | 2 | 2017 |
| 20 | *CIRIEC - Revista de Economia Publica Social y Cooperativa* | 2 | 2 | 0.40 | 94 | 9 | 2 | 2017 |
| 21 | *Current Issues In Tourism* | 2 | 2 | 0.67 | 96 | 10 | 2 | 2019 |
| 22 | *European Planning Studies* | 2 | 2 | 0.11 | 102 | 25 | 2 | 2004 |
| 23 | *Historia y Comunicacion Social* | 2 | 2 | 0.22 | 104 | 4 | 2 | 2013 |
| 24 | *International Entrepreneurship and Management Journal* | 2 | 2 | 0.50 | 108 | 16 | 2 | 2018 |
| 25 | *International Journal of Communication* | 2 | 2 | 0.33 | 110 | 261 | 2 | 2016 |
| 26 | *International Journal of Hospitality Management* | 2 | 2 | 0.67 | 112 | 23 | 2 | 2019 |
| 27 | *Internet Research* | 2 | 2 | 0.67 | 114 | 19 | 2 | 2019 |
| 28 | *Journal of Business Ethics* | 2 | 2 | 1.00 | 116 | 26 | 2 | 2020 |
| 29 | *Journal of Business Venturing* | 2 | 2 | 0.20 | 118 | 97 | 2 | 2012 |
| 30 | *Journal of Knowledge Management* | 2 | 2 | 0.67 | 122 | 19 | 2 | 2019 |
| 31 | *Journal of Managerial Psychology* | 2 | 2 | 0.67 | 124 | 11 | 2 | 2019 |
| 32 | *Journalism and Mass Communication Educator* | 2 | 2 | 0.22 | 134 | 35 | 2 | 2013 |
| 33 | *Kolner Zeitschrift Fur Soziologie Und Sozialpsychologie* | 2 | 2 | 0.09 | 132 | 26 | 2 | 1999 |

*Notes:* Abbreviations: R = Ranking; H = H-index; G = G-index; M = M-index; BF = Bradford's law frequency; TC = Total citation; NP = Number of publications

*Source:* Author's own elaboration.

Table 6
**Author impact**

| Rank | Author | H | G | M | TC | NP | Year |
|------|--------|---|---|---|----|----|------|
| 1 | Bouncken R | 4 | 7 | 1.333 | 76 | 7 | 2019 |
| 2 | Kraus S | 4 | 5 | 0.800 | 137 | 5 | 2017 |
| 3 | Bgenhold D | 3 | 3 | 0.375 | 40 | 3 | 2014 |
| 4 | Cohen B | 3 | 3 | 0.500 | 194 | 3 | 2016 |
| 5 | Burke A | 2 | 4 | 0.286 | 18 | 5 | 2015 |
| 6 | Cowling M | 2 | 4 | 0.286 | 17 | 4 | 2015 |
| 7 | Damian D | 2 | 3 | 0.667 | 11 | 3 | 2019 |
| 8 | Dvoulety O | 2 | 3 | 0.500 | 12 | 3 | 2018 |
| 9 | Noonan D | 2 | 3 | 0.667 | 20 | 3 | 2019 |
| 10 | Akhavan M | 2 | 2 | 0.667 | 13 | 3 | 2019 |
| 11 | Aslam M | 2 | 2 | 0.667 | 18 | 2 | 2019 |
| 12 | Boegenhold D | 2 | 2 | 0.667 | 5 | 2 | 2019 |
| 13 | Campelo R M | 2 | 2 | 0.222 | 4 | 2 | 2013 |
| 14 | Cieslik J | 2 | 2 | 0.286 | 7 | 2 | 2015 |
| 15 | Ghezzi A | 2 | 2 | 0.400 | 104 | 2 | 2017 |
| 16 | Gottschall K | 2 | 2 | 0.087 | 26 | 2 | 1999 |
| 17 | Henkel S | 2 | 2 | 0.400 | 71 | 2 | 2017 |
| 18 | Mariotti I | 2 | 2 | 0.667 | 13 | 2 | 2019 |
| 19 | Muoz P | 2 | 2 | 0.400 | 135 | 2 | 2017 |
| 20 | Park K | 2 | 2 | 0.400 | 31 | 2 | 2017 |
| 21 | Ravenelle A | 2 | 2 | 0.400 | 75 | 2 | 2017 |
| 22 | Stanworth J | 2 | 2 | 0.074 | 87 | 2 | 1995 |
| 23 | Van D Z P | 2 | 2 | 1.000 | 11 | 2 | 2020 |
| 24 | Wilhelms M | 2 | 2 | 0.400 | 71 | 2 | 2017 |
| 25 | Woronkowicz J | 2 | 2 | 0.667 | 20 | 2 | 2019 |
| 26 | Yun J | 2 | 2 | 0.400 | 31 | 2 | 2017 |

*Notes:* Abbreviations: H = H-index; G = G-index; M = M-index; TC = Total citation; NP = Number of publications.
*Source:* Author's own elaboration.

When analyzing author production over time, Burke, A, Cowling, M, Kraus, S, Cieslik, J, and Mckeown, T are the authors that represent a larger chronological line of contributions as seen in Figure 3. However, four of them published extensively in the period of time from 2015 until 2021, and three of them (Burke, A, Cowling, M, Kraus, S) alongside Bouncken, R have the largest number of publications in 2020.

As mentioned before, this collection is composed by 751 authors, with 101 authors (13.44%) contributing with single-authored documents and 650 (86.55%) in collaboration with others. Also, a collaboration index of 2.71 was identified, considering that 650 authors produced 240 documents with a mean of 2.34 co-authors per document. Furthermore, after applying Lotka's law (Maz-Machado *et al.*, 2017) it is possible to conclude that 741 (98.66%) of collection are occasional authors and, within this group, 712 (94.8%) have a single contribution. On the other hand, only 10 authors (1.05%) contributed with three or more publications within the highest productivity period, and they are core to the theme.
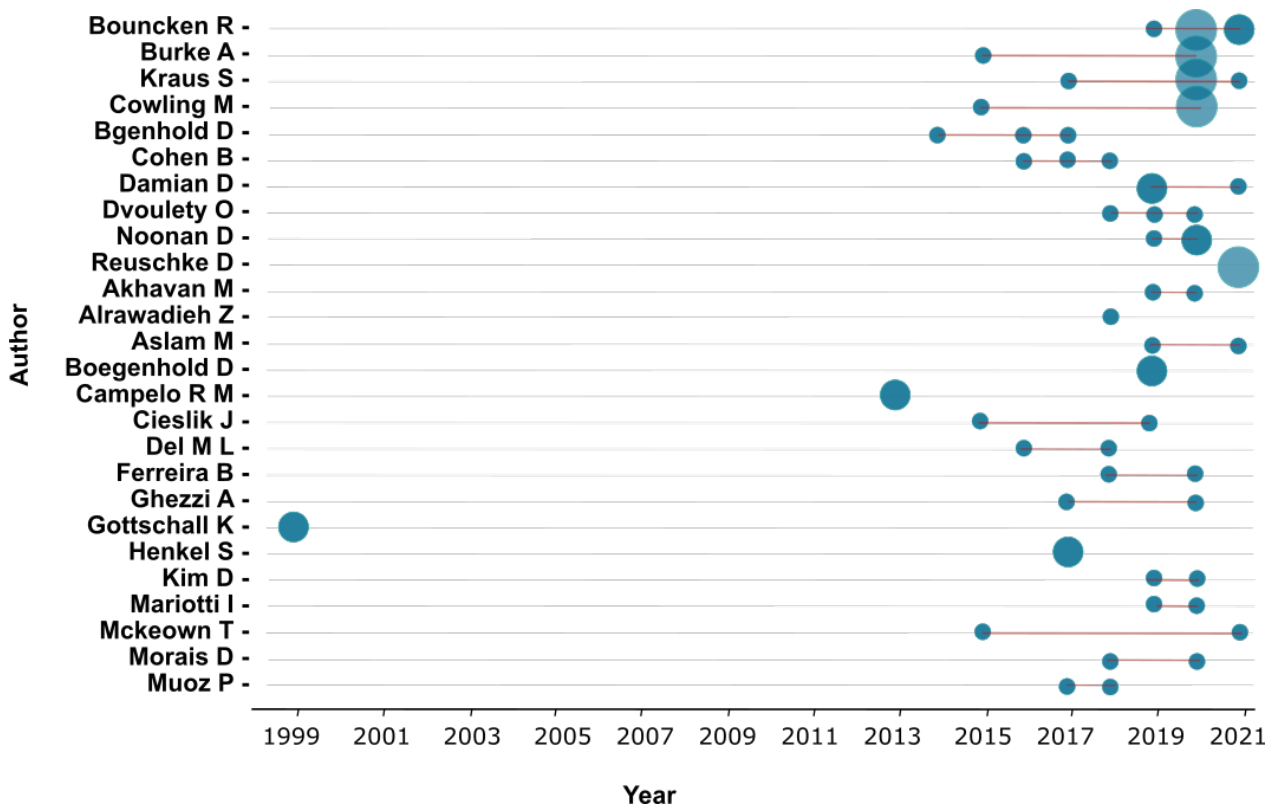
Figure 3
**Most relevant author production over time**
*Source:* Author's own elaboration.

### 3.4. *Affiliations and Countries*

The disambiguation method of affiliation was used (Donner *et al.*, 2020) to find the most relevant institutional affiliations. This discloses the main institutions that have worked in the theme based on the aforementioned co-authorship index of 2.34 authors per document. Therefore, as shown in Table 7, the result indicates that the University of Bayreuth, Kozminski University, Chongqing University, Tilburg University, and the University of Southampton are the top five institutions affiliated with the production of articles related to the theme.

In general, it can be asserted that the United Kingdom, Germany and the United States are the main three countries in terms of output. Furthermore, all countries show an intra-country collaboration, or single country publication (SCP), rate of 92.74%, and an inter-author country collaboration, or multiple countries on publishing (MCP), rate of 7.26%, as shown in Figure 4.

Overall, the top 20 of the set of 44 countries represents 94.45% of the total number of citations, whereas the first top 10 countries are responsible for 83.78% of these citations. The findings shown in Table 8 show several realities. In terms of total citations, three countries stand out: the United Kingdom (664), the United States (462) and Germany (210). From a different perspective, when analyzing productivity (number of publications), it can be concluded that although the United States (69) and the United Kingdom (56) are still within the top three, Germany (29) is replaced by Spain (40), which takes third position.

Table 7
**Most relevant affiliations**

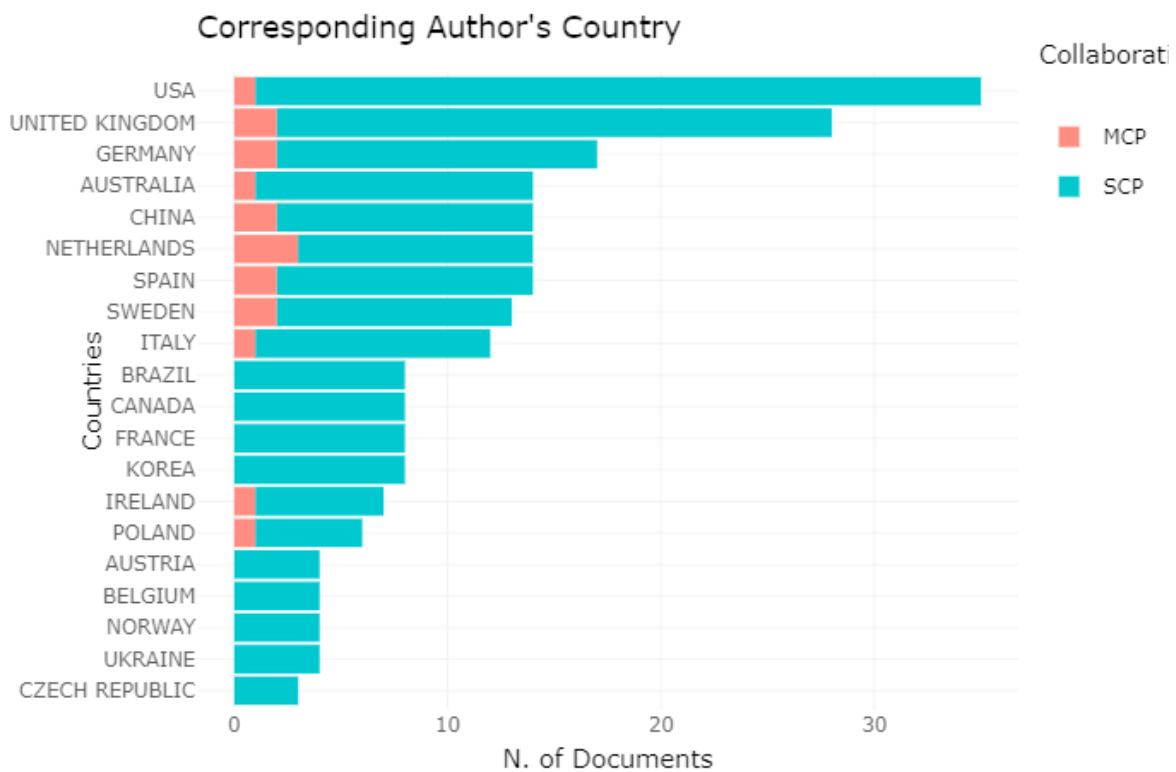| # | Affiliations | Articles |
|---|---|---|
| 1 | University of Bayreuth | 10 |
| 2 | Kozminski University | 7 |
| 3 | Chongqing University | 6 |
| 4 | Tilburg University | 6 |
| 5 | University of Southampton | 6 |
| 6 | Utrecht University | 5 |
| 7 | Durham University | 4 |
| 8 | Indiana University | 4 |
| 9 | Leiden University | 4 |
| 10 | Monash University | 4 |
| 11 | New York University | 4 |
| 12 | North Carolina State University | 4 |
| 13 | University of Klagenfurt | 4 |
| 14 | University of Louisville | 4 |
| 15 | University of Malaga | 4 |
| 16 | University of Oxford | 4 |
| 17 | Universidad Cardenal Cisneros | 3 |
| 18 | Curtin University | 3 |
| 19 | EADA Business School | 3 |
| 20 | Feng Chia University | 3 |

*Source:* Author's own elaboration.

Figure 4
**Intra and inter country collaboration**
*Source:* Author's own elaboration.

Table 8
**Most cited countries**

| R | Country | TC | AAC | NP |
|---|---------|-----|--------|-----|
| 1 | United Kingdom | 664 | 23.710 | 56 |
| 2 | United States | 462 | 13.200 | 69 |
| 3 | Germany | 210 | 12.350 | 29 |
| 4 | Netherlands | 179 | 12.780 | 31 |
| 5 | Sweden | 137 | 10.530 | 18 |
| 6 | Canada | 118 | 14.750 | 15 |
| 7 | South Korea | 92 | 11.500 | 11 |
| 8 | Italy | 91 | 7.580 | 16 |
| 9 | Norway | 81 | 20.250 | 3 |
| 10 | China | 43 | 3.070 | 24 |
| 11 | Finland | 42 | 14.000 | 5 |
| 12 | Australia | 41 | 2.930 | 23 |
| 13 | Austria | 40 | 1.000 | 9 |
| 14 | Ireland | 37 | 5.286 | 4 |
| 15 | Brazil | 32 | 4.000 | 23 |
| 16 | Spain | 26 | 1.860 | 40 |
| 17 | Turkey | 26 | 8.670 | 3 |
| 18 | France | 25 | 3.130 | 29 |
| 19 | Saudi Arabia | 24 | 24.000 | 1 |
| 20 | Belgium | 21 | 5.250 | 7 |

*Notes:* Abbreviations: TC = Total citation; AAC = Annual average citation; NP = Number of publications.

*Source:* Author's own elaboration.

Once again the United Kingdom (23.7) and the United States (13.2), based on the annual average citations (AAC), are among the top three performers; however, Norway (20.25) is in second position. Furthermore, it can also be concluded that Norway, although only having three publications, represents almost 10% of the annual average citation of all countries. Also, even though the productivity of countries as Spain (40) and France (29) are higher than some of those ranked in the top ten, neither their total nor their AACs present relevance equivalent to the top countries.

### 3.5. Documents

This investigation identified a total of 4387 citations, with an average of 9.907 citations per document and of 2.146 citations per year per document. The top 20 most highly-cited articles correspond to 51.15% of the total number of citations of all the collection analyzed. Most of them were published in the period between 2014 and 2017. Moreover, as shown in Table 9, on 31 of May 2020 the most global cited documents were written by C. Martin (2016), A. Rosenblat & L. Stark (2016) and G. Friedman (2014). All of them are from the United Kingdom, followed by the United States, confirming the trend previously evinced through the geographical perspective of author's countries contributions.

Table 9
**Top 50 most influential articles**

| # | Title | Authors | Year | Country | TC | CY | LC | Journals | CR |
|---|-------|---------|------|---------|-----|------|-----|----------|-----|
| 1 | The sharing economy a pathway to sustainability or a nightmarish form of neoliberal capitalism | Martin C | 2016 | United Kingdom | 499 | 83.17 | 0 | *Ecological Economics* | 28 |
| 2 | Algorithmic labor and information asymmetries a case study of Ubers drivers | Rosenblat A; Stark L | 2016 | United States | 257 | 42.83 | 0 | *International Journal of Communication* | 7 |
| 3 | Workers without employers shadow corporations and the rise of the gig economy | Friedman G | 2014 | United States | 171 | 21.38 | 3 | *Review of Keynesian Economics* | 9 |
| 4 | Mapping out the sharing economy a configurational approach to sharing business modeling | Muoz P; Cohen B | 2017 | Spain | 117 | 23.4 | 0 | *Technological Forecasting and Social Change* | 2 |
| 5 | The relational antecedents of project entrepreneurship network centrality team composition and project performance | Ferriani S; Cattani G; Baden-Fuller C | 2009 | Italy | 115 | 8.85 | 0 | *Research Policy* | 1 |
| 6 | Sharing and neoliberal discourse the economic function of sharing in the digital on demand economy | Cockayne D | 2016 | Canada | 103 | 17.17 | 0 | *Geoforum* | 5 |
| 7 | Can you gig it an empirical examination of the gig economy and entrepreneurial activity | Burtch G; Carnahan S; Greenwood B | 2018 | United States | 93 | 23.25 | 0 | *Management Science* | 8 |
| 8 | Cultural entrepreneurialism on the changing relationship between the arts culture and employment | Ellmeier A | 2003 | Austria | 87 | 4.58 | 1 | *International Journal of Cultural Policy* | 3 |
| 9 | Innovative and sustainable business models in the fashion industry entrepreneurial drivers opportunities and challenges | Todeschini B; Cortimiglia M; Callegaro-De-Menezes D; Ghezzi A | 2017 | Brazil | 86 | 17.20 | 0 | *Business Horizons* | 2 |
| 10 | Digital entrepreneurship innovative business models for the sharing economy | Richter C; Kraus S; Brem A; Durst S; Giselbrecht C | 2017 | Finland | 80 | 16.00 | 0 | *Creativity and Innovation Management* | 3 |
| 11 | Digital work self-branding and social capital in the freelance knowledge economy | Gandini A | 2016 | United Kingdom | 76 | 12.67 | 0 | *Marketing Theory* | 9 |
| 12 | Social capital and networks in film and tv jobs for the boys | Grugulis I; Stoyanova D | 2012 | United Kingdom | 68 | 6.80 | 0 | *Organization Studies* | 5 |
| 13 | Self-employment career dynamics the case of unemployment push in UK book publishing | Granger B; Stanworth J; Stanworth C | 1995 | United Kingdom | 67 | 2.48 | 0 | *Work Employment & Society* | 4 |
| 14 | Conducting field experiments using freelancing natural environment | Aguinis H; Lawal S | 2012 | United States | 67 | 6.70 | 0 | *Journal of Business Venturing* | 0 |
| 15 | Sharing economy workers selling not sharing | Ravenelle A | 2017 | United States | 66 | 13.2 | 0 | *Cambridge Journal of Regions, Economy and Society* | 5 |
| 16 | Coworking spaces for promoting entrepreneurship in sparse regions the case of South Wales | Fuzi A | 2015 | United Kingdom | 61 | 8.71 | 1 | *Regional Studies, Regional Science* | 6 |
| 17 | The city as a lab open innovation meets the collaborative economy | Cohen B; Almirall E; Chesbrough H | 2016 | Spain | 59 | 9.83 | 1 | *California Management Review* | 4 |
| 18 | Sharing versus collaborative economy how to align ICT developments and the SDGS in tourism | Gssling S; Michael H C | 2019 | Norway | 59 | 19.67 | 0 | *Journal of Sustainable Tourism* | 0 |
| 19 | Entrepreneurial journalism and the precarious state of media work | Cohen N | 2015 | Canada | 57 | 8.14 | 0 | *South Atlantic Quarterly* | 5 |
| 20 | Microentrepreneurs dependent contractors and instaserfs understanding online labor platform workforces | Kuhn K; Maleki A | 2017 | United States | 56 | 11.20 | 0 | *Academy of Management Perspectives* | 0 |
| 21 | Mr. gates returns curation community management and other new roles for journalists | Bakker P | 2014 | Netherlands | 53 | 6.63 | 0 | *Journalism Studies* | 2 |
| 22 | To earn is not enough a mean send analysis to uncover peer providers participation motives in peer-to-peer carsharing | Wilhelms M; Henkel S; Falk T | 2017 | Germany | 49 | 9.80 | 0 | *Technological Forecasting and Social Change* | 1 |
| 23 | People as businesses Airbnb and urban micro entrepreneurialism in New York city | Stabrowski F | 2017 | United States | 48 | 9.60 | 1 | *Cambridge Journal of Regions, Economy and Society* | 3 |
| 24 | Capitalizing on the crowd the monetary and financial ecologies of crowdfunding | Langley P; Leyshon A | 2017 | United Kingdom | 47 | 9.40 | 0 | *Environment and Planning A* | 1 |
| 25 | Digital labor is the new killer app | Fish A; Srinivasan R | 2012 | United States | 44 | 4.40 | 0 | *New Media and Society* | 1 |
| 26 | Fluid loyalties in a regional crisis: Chadian ex liberators in the Central African Republic | Debos M | 2008 | France | 41 | 2.93 | 0 | *African Affairs* | 0 |
| 27 | Drivers of freelance career success | Van D B A; Van W A | 2013 | Netherlands | 38 | 4.22 | 0 | *Journal of Organizational Behavior* | 0 |

| # | Title | Authors | Year | Country | TC | CY | LC | Journals | CR |
|---|-------|---------|------|---------|----|----|----|----------|----|
| 28 | An education for independence should entrepreneurial skills be an essential part of the journalist's toolbox | Baines D; Kennedy C | 2010 | United Kingdom | 37 | 3.08 | 0 | *Journalism Practice* | 0 |
| 29 | Evasive entrepreneurship | Elert N; Henrekson M | 2016 | Sweden | 36 | 6.00 | 0 | *Small Business Economics* | 0 |
| 30 | UK film companies project-based organizations lacking entrepreneurship and innovativeness | Davenport J | 2006 | United Kingdom | 31 | 1.94 | 0 | *Creativity and Innovation Management* | 0 |
| 31 | Media entrepreneurship curriculum development and faculty perceptions of what students should know | Ferrier M | 2013 | United States | 30 | 3.33 | 1 | *Journalism and Mass Communication Educator* | 0 |
| 32 | Adaptive governance and decentralization evidence from regulation of the sharing economy in multilevel governance | Hong S; Lee S | 2018 | South Korea | 30 | 7.50 | 0 | *Government Information Quarterly* | 0 |
| 33 | Sharing and shaping a cross country comparison of how sharing economy firms shape their institutional environment to gain legitimacy | Uzunca B; Rigtering J; Ozcan P | 2018 | Netherlands | 30 | 7.50 | 0 | *Academy of Management Discoveries* | 0 |
| 34 | The emergence of the maker movement implications for entrepreneurship research | Browder R; Aldrich H; Bradley S | 2019 | United States | 30 | 10.00 | 0 | *Journal of Business Venturing* | 0 |
| 35 | Knowledge and innovation-based business models for future growth digitalized business models and portfolio considerations | Bouncken R; Kraus S; Roigtierno N | 2021 | Germany | 30 | 30.00 | 0 | *Review of Managerial Science* | 0 |
| 36 | Return to work after thoracic organ transplantation in a clinically stable population | Petrucci L; Ricotti S; Michelini I; Vitulo P; Oggionni T; Cascina A; D'armini | 2007 | Italy | 29 | 1.93 | 0 | *European Journal of Heart Failure* | 0 |
| 37 | The freelance translation machine algorithmic culture and the invisible industry | Kushner S | 2013 | Canada | 29 | 3.22 | 0 | *New Media and Society* | 0 |
| 38 | Freelance journalists as a flexible workforce in media industries | Edstrom M; Ladendorf M | 2012 | Sweden | 26 | 2.60 | 0 | *Journalism Practice* | 0 |
| 39 | Exploring entrepreneurship in the sharing accommodation sector empirical evidence from a developing country | Alrawadieh Z; Alrawadieh Z | 2018 | Turkey | 26 | 6.5 | 0 | *Tourism Management Perspectives* | 0 |
| 40 | Trusted strangers care work platforms cultural entrepreneurship in the on-demand economy | Ticona J; Mateescu A | 2018 | United States | 25 | 6.25 | 0 | *New Media and Society* | 0 |
| 41 | Relational governance mechanisms and uncertainties in nonownership services | Ndubisi N; Ehret M; Wirtz J | 2016 | Saudi Arabia | 24 | 4.00 | 0 | *Psychology and Marketing* | 0 |
| 42 | Green entrepreneurship in the sharing economy utilising multiplicity of institutional logics | Grinevich V; Huber F; Karata-Zkan M; Yavuz | 2019 | United Kingdom | 23 | 7.67 | 0 | *Small Business Economics* | 0 |
| 43 | German artists between bohemian idealism and entrepreneurial dynamics reflections on cultural entrepreneurship and the need for startup management | Hausmann A | 2010 | Germany | 22 | 1.83 | 1 | *International Journal of Arts Management* | 0 |
| 44 | Yours mine and ours a user centric analysis of opportunities and challenges in peer-to-peer asset sharing | Wilhelms M; Merfeld K; Henkel S | 2017 | Germany | 22 | 4.40 | 0 | *Business Horizons* | 0 |
| 45 | Tribal proletarian and entrepreneurial career stories junior academics as a case in point | Ylijoki O; Henriksson L | 2017 | Finland | 22 | 4.40 | 0 | *Studies In Higher Education* | 0 |
| 46 | Entrepreneurship and ethics in the sharing economy a critical perspective | Ahsan M | 2020 | United States | 22 | 11.00 | 0 | *Journal of Business Ethics* | 0 |
| 47 | A qualitative investigation of micro entrepreneurship in the sharing economy | Zhang T; Bufquin D; Lu C | 2019 | United States | 21 | 7.00 | 0 | *International Journal of Hospitality Management* | 0 |
| 48 | Digital entrepreneurship and field conditions for institutional change investigating the enabling role of cities | Geissinger A; Laurell C; Sandstrm C; Eriksson K; Nykvist R | 2019 | Sweden | 21 | 7.00 | 0 | *Technological Forecasting and Social Change* | 0 |
| 49 | Reluctant entrepreneurs and their clients the case of self-employed freelance workers in the British book publishing industry | Celia C; Stanworth J | 1997 | United Kingdom | 20 | 0.80 | 2 | *International Small Business Journal* | 0 |
| 50 | Entrepreneurship and independent professionals social and economic logics | Bgenhold D; Heinonen J; Akola E | 2014 | Austria | 20 | 2.50 | 0 | *International Advances in Economic Research* | 0 |

*Notes:* Abbreviations: TC = Total Citation; CY= Average Citation Per Year; LC = Local Citation; CR = Cited References.
*Source:* Author's own elaboration.

When analyzing the most local cited documents in Table 9, it can be concluded that there is a huge mismatch between global and local citations. This means that entrepreneurship activities in the gig economy are still in their infancy.

### 3.6. Keywords and structures of knowledge

To understand the most relevant terms of the collection, we analyzed 700 keywords plus —a metric provided by the bibli-oshiny package based on words or phrases that frequently appear in the titles of an article's references— and 2072 author keywords. To avoid errors building the maps we grouped the keywords presenting similar concepts, for instance: "entrepreneurialism" and "entrepreneurship" as "entrepreneurship", "freelance", "free-lance" and "freelancers" as "freelancers", "business model" and "business models" as "business models". Furthermore, we re-moved terms that did not aggregate value for the analysis, such as "science", "pathway" and "research".



Figure 5
**Author keyword word tree**
*Source:* Author's own elaboration.



Figure 6
**Co-occurrence of author keywords with 50 occurrences excluding isolated nodes**
*Source:* Author's own elaboration.

As shown in Figure 5, it is possible to conclude that authors use keywords such as "sharing economy", "gig economy" and "platform economy" as part of, or closely related with "gig economy", which is under scrutiny in this paper. Setting aside those keywords, the main author keywords related with the theme studied are "freelancers" (52), "'self-employment" (34), "business models" (26), "innovation" (24), "airbnb" (21) and "collaborative economy" (13). It is noteworthy that terms such as "sustainability" (11) and "precarious work" (10) are also well established.

Table 10 shows the 50 most representative keywords of the collection analyzed, whilst Figure 6 shows the main clusters of author keywords. It is clear that four clusters stand out, led by the core themes: "sharing economy", "entrepreneurship", "gig

economy" and "self-employment". They are closely followed by the following isolated nodes: "digital entrepreneurship", "social innovation", "community", "entrepreneurialism", "economic growth" and "case study". Figure 6 shows the ten main clusters from which all the information in the collection of keywords is derived, but when a conceptual structured analysis tracing a thematic map is applied, these ten clusters are grouped into five cluster groups, as shown in Figure 7. Therefore, in addition to the previously mentioned four main clusters "*entrepreneurship*", "*sharing economy*", "*gig economy*" and "*self-employment*", a new cluster is revealed: "*digitalization*". This thematic map is displayed in Figure 8, corresponding to the top two most frequent terms per thousand documents, considering their density and centrality.

Table 10
**Top 50 most representative keywords**

| # | Keywords | Occurrences | BT | CT | PR | # | Keywords | Occurrences | BT | CT | PR |
|---|----------|-------------|-----|-----|-----|---|----------|-------------|-----|-----|-----|
| 1 | sharing economy | 114 | 1564.31 | 0.0040 | 0.1997 | 26 | platforms | 5 | 0.00 | 0.0033 | 0.0093 |
| 2 | entrepreneurship | 85 | 991.42 | 0.0038 | 0.1010 | 27 | platform | 5 | 66.00 | 0.0032 | 0.0105 |
| 3 | entrepreneur | 36 | 52.72 | 0.0033 | 0.0133 | 28 | bibliometrics | 5 | 0.00 | 0.0032 | 0.0131 |
| 4 | self-employment | 34 | 366.38 | 0.0034 | 0.0456 | 29 | regulation | 5 | 0.00 | 0.0031 | 0.0049 |
| 5 | innovation | 31 | 89.94 | 0.0035 | 0.0245 | 30 | management | 5 | 0.00 | 0.0031 | 0.0049 |
| 6 | gig economy | 26 | 275.26 | 0.0036 | 0.0306 | 31 | agency | 5 | 0.00 | 0.0031 | 0.0047 |
| 7 | freelancers | 23 | 197.48 | 0.0032 | 0.0209 | 32 | work | 5 | 0.00 | 0.0031 | 0.0047 |
| 8 | airbnb | 20 | 2.24 | 0.0034 | 0.0288 | 33 | stakeholder theory | 4 | 0.00 | 0.0032 | 0.0082 |
| 9 | sustainable development | 15 | 0.00 | 0.0032 | 0.0097 | 34 | networks | 4 | 0.00 | 0.0031 | 0.0049 |
| 10 | sustainability | 15 | 0.00 | 0.0031 | 0.0076 | 35 | peer-to-peer | 4 | 0.00 | 0.0031 | 0.0049 |
| 11 | freelance | 13 | 178.54 | 0.0032 | 0.0315 | 36 | entrepreneurial ecosystems | 4 | 0.00 | 0.0031 | 0.0063 |
| 12 | business model | 13 | 0.00 | 0.0031 | 0.0049 | 37 | digital economy | 4 | 0.00 | 0.0031 | 0.0049 |
| 13 | digital platforms | 12 | 0.00 | 0.0031 | 0.0076 | 38 | labor market | 4 | 0.00 | 0.0031 | 0.0086 |
| 14 | collaborative consumption | 11 | 0.00 | 0.0032 | 0.0145 | 39 | labor | 4 | 0.00 | 0.0031 | 0.0047 |
| 15 | social capital responsibility | 11 | 0.00 | 0.0031 | 0.0049 | 40 | motivation | 4 | 0.00 | 0.0031 | 0.0060 |
| 16 | tourism | 10 | 0.00 | 0.0034 | 0.0151 | 41 | smart cities | 3 | 0.00 | 0.0031 | 0.0049 |
| 17 | platform economy | 9 | 0.89 | 0.0034 | 0.0100 | 42 | cities | 3 | 0.00 | 0.0031 | 0.0049 |
| 18 | collaborative economy | 9 | 0.00 | 0.0034 | 0.0074 | 43 | two-sided markets | 3 | 0.00 | 0.0031 | 0.0063 |
| 19 | uber | 9 | 0.18 | 0.0032 | 0.0182 | 44 | creative industries | 3 | 0.00 | 0.0031 | 0.0047 |
| 20 | crowdfunding | 8 | 0.00 | 0.0034 | 0.0101 | 45 | coworking spaces | 3 | 0.00 | 0.0031 | 0.0047 |
| 21 | neoliberalism | 8 | 0.00 | 0.0031 | 0.0063 | 46 | enterprise | 3 | 0.00 | 0.0029 | 0.0090 |
| 22 | on-demand economy | 8 | 0.00 | 0.0031 | 0.0049 | 47 | precarious work | 3 | 66.00 | 0.0029 | 0.0110 |
| 23 | digitalization | 7 | 66.00 | 0.0032 | 0.0114 | 48 | data analytics | 2 | 0.00 | 0.0031 | 0.0049 |
| 24 | business models | 7 | 0.00 | 0.0031 | 0.0117 | 49 | intermediaries | 1 | 0.00 | 0.0031 | 0.0049 |
| 25 | design | 6 | 66.00 | 0.0032 | 0.0114 | 50 | freelancing | 1 | 14.51 | 0.0031 | 0.0130 |

*Notes:* Abbreviations: BT = Betweenness; CT= Centrality; PR = Page Rank

*Source:* Own elaboration based in collection data.

Furthermore, the same five-cluster formation can be seen when analyzing the co-citation network in Figure 8 that shows the intellectual structure based on groups led by Martin C (2016), Belk R (2014), Botsman & Rogers (2010), Friedman G (2014), Bouncken

& Reuschl (2018) and Bogenhold D (2019). These groups were considered based in the co-citation of two documents in a third article, thus building a network based on the 19150 references found in the collection.
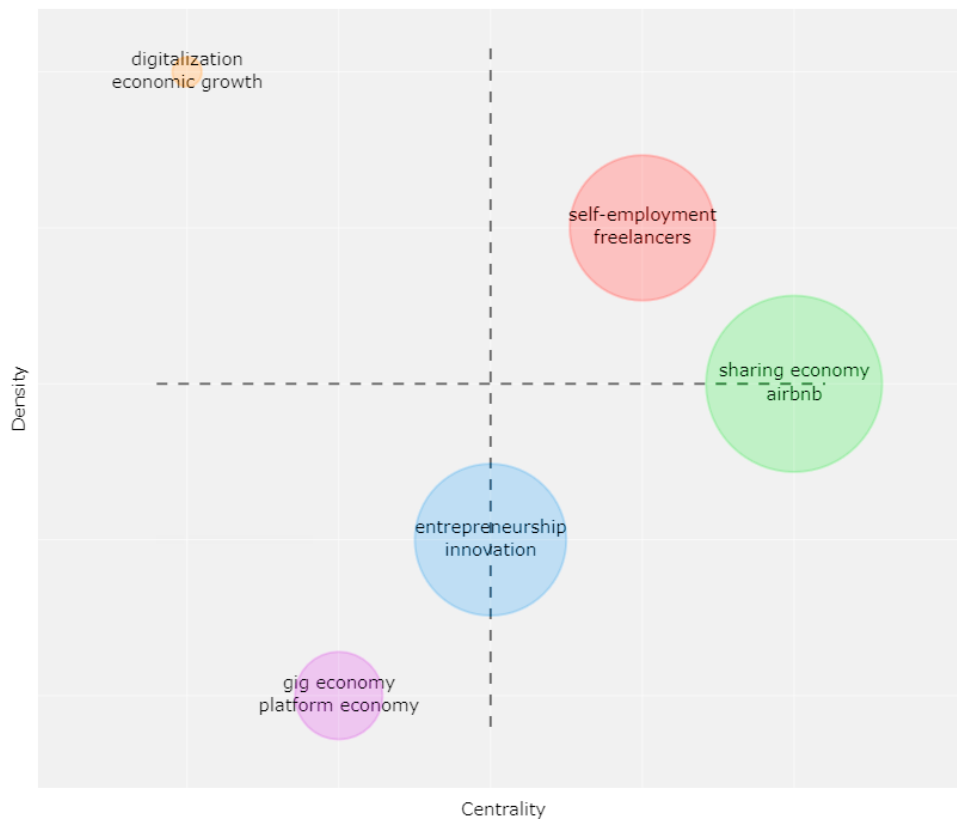
Figure 7
**Thematic map**
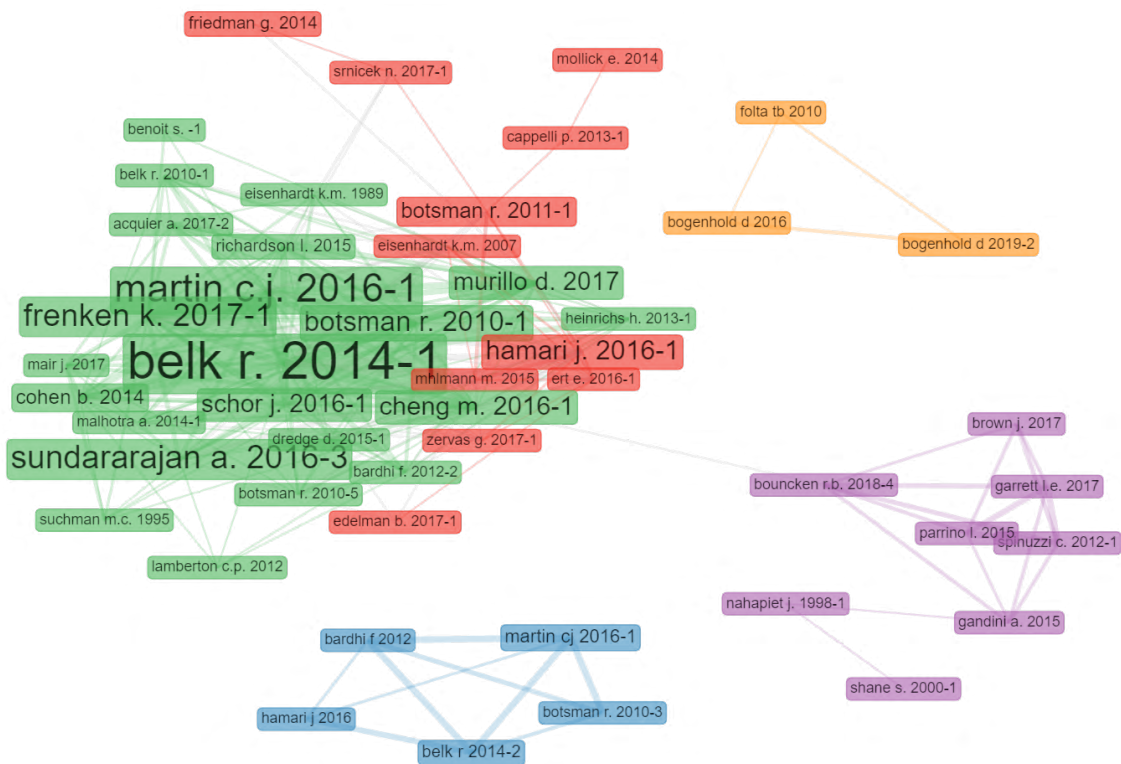*Source:* Author's own elaboration.



Figure 8
**Co-citation network**
*Source:* Author's own elaboration.

## 4. DISCUSSION

Using bibliometric indicators and visualization techniques, this study analyzed all the published literature, indexed in Scopus and Web of Science databases, on the gig economy and entrepreneurship. Initially 506 documents of different types and from 381 different sources were collected. The results obtained from both databases cover the years between 1991 and 2021. However, after removing duplicates and applying some eligibility criteria, 365 articles from 245 different journals totalizing 19150 references were included in the core collection.

The results underline an exponential increase in productivity, with a growth rate of 94.78% in the last decade. The citations also grew exponentially (63.59%) during the same time span. Therefore, explicit interest on this theme is perceptible throughout the years, mainly in the last five (2016-2021) in which 86.37% (298) of the articles were published.

This growth is associated with the emergence of new information and communications technologies that amplified the number of digital platforms offering solutions for the implementation of entrepreneurial and gig economy online activities during the last four years. According to Broda (2021), from 2018 until May 2021, the gig economy sector has shown an annual growth rate of 17.4%, involving more than 1 trillion USD, as a result of the increasing volume of digital platforms created based on this business model. Yet, it is worth mentioning the prominent productivity growth during this Covid-19 pandemic period, with a peak of 89 publications in 2020.

Applying Bradford's law to the collection, it is evident, from the original set of 245 journals, that the first quarter was the most relevant and productive, containing 33 journals, which correspond to 9.57% of the total number of journals. Therefore, based on the number of publications and total citations, also reinforced by the H-index, researchers will capture one-third of the relevant knowledge related to the theme under analysis when accessing these resources. Yet, when analyzing the time span, the period between 2016 and 2021 has the largest pattern of productivity and frequency of citations, which is also seen reflected in the M-index growth over the years. Clearly, entrepreneurship in the gig economy is a quite recent theme in an exploratory stage.

As shown in Table 5, when considering only the top 10 sources of these clusters, which are responsible for 18% of all publications and 20.79% of all citations, based either on the G-index or on the number of publications, it can be concluded that the theme has been discussed mainly by journals in the field of business (*Small Business Economics*, *Technological Forecasting and Social Change*, *International Review of Entrepreneurship*, *Creativity and Innovation Management*, *Business Horizons* and *Journal of Business Research*).

Following the global citation score (GCS) perspective, the following are the most highly ranked authors measured by their overall impact using the G-index or the number of publications contributing with more than three publications related to the theme: Bouncken R, Kraus S, Bgenhold D, Cohen B, Burke A, Cowling M, Damian D, Dvouletý O, Noonan

D and Akhavan M. Yet, Bouncken R, Kraus S and Burke A can be considered as core authors dealing with the theme as only three of them contribute with five or more articles within a time span of 10 years.

This collection included 345 documents totalizing 4387 citations. Those ranked in the top six (Table 9), based on total number of citations, represent 29% of all publications:

—"*The sharing economy: a pathway to sustainability or a nightmarish form of neoliberal capitalism*", with 499 citations and 11.3% of all citations;
—"*Algorithmic labor and information asymmetries: a case study of Ubers drivers*", with 257 citations and 5.9% of all citations;
—"*Workers without employers shadow corporations and the rise of the gig economy*", with 171 citations and 3.9% of all citations;
—"*Mapping out the sharing economy: a configurational approach to sharing business modeling*", with 117 citations and 2.7% of all citations;
—"*The relational antecedents of project-entrepreneurship: network centrality, team composition and project performance*", with 115 citations and 2.6% of all citations; and
—"*Sharing and neoliberal discourse: the economic function of sharing in the digital on demand economy*", with 103 citations and 2.3% of all citations.

A different approach, based on the average citation per year, shows that the articles with highest performance are: "*Knowledge and innovation-based business models for future growth: digitalized business models and portfolio considerations*", with 30 citations per year and "*Can you gig it? An empirical examination of the gig economy and entrepreneurial activity*", with an average of 23 citations per year. Furthermore, it is clear that through an intra-collection perspective, the results are quite different from those of the top ranked, in which the only documents reflecting local citations from the mentioned ranking are: "*Workers without employers: shadow corporations and the rise of the gig economy*" and "*Cultural entrepreneurialism: on the changing relationship between the arts culture and employment*."

We analyzed the articles' titles of those top 50 journals and concluded that most of the publications aim to study the theme through a social and human perspective, which reflects how the gig economy affects the individual's behavior and how the individual and society have dealt with the gig economy.

Complementarily, based on the map of co-occurrences of words in the titles and abstracts of these articles, Figures 9 and 10 confirm the interest in investigating the individuals' role in the field. This is reflected by the repeated frequency of terms such as "entrepreneurs", "worker", "self-employed", "self-employment", "career" and "freelancer". Moreover, when associating these words with access to the subjacent knowledge, the emergence of terms as "skills", "development", "creative", "culture", "degrees", "students", "potential" and "atypical" is noticeable. It stresses the importance of investigating the gig economy as a tool to facilitate the entry and development of entrepreneurial personal capabilities.

Figure 9
**Top 50 articles: Title co-occurrence network**
*Source:* Author's own elaboration.



Figure 10
**Top 50 articles: Abstract co-occurrence network**
*Source:* Author's own elaboration.

As previously mentioned, there is a trending interest in studying this topic focused on understanding human beings and their interactions with society as the focal point of the discussion, which is also confirmed by the keyword analysis. Overall, considering keywords and author's keywords, 2772 terms were analyzed and brought to light the course of the discourse. Therefore, Figure 11 shows the growth pattern in discussing the theme through an entrepreneurial perspective ("*entrepreneurship*", "*entrepreneur*"), also assuming its innovative ("*innovation*") charac- ter through a digital ("*digital platforms*", "*digitalization*") pathway for the independence of the individual ("*self-employment*", "*freelance*", "*freelancing*"). Yet, it is important to note that "*Airbnb*" and "*Uber*", as well as "*gig economy*" digital platforms ("*platform economy*"), show a growing trend, mainly during the last six years. Finally, the term "*sharing economy*", which is largely associated with a new sustainable pathway for society linked to "*collaborative consumption*", "*collaborative economy*" and "*crowdfunding*", shows high growth in this field of research.



Figure 11
**Historic keyword growth**
*Source:* Author's own elaboration.

Figure 12 shows the evolution of the thematic map. It is clear that despite the evolution and diversification of the themes over time, core themes remain over time: "*entrepreneurship*", "*sharing economy*" and "*freelancing*" (1995-2021). However, terms such as "*digitalization*", "*platform economy*", "*gig economy*", "*platform*", "*sharing economy*" and "*homeworking*" are closely related to the original theme. Finally, it is clear that there are new terms that encompass new realities such as "*career*", "*cities*", "*crowdfunding*", and "*citizen participation*".

Figure 13 presents the formation of five clusters based on the co-frequency of terms of author keywords. Those clusters are ar- ranged according to their proximity to each nuclear topic. They are named: "*self-employment and social economy*"; "*sharing economy and sustainable development*"; "*entrepreneurship and innovation*"; "*gig and platform economy*"; and "*digitalization*". Those clusters represent their centrality based on the indexation of words by similarity. As such, they represent the main subjects that have been studied and have emerged over time. For instance, is possible to visualize the emergence of terms as "*social capital*", "*motivation*, "*creative industries*", "*social innovation*", and "*digital entrepreneurship*", which although considerably distant from the original core topic, show a consistent relevance in study of the theme.
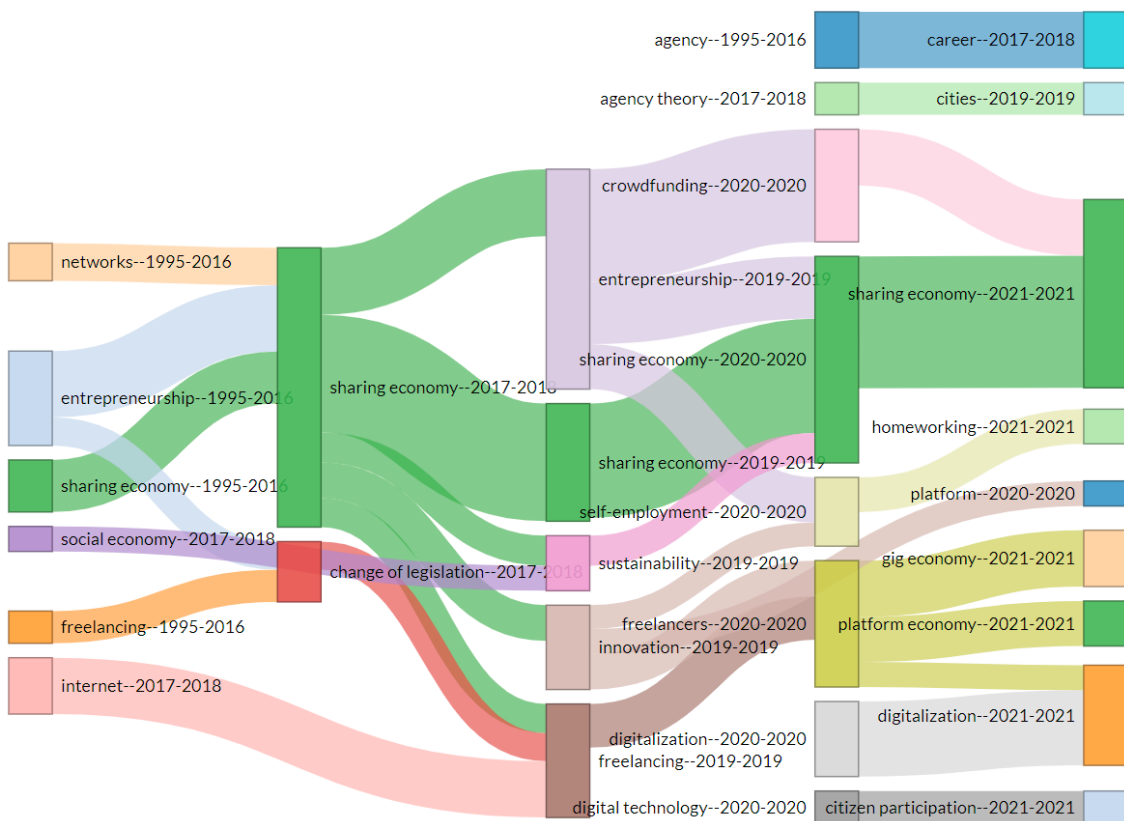
Figure 12
**Thematic evolution**
*Source:* Author's own elaboration.



Figure 13
**Network visualization based in author keywords**
*Source:* Author's own elaboration.

## 5. CONCLUSION

The emergence of the gig economy and its relationship with entrepreneurial activity worldwide is an important phenomenon both at business and individual levels: it impacts the entrepreneurial ecosystem due the adaptive circumstances imposed by the emergence of digitalization, which makes it imperative to understand the state of the art. Theoretically, we confirmed the importance of studying the impact of the gig economy on en-

trepreneurship and found new directions for developing further studies on this topic.

Table 11 summarizes the main findings of the paper, based on the bibliographic study. It can be asserted that the theme has grown steadily, highlighted by the high peak in productivity and citation in recent years. Interest in the theme is widespread in different fields, areas of interest, institutions, and countries, which demonstrates the critical value of the subject.

Table 11
**Objectives and findings summary**

| Objective | Findings Summary |
|---|---|
| **Evolution of the theme** | 94.78% of all publications and 63.59% of all citations were published in the last decade. The highest productivity was reached in 2020 with 89 publications (during the Covid-19 pandemic period). |
| **Top 5 journals** | *Small Business Economics*; *New Media and Society*; *Sustainability (Switzerland)*; *Technological Forecasting and Social Change*; and *Journalism Practice*. |
| **Most relevant authors (H-index)** | Bouncken R; Kraus S; Bgenhold D; Cohen B; Burke A; Cowling M |
| **Top 5 affiliations** | Kozminski University; Chongqing University, Tilburg University; University of Bayreuth; University of Southampton |
| **Top ranked countries** | United States; United Kingdom; Spain; Netherlands; Germany France; Canada; and Sweden. |
| **Top 5 documents** | "*The sharing economy: a pathway to sustainability or a nightmarish form of neoliberal capitalism*"; "*Algorithmic labor and information asymmetries: a case study of Ubers drivers*"; "*Workers without employers: shadow corporations and the rise of the gig economy*"; "*Mapping out the sharing economy: a configurational approach to sharing business modeling*"; and "*The relational antecedents of project entrepreneurship: network centrality, team composition and project performance*". |
| **Content based on the main keywords** | Sharing economy; Entrepreneurship; Self-employment; Gig economy; Innovation. |
| **Content based on the main keywords plus** | Entrepreneurship; Entrepreneur; Sharing economy; Innovation; Employment; Freelancers. |
| **Trend based on conceptual and thematic structure** | **Trending clusters research:** Self-employment and social economy; Sharing economy and sustainable development; Entrepreneurship and innovation; Gig economy and platform economy; and Digitalization.<br>**Thematic evolution (Recent domains): (2021)** Digital technology; Homeworking and Citizen participation; **(2020)** Self-employment; Collaborative economy; Creative industries; **(2019)** Sustainability; Freelancing; Innovation. |

*Source:* Author's own elaboration.

It is possible to assert that over time, the gig economy has gone through different waves and it is closely related with other terms that several authors have coined, such as: sharing economy, digital economy, platform economy, collaborative economy and on-demand economy. This is the consequence of an evolutionary perspective, as well as an interpretation that authors have used in positioning their manuscripts and concepts.

Another important aspect worth mentioning is that it all started with an entrepreneurial perspective based on digitalized business models and digital platforms in which freelancing activities and freelancers played an important role.

This paper also reveals information referring to conceptual and intellectual trends, as well as information on thematic avenues throughout the years, including the analysis of keywords, titles, and abstracts. Five trends were found based on the content analyzed:

— The gig economy is driven by a central cluster led by the sharing economy, sustainability, collaborative consumption and digital entrepreneurship, and is focused on digital business models. Mostly, this cluster is concentrated on case studies that investigate the route towards a fairer ecosystem. Moreover, it is worth noting that regulation policies have been assessed through the analysis of the policies and functionalities of the traditional platforms.

— The cluster entrepreneurship and social innovation holds the key position for the development of the theme. It deals with how individuals and society are dealing with and fund the advent of DPs. Led by the terms entrepreneurship and collaborative economy, it points the discussion to the innovative path for making the individual the central subject of the cluster and of the ecosystem through community development and crowdfunding initiatives. Furthermore, it also highlights the need

for discussing the motivating factors guiding the gig worker to adhere the digital environment through entrepreneurship.

— Social capital, entrepreneurs and digital labor encompass the interest in discussing the individual's role in the gig economy. As such, this cluster is characterized by the effects of DPs on the labor market through the prism of the worker as a freelancer or entrepreneur, reflected in the discussion about how to achieve a fair career in this digital labor environment.

— The gig economy and platform economy are associated with the innovative trends proposed by the technological digital advances, demonstrating a central proximity to the core of the other two clusters. Therefore, this cluster addresses what stimulates the advancements of the platforms and what makes gig work pivotal for most of the utilized models in the ecosystem. This is critical for contemporary investigation into the subject as it covers the sharing economy and social economy spectrum.

— Digital transformation emerged as an important cluster and is related to digital innovation advancements. This cluster stresses the need for the adaptation of businesses through digitalization, demanding a compelling appeal to understand its antecedents and outcomes. Although far from the core of the clusters, it is close to the themes related to the economic and structural aspects of the gig and platform economy. As such, it is fundamental to investigate the economic changes and impacts of these business models in the contemporary scenario.

It is clear that the gig economy is based on the digital transformation, which has consequences for entrepreneurs, as well as for the business ecosystem.

At individual level, self-employed freelancers are expected to increase their pressure as the main players of the gig economy. This can be explained by the low barriers to enter the international job market as self-employed freelancers can work remotely vising digital technology-based networks. Clearly, several industries — the tourism/hospitality, social media and entertainment, retail and demand professional services— are the engine of digitalization and employment growth, with consequences for business firms whose main challenges are: embracing digitalized of business models; collaborative work and consumption; and digital platforms.

It is also important to emphasize the role of the business ecosystem, especially the role of digitalization and collaborative business activities in the implementation of digital business models, which is expected to boost the gig economy, closely linked with peer-to-peer business interactions, outsourcing and intermediation activities. As such, public policy implications need to be taken into account at least at three levels of analysis.

First, the gig economy demands a new perspective on employee protection regulation, consumer protection regulation and fair competition regulation. Self-employment, digital workers, freelancers, digital entrepreneurs, among other types of work employment, need to be revisited so that the gig economy can successfully be implemented. Secondly, public policy needs to follow inter-organizational relationships closely as business interactions in the digital world need to be based on solid, trustful business relationships. As such, one of the main challenges for public policy is to support freelancers, digital entrepreneurs so that they can be treated fairly in their relationships with other business firms, but also to have the support from government as business men/women.

Finally, if the gig economy is to properly succeed, public policy needs to be tuned to the training of individuals' digital capabilities and to the deployment of digital platforms so that the players of the gig economy are prepared to the digitalization era.

## 6. LIMITATIONS AND FUTURE RESEARCH

The paper was prepared by using two of the most relevant databases sources for bibliometric information and only articles published until May 21st, 2021 were considered. Therefore, future research could consider other sources and other types of documents, in a further time span, to have different insights. Furthermore, a bibliometric analysis intra corpus will contribute to a more thorough understanding with new nodes of knowledge, since the software utilized uses a pre-defined setting which limits some actions related to data cleansing and optimization.

Moreover, to complement this perspective, the following main directions for future research can be indicated:

— To analyze the contribution of entrepreneurial activities to the job market and economic growth;

— To analyze the environmental impacts on sustainability, social welfare, and community development through digital entrepreneurship on such platforms, to access or update business models for fair economic growth;

— To analyze public policy perspectives on the support to the business community on the introduction of digital technologies and their consequences for the competitiveness of firms and the business ecosystem;

— To analyze public policy perspectives on the implementation of employee protection, consumer protection and fair competition regulation and how they may improve the economic wellbeing of the business ecosystem;

— To analyze the role of individuals as independent contractors and their decision-making process when adhering to the GE platforms as a bridge for entrepreneurship in order to understand the factors that motivate them as nascent entrepreneurs, as well as their behavioral and psychological aspects;

— To analyze the role of digital innovation as constrained support resources for promoting digital entrepreneurship as a career. As such, it would be important to consider the geographic contexts in the development of structured business models to make entrepreneurs the central gear for fair policies, well-being, and reduction of inequalities.

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