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# **EVOLUTION OF ENTREPRENEURIAL RESILIENCE: A BIBLIOMETRIC ANALYSIS**

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### ***Abstract***

*Today more than ever, entrepreneurial survival depends on the ability to overcome new and critical situations and to recover from unforeseeable events. Hence, entrepreneurial resilience is becoming increasingly important. The aim of this study is to outline the field of research by examining the main characteristics of publications on entrepreneurial resilience. Therefore, a bibliometric analysis based on the Web of Science Core Collection database was conducted to examine studies on this concept from the last ten years (2014-2023). The analysis was performed on a total of 651 extracted articles using VOSviewer and R. The results show an exponential increase in studies with emphasis on the keywords covid-19, crisis, orientation, SMEs and innovation, i.e. the results suggest that further research should focus on analysing the importance and role of the entrepreneurial ecosystem as well as entrepreneurial intention, orientation and self-efficacy and the characteristics of entrepreneurial failure.*

**Keywords:** *bibliometric analysis, entrepreneurial resilience, crisis, failure, SME*

## 1. INTRODUCTION

Interest in understanding the concept of resilience within different research areas and disciplines has been prominent in the literature over the last several decades. The growing interest in the study of resilience is particularly evident in the exponential increase in literature on resilience in the last few years, making the notion of resilience extremely relevant for understanding and interpreting the challenges facing society today. Across a wide range of research areas and disciplines, such as engineering (Hollnagel, Woods & Leveson, 2006), psychology (Powley, 2009), sociology (McKeown, Bui & Glenn, 2022), economy (Sutton, Arcidiacono, Torrisi & Arku, 2023, Perić, Vitezić & Perić Hadžić, 2020, Buheji, 2017), management (Đokić, Slijepčević, 2023; Hartmann, Backmann, Newman, Brykman & Pidduck, 2022, Rajh, Škrinjaric, & Budak, 2021, Hillmann & Guenther, 2020), the term has been used to generally denote the ability to withstand, thrive and survive, thus explaining its contribution to overcoming adversity and achieving success. The recent global health, economic, and social crisis caused by the Covid-19 pandemic tested the ability of individuals, organisations, and society to bounce back, recover and make a new start, stressing the importance of building resilience as a prime concern. In line with this situation, Covid-19 as a disruptive external event has recently become a common determinant for researchers in the study of practices, mechanisms and processes that can characterize resilience.

The concept of resilience is substantially analysed and discussed in the management literature (Jámbor, Nagy, 2022, Williams, Gruber, Sutcliffe, Shepherd & Zhao, 2017, Ortiz-de-Mandojana & Bansal, 2016), while in the entrepreneurship studies it can be defined as a relevant and emerging concept that is gaining increasing importance in terms of its broad application in contemporary business practise. Entrepreneurship in itself necessarily entails the process of innovating and creating new value, and entrepreneurial activity is concerned with the process of change, emergence and creation (Schumpeter, 1934, Shane & Venkatamaran, 2000). In general, it can be concluded that the entrepreneurial process is characterized by non-linearity, iterativity, experimentation and a willingness to take risks (Kerr & Coviello, 2020, von Briel, Davidsson & Recker, 2018, Duening, Shepherd & Czaplewski, 2012, Goel & Karri, 2006, Sarasvathy, 2001). When starting and developing new businesses, entrepreneurs frequently have to manage with various setbacks and difficulties that are most pronounced in the early stages, starting with developing the idea concept, testing it in the market, and obtaining and organizing resources. Dealing with frequent challenges and adversity is therefore something that is inherent to entrepreneurship (Pidduck & Clark, 2021, Chadwick & Raver, 2020). Resilience is conceptualized as a multi-level capability and confirms its relevance when exploring its impact on the individual level (Hoegl & Hartmann, 2021, Fisher, Merlot & Johnson, 2018, Duchek, 2018), firm-level (Elia, Margherita & Passiante, 2020, Iacobucci & Perugini, 2021, Metro, Harper, & Bogus, 2021) and community-level (Ryan, Giblin, Buciuini & Kogler, 2021, Roundy, Brockman & Bradshaw, 2017, Sankaran & Demangeot, 2017) in entrepreneurship

studies. Furthermore, some studies focused on identifying the determinants of resilience in a specific context before a disruptive event, where resilience is often conceptualized as a set of characteristics of an individual or company, and through a positive impact on entrepreneurial intentions (González-López, Pérez-López & Rodríguez-Ariza, 2019), self-employment (Baluku, Onderi & Otto, 2021) and venture performance and growth (Agarwal, Ramadani, Dana, Agarwal & Dixit, 2022), and post disruption, in order to explain mechanisms of adjustment of entrepreneurs, firms or ecosystems to new environment (Hayward, Forster, Saraswathy & Fredrickson, 2010).

The emerging research field of entrepreneurial resilience and its contribution to explaining a wide range of challenges inherent in the processes and effects of entrepreneurial activity press the need for a comprehensive analysis of existing research on entrepreneurial resilience to provide greater clarity in structuring research and identifying trends within the entrepreneurial literature. Existing literature reviews on entrepreneurial resilience (Nautiyal & Pathak, 2023, Tiwari, 2022, Candeias Fernandes, 2022, Korber & McNaughton, 2017), which are mainly based on bibliometric analyses and systematic literature reviews, provide an overview of the field and mainly focus on a smaller number of research studies, resulting from a narrower focus on the term "entrepreneurial resilience". Furthermore, the reviews predominantly refer to research findings published in management and business publications and some of them require a new research review in terms of timing.

Regarding the exponential growth dynamics of research on the concept of resilience in the context of entrepreneurship in the last few years, there is a need for a more detailed and comprehensive analysis of the contribution of publication output to fill the before mentioned gap. This study will provide a quantitative overview of existing research on resilience and entrepreneurship to determine current research topics and development trends of scientific production using the bibliometric metrics and its graphical visualization. The study is intended to show the increasing research interest in the topic through the number of articles on the topic and the increasing number of citations. In addition, the quantitative literature review provides insight into key research indicators, such as the number of authors interested in the topic, the most relevant research areas related to entrepreneurial resilience, the most relevant SDGs, the most prolific countries and universities where authors on the topic of entrepreneurial resilience come from, the keywords most frequently used by authors, emerging research topics or the most influential articles in the field. This research is primarily aimed at young researchers or researchers interested in the area of entrepreneurial resilience. It helps them by providing information on where to look for important articles or possible co-authors or project partners, highlighting the most important research topics or pointing them to the emerging research topics. By analysing a wide range of bibliometric indicators, taking into account the timespan of the last ten years, this study complements the existing reviews, which is particularly related to the retrieval of data from the Web of Science Core Collection database and provides

data on the contribution of entrepreneurial resilience topic to the challenges of achieving the Sustainable Development Goals. In accordance with the set research objectives, this study answers the following research questions:

RQ1. How has the literature on resilience and entrepreneurship evolved, considering the distribution of articles and their impact?

RQ2. What are the most prominent research papers dealing with this topic?

RQ3. Which main areas of research interpret resilience in the context of entrepreneurship?

RQ4. How is the research field on entrepreneurial resilience structured considering the context of the Sustainable Development Goals it addresses?

RQ5. Which countries are leading the way in the production of research dealing with entrepreneurial resilience and the impact it makes?

RQ6. Which journals have published research papers in this area?

RQ7. Which keywords occur most frequently in existing research and what is their thematic structure regarding the degree of development and degree of relevance?

The remainder of the paper starts with an overview of the theoretical background of the concept of resilience in light of its relationship and contribution to the entrepreneurship literature, with an emphasis on existing studies that address the integration of these two concepts through existing literature review studies. Following that, the research methodology is presented in the next section. Section 4 provides the research findings of the bibliometric analysis using bibliometric indicators. The final section discusses the findings and derives conclusions, outlining the implications for research as well as limitations and guidelines for future research.

## 2. BACKGROUND

In the relation to the entrepreneurship research, resilience usually refers to readiness, hardiness, perseverance, or self-efficacy to explain why some entrepreneurs perform better than their non-resilient counterparts, and to argue how cognitive and behavioral entrepreneurial traits or features of the entrepreneurial ecosystem enhance the ability of firms and individuals to adapt to new circumstances and contribute to long-term sustainability through innovation (Elshaer 2022, Hartmann, Backmann, Newman, Brykman & Pidduck, 2022, Saad, Hagelaar, van der Velde & Omta, 2021). It generally refers to the ability to cope with uncertainty and obstacles, so it is explained by manifesting positive adaptive skills despite experiencing significant adversities (Manzano-García & Ayala Calvo, 2012). Entrepreneurs possessing the ability to recognize opportunities and transforming them into viable opportunities can more easily keep pace with changing events and uncertainties in the course of the company's development when exploring and exploiting opportunities, which can be explained by having the ability of resilience.

Previous research on resilience at the individual level in the context of entrepreneurship examined how individual resilience traits help to explain the development of entrepreneurial activities (Fisher et al., 2018) through affective, cognitive, and behavioral mechanisms, based on their inherent capacities to achieve positive outcomes as demonstration of resilience (Hoegl & Hartmann, 2021, Shepherd & Williams, 2022). Zhao and Wibowo (2021) thus examined how resilience traits of entrepreneurs support overcoming entrepreneurial failure, and Doyle Corner et al. (2017) reveal that resilience is relevant for re-entry to entrepreneurship, which is vital for serial entrepreneurship and economic growth (Hayward et al., 2010). In their literature review study of entrepreneur resilience, Hartmann et al. (2022) conclude that in the majority of these studies, entrepreneurs' resilience is an important competence that facilitates entrepreneurial intentions (González-López et al., 2019), self-employment intentions (Baluku et al., 2021), entrepreneurial entry (Doyle Corner et al., 2017), career success (Croteau, Grant, Rojas & Abdelhamid, 2021), financial performance (Digan, Sahi, Mantok & Patel, 2019), venture growth (Agarwal et al., 2022), especially in a highly dynamic environment.

Regarding the organisational level analysis, distinguishing characteristics of the company's business model provide the main framework for the interpretation of variables and their relationships in the context of resilience on a firm-level analysis. For example, following Metro, Harper and Bogus (2021), start-ups are good examples of resilient companies, mainly because their business models are based on innovation, which implies a strong need for resilience to anticipate and adapt quickly to market changes. Moreover, attributes of digital technology, namely modularity, reproducibility and generativity, contribute to digital entrepreneurial activities spilling over much faster to other businesses, enabling to recover more quickly from adversity and become more resilient (Iacobucci & Perugini, 2021, Elia et al. 2020). Furthermore, Branicki, Sullivan-Taylor and Livschitz (2017) argue that building SMEs resilience differs considerably from building resilience in large organisations.

The significance of location for the competitiveness of entrepreneurial firms has been recognized in the literature (Fredin & Lidén 2020, Fraiberg, 2017, Audretsch & Belitski 2017) and the interaction within the entrepreneurial ecosystem is crucial for their development (Fisher et al., 2022). Accordingly, community-level approach in studying resilience is focused on determinants and mechanisms of generating a resilient entrepreneurial ecosystem (Ryan, Giblin, Buciuni & Kogler, 2021, Roundy et al., 2017), that represents a contextual embedded concept (Audretsch & Belitski, 2017) with its dynamic processes of diversity, resilience and adaptation (Malecki 2018, Roundy et al. 2017).

Few authors deal with the bibliometric mapping the research of resilience and entrepreneurship. Korber and McNaughton (2017) in their review of existing literature at the intersection of resilience and entrepreneurship published in the period from 1986 to half of 2017 identifies six research streams: resilience as traits or characteristics of entrepreneurial firms or individuals, resilience as a trigger for entrepreneurial intentions, entrepreneurial behavior as enhancing organisational

resilience, entrepreneurial firms fostering macro-level (regions, communities, economies) resilience, resilience in the context of entrepreneurial failure, and resilience as a process of recovery and transformation. Based on the obtained results, they call for future studies to examine the concept of entrepreneurial resilience more in terms of positive long-term trajectory as a contextual embedded ex ante, multi-level capacity (Korber & McNaughton, 2017).

Nautiyal and Pathak (2023) focused their comprehensive bibliometric mapping on resilience and entrepreneurship on the studies published in the Scopus database and concluded that the exact significance of resilience in the context of entrepreneurship remains to be determined due to the distinct multidisciplinary nature of the field. In their study on entrepreneurial resilience Tiwari and Homechaudhuri (2022) focused on papers from the period 2002-2021 and published in the Scopus database as well, using search criteria for the terms “entrepreneurial resilience”, “resilient entrepreneurship” and “business resilience”. Furthermore, Candeias Fernandes and Franco (2021) concentrated their systematic literature review on studying the entrepreneurial resilience and forms of collaboration interconnectedness.

Following the conclusions from the previous evidence on research on resilience and entrepreneurship, and considering the emerging nature of the concept of entrepreneurial resilience, this paper attempts to respond to the demand for a comprehensive analysis and systematic structuring of the existing research on the concept of resilience in entrepreneurship.

### 3. METHODOLOGY AND DATA

The Web of Science Core Collection (WoS CC) was searched for relevant articles on the topic of entrepreneurial resilience, using the search query “*entrepreneurial*” AND “*resilience*”. The topic search for articles includes title, abstract and keywords for relevant articles. Based on the topic search, 748 articles were found. A further restriction of the relevant articles to full articles and review articles left 709 relevant articles, and a restriction to the English language resulted in 694 articles. There were no articles written in Croatian. To consider the relevance of the retrieved articles, we further restricted the search to articles from the last ten years, considering the period from 2014 to 2023. The restricted search resulted in the final 651 articles for further analysis. The specified restrictions helped us to find relevant and contemporary articles as a basis for our bibliometric analysis and are in line with the recommendations for conducting a bibliometric analysis (Romanelli, 2021).

The retrieved articles were analysed using several bibliometric analyses to present various bibliometric indicators, which allowed us to identify the main components in the research area and to show existing and emerging trends in the literature. In addition, the use of two analysis software tools R and VOSViewer (Aria & Cuccurullo, 2017, van Eck & Waltman, 2010) enabled several visualizations of bibliometric networks in the research area, as well as other visual representations of the bibliometric indicators obtained.

In the results section, we first present bibliometric indicators and summarized statistics on the relevant articles retrieved over the last ten years. The bibliometric indicators on the trends in the publication of articles and article citations in the period under review are listed and supplemented by corresponding visualizations of the trends. The summarized statistics on entrepreneurial resilience research, such as the number of authors, journals, countries, institutions and keywords used, are the results of the bibliometric analysis of the bibliographic data from the retrieved articles. We also indicate the proportion of articles belonging to specific research areas and the proportion of articles related to the Sustainable Development Goals. In the bibliometric analyses we select several components of the bibliographic data from the extracted articles in order to analyse them in depth and focus on their bibliometric indicators and visualize their relationship to each other. For this purpose, we use several bibliometric analyses (van Eck & Waltman, 2014). In each bibliometric analysis, we focus on two main parts: a table with the bibliometric indicators such as the number of citations or the number of articles and the corresponding bibliometric network that visualizes the research components and their connection.

In the bibliometric networks, the analysed components (such as articles, journals, countries) are represented as circles, with the size of the circle representing the influence of the component. The links in the bibliometric network represent the strength of the relationship between the components in the bibliometric network (e.g. the number of jointly authored articles, the number of co-citations, the number of shared references). Thicker links between the components of the network indicate stronger connections (van Eck & Waltman, 2014). The first bibliometric network is based on analysing the co-authorship of the countries and universities from which the authors of the extracted articles on entrepreneurial resilience originate. In the bibliometric network of co-authorship, the size of the nodes represents the number of articles per country represented by the node and the link between two nodes represents the number of articles produced between two countries. The analysis shows the most cited countries to capture both the most productive and the most cited countries in the context of entrepreneurial resilience research. The second bibliometric analysis is the citation analysis of articles. The size of the node represents the influence or citation count of the article represented by the node, and the links are determined based on the articles' citations to each other. The citation analysis is useful to show the influence of the analysed articles over the entire timeline of the extracted articles on entrepreneurial resilience research. That is, data on the most influential publications in this period are shown along with the total number of citations per article or the average citations per year.

We then use a bibliometric coupling analysis to present the most productive journals for articles on entrepreneurial resilience, which are presented as nodes in the bibliometric network. The links between the items of analysis, in this case scientific journals, are established on the basis of common references of the articles analysed. This makes bibliometric coupling more useful for identifying new or emerging trends in research, as opposed to citation analysis, which uses

citations accumulated over the time period under consideration. In addition, we present analyses of the author keywords. When analysing the co-occurrence of author keywords and the associated bibliometric network, the size of the items, i.e. the author keywords, is based on the number of occurrences of a keyword, which results in more frequently used keywords being displayed larger. The links between the keywords indicate the number of articles in which the keywords occur together.

Finally, we present a thematic analysis of the authors' keywords, which allows us to draw conclusions about the importance of the topics in the field of research. The topics are presented in four quadrants on the axis of centrality or relevance and on the axis of development in the field of research. On the one hand, there are the niche themes, which contain very specific topics which are not of central importance but are well developed in the field of research. Emerging or declining themes include topics that are currently either not relevant enough or central to the field of research and not developed enough. On the other hand, there are motor themes containing topics that are driving the research area because they are both relevant and well developed or well researched in the research area. Topics that are not dense or well developed in the field of research but are generally central and relevant to the field of research are referred to as basic topics.

## 4. RESULTS

### 4.1. Overview of the Research Area

First, we provide an overview of the research area by summarising statistics and visualizing research trends based on the 651 articles on entrepreneurial resilience published in the last 10 years (2014 - 2023).

In order to emphasise the research area as emerging and contemporary, we first present the number of articles per year and the number of citations. The visualization in Figure 1 shows that the number of articles on the topic of entrepreneurial resilience has increased exponentially over the last ten years. The highest number of article publications was reached in 2023, followed by 2022 and 2021 with 187, 132 and 98 articles respectively (Table 1). The current importance of entrepreneurial resilience research is evidenced by the exponentially growing number of articles with a growth rate of 32.36% per year and an average age of the articles of only 2.26 years.

The highest number of citations of articles on entrepreneurial resilience was recorded in 2021, followed by 2020, 2019 and 2022 with 1621, 1338, 1198 and 1192 citations per year respectively (Table 1, Figure 1). The articles were cited an average of 15.73 times, resulting in a total of 10241 citations over the last 10 years.



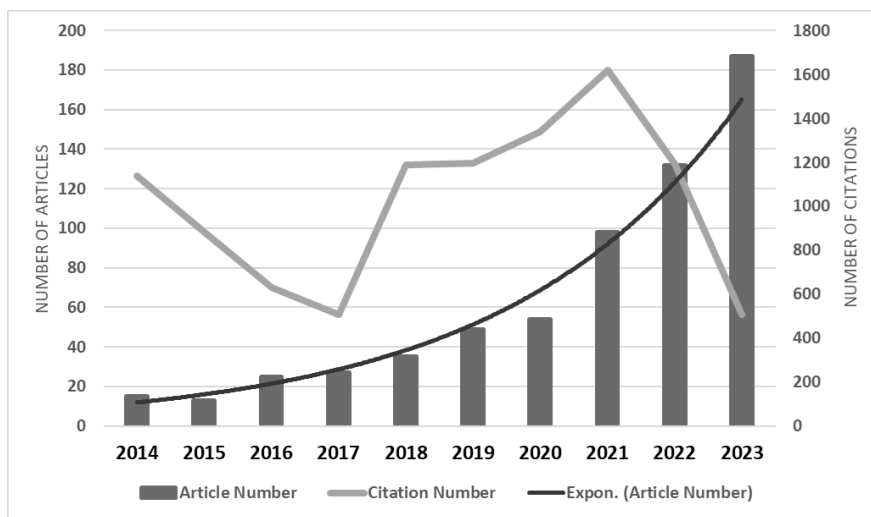


Figure 1 Visual presentation of the number of articles and citations (per year, 2014 - 2023)

Source: Authors

To analyse the significance of the research in more detail, we consider not only the number of citations, but also the publication year of the article. The articles published in the earlier years of the studied period had more time since publication to be cited, i.e. more citable years, while the articles published more recently had a shorter time since publication to be cited. Table 1 therefore shows not only the total number of articles and citations, but also the average number of citations per article, and the average number of citations per article and per citable year, which provides a better overview of the research area.

The average number of citations per article is high in the first two publication years of the period under review, 2014 and 2015, at 75.8 and 68.08 respectively. In 2018, the number of citations per article is also high at 33.98 citations per article. Looking at the citable years, the articles published in 2014 and 2015 have the highest average number of citations per article and citable year (7.58 and 7.56), with 10 and 9 citable years respectively. However, the years 2020, 2018 and 2021 follow with 6.19, 5.66 and 5.51, despite the short period in which they are cited, namely 4, 6 and 3 citable years, which further emphasises the current relevance of research on business resilience.

Table 1 Summary statistics on articles and citations (per year, 2014 - 2023)

Year	AN	CN	AVG. CN per AN	AVG. CN. Per AN per Year	Citable Years
2014	15	1137	75.8	7.58	10
2015	13	885	68.08	7.56	9
2016	25	630	25.2	3.15	8
2017	27	507	18.78	2.68	7
2018	35	1188	33.94	5.66	6
2019	49	1198	24.45	4.89	5
2020	54	1338	24.78	6.19	4
2021	98	1621	16.54	5.51	3
2022	132	1192	9.03	4.52	2
2023	187	507	2.71	2.71	1

Note: AN – Article Number, CN – Citation Number, AVG. CN Per AN – Average Number of Citations per Article, AVG. CN per AN per Year – Average Number of Citations per Article per Citable Year

Source: Authors

Table 2 lists the 10 most cited articles. The paper by Jaskiewicz, Combs and Rau (2015) and Bullough, Renko and Myatt (2014) are the most cited with a total of 374 and 355 citations. However, if we take into consideration the average number of citations per year it can be seen that newer publications like those by Cowling, Brown and Rocha (2020) and Belitski, Guenther, Kritikos and Thurik (2022), focusing on SME and COVID-19, already show almost equal importance.

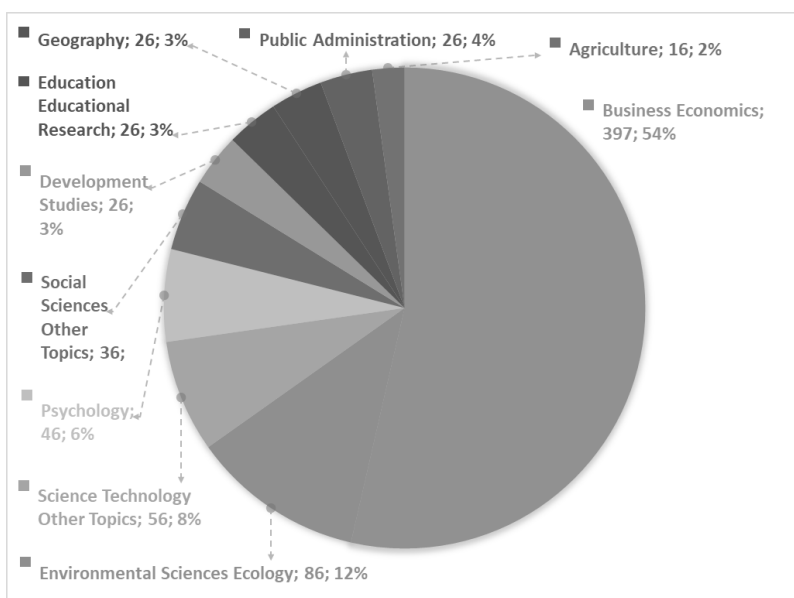
Table 2 Most cited articles (per year, 2014 - 2023)

Title	Authors	Year	CN	AVG. CN per Year
Entrepreneurial legacy: Toward a theory of how some family firms nurture transgenerational entrepreneurship	Jaskiewicz, Peter; Combs, James G.; Rau, Sabine B.	2015	374	37.4
Danger Zone Entrepreneurs: The Importance of Resilience and Self-Efficacy for Entrepreneurial Intentions	Bullough, Amanda; Renko, Maija; Myatt, Tamara	2014	355	32.27
Individual responses to firm failure: Appraisals, grief, and the influence of prior failure experience	Jenkins, Anna S.; Wiklund, Johan; Brundin, Ethel	2014	197	17.91
The resilience of the entrepreneur. Influence on the success of the business. A longitudinal analysis	Ayala, Juan-Carlos; Manzano, Guadalupe	2014	195	17.73
Creating New Paths? Offshore Wind, Policy Activism, and Peripheral Region Development	Dawley, Stuart	2014	187	17
Resilience and entrepreneurship: a systematic literature review	Korber, Stefan; McNaughton, Rod B.	2018	177	25.2
Did you save some cash for a rainy COVID-19 day? The crisis and SMEs	Cowling, Marc; Brown, Ross; Rocha, Augusto	2020	153	30.6
Rethinking organizational resilience and strategic renewal in SMEs	Herbane, Brahim	2019	142	23.6
Economic effects of the COVID-19 pandemic on entrepreneurship and small businesses	Belitski, Maksim; Guenther, Christina; Kritikos, Alexander S.; Thurik, Roy	2022	14	35
Integrating discovery and creation perspectives of entrepreneurial action: The relative roles of founding ceo human capital, social capital, and psychological capital in contexts of risk versus uncertainty	Hmieleski, Keith M.; Carr, Jon C.; Baron, Robert A.	2015	13	13.2

Note: CN – Citation Number, AVG. CN Per Year – Average Number of Citations per Year

Source: Authors

Considering the research area in which the papers were published, the 651 articles relate to 53 research areas, with 54% or 397 articles published in the area of Business Economics, followed by Environmental Sciences and Ecology with 12% or 86 articles and Science Technology other topics with 8% or 56 articles. The ten research areas with the most articles are shown in Figure 2. As entrepreneurship is a key area of research in business studies, the findings suggesting that the research area of Business and Economics is most concerned with the topic of entrepreneurial resilience are to be expected. The topic of entrepreneurial resilience is one of the key issues that ensures the survival of companies, especially in various times of crisis. It should also be noted that entrepreneurial resilience is also somewhat related to the research area of Environmental science, which is to be expected given the growing demands on enterprises to adapt to today's social, environmental and governmental policies. In addition, enterprises today must also adapt to the Sustainable Development Goals (SDG; United Nations [UN], 2015), most of which require sustainable and environmentally friendly action to contribute to a better future. Other research areas (e.g., Science Technology, Social Sciences, Development Studies, Public Administration) account for less than 10% of the articles.



Note: The name of the research area is followed by the number of articles and the percentage of articles in this research area.

Figure 2 Research Areas

Source: Authors

Finally, the articles can be grouped in terms of the SDG. The 651 articles related to entrepreneurial resilience that we include in our analysis are mainly related to SDG 09 – Industry, innovation and infrastructure (424 articles), followed by SDG 01 No poverty (368 articles). SDG 09 - Industry, innovation and infrastructure refers to building resilient infrastructures, promoting inclusive and sustainable industrialisation and fostering innovation and aims to support economic development, sustainable industry, retooling industry for sustainability, increasing resource efficiency, developing innovative, clean and environmentally friendly technologies and industrial processes, and promoting technology development, making it the most important SDG related to entrepreneurial resilience (United Nations [UN], 2015). Next, SDG 01 No poverty aims to eradicate poverty in general and is therefore closely linked to enterprises that create and maintain jobs. In addition, resilient enterprises should adhere to policy frameworks that mitigate economic, social and environmental shocks and disasters, thus reducing the impact on workers and their families by avoiding unnecessary layoffs. The ten Sustainable Development Goals on which the most articles were published are shown in Figure 3.

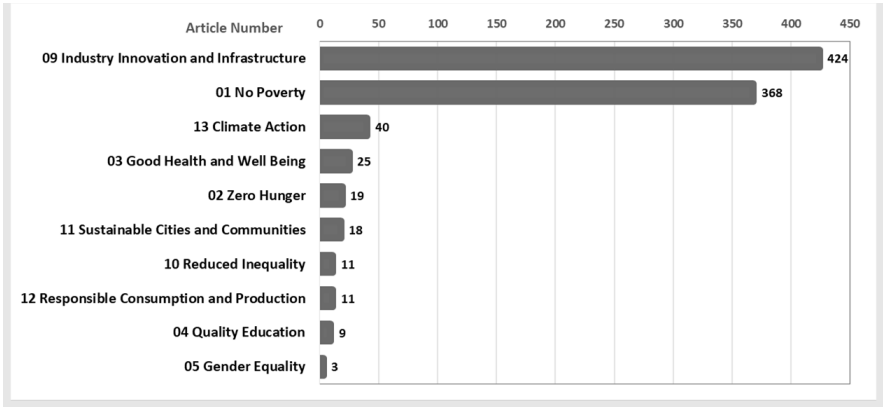


Figure 3 Sustainable Development Goals

Source: Authors

4.2. Countries and Co-authorship

Authors from a total of 94 countries were involved in research in this area. Furthermore, the authors originated from 1023 organisations or universities. The United States of America (USA) and England at the top of productive countries with 106 and 104 articles, respectively, followed by Australia with 53 articles (Table 3). The United States of America is also the most frequently cited country with 2681 citations, followed by England with 2136 citations and Australia with 1251 citations. However, there are also exceptions such as Germany, New Zealand and the Netherlands, which are cited a lot but are less productive. The number of research articles may relate to the size of the country, as well as the number of

prominent universities or organisations engaged in research related to entrepreneurship. Indiana University, USA, followed by Cantenbury University of Kent, England, Lincon University, England, University of Birmingham and Lancanster University, England, were among the most prolific universities associated with authors of articles on entrepreneurial resilience. According to CEOWORLD magazine's Entrepreneurship Index (Jones, 2024), the best countries for entrepreneurs in 2024 are also the USA, Germany and the UK, which are among the most productive countries in our list. The Entrepreneurship Index takes into account, among other things: Innovation, competitiveness, infrastructure, labour force skills, access to capital and access to business.

Table 3 Ten most cited countries

Country	AN	CN
USA	106	2681
England	104	2136
Australia	53	1251
Germany	36	1171
Canada	35	801
New Zealand	23	797
Spain	38	693
Italy	36	558
France	29	503
Netherlands	23	474

Note: AN – article number, CN – citation number

Source: *Authors*

The most productive countries in terms of number of articles authored by authors originated from a particular country are shown in the bibliometric network of countries based on the bibliometric authorship analysis (Figure 4). The size of the node shows the productivity of the countries in terms of number of articles and the thickness of the lines connecting the countries shows the number of co-authorships in terms of number of articles. Figure 4 shows that authors from the USA and England publish much more than the other countries outlined. In addition, the line depicting the co-authorship shows that the most productive countries and the countries with the highest scores on the Entrepreneurship Index often collaborate, learn from each other and provide resources for entrepreneurs and researchers seeking information on various aspects of entrepreneurial resilience.

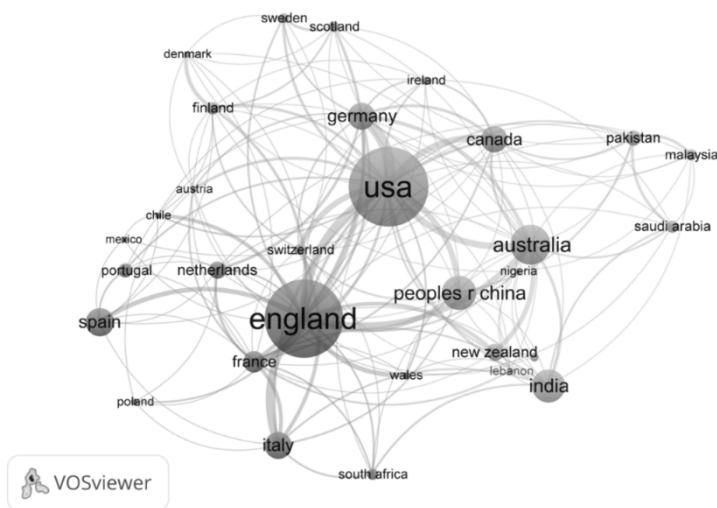


Figure 4 Bibliometric network of most productive countries based on co-authorship analysis

Source: Authors

#### 4.3. Relevant journals in the area

A total of 316 journals published the 651 articles in our analysis. Although the number of articles in a Journal can present the importance of a Journal for a certain research topic, the number of citations for sure indicated the relevance of both the Journal and the article published. Table 4 presents the journals with the most citations and the number of published articles. The top cited journals were the Journal of Business Venturing, followed by the International Journal of Entrepreneurial Behaviour & Research and Entrepreneurship and Regional Development with 884, 709 and 562 citations respectively. Although the journal Sustainability has the biggest number (39) of published article among the top ten cited journals, the number of citations is not nearly as big as those of the two most cited Journals. Also, if looking into the aims and scopes of the ten journals, Sustainability is the only one that does not emphasise entrepreneurship as a key topic. Further, if considering the top ten cited articles (Table 2) it can be seen that the top four journals by citation number account for five of the ten most cited articles. That is, the Journal of Business Venturing, as the most cited journal, accounts for two of the three most cited articles of the analysed sample, while the journal Sustainability account for none of them. The same applies also for the Journal of Entrepreneurship in Emerging Economies, with 409 citations. However, this can be explained by the fact that the journal is published only from 2014 while all the other top ten journals exist longer.

Table 4 Ten most cited journals

Journal	AN	CN
Journal of Business Venturing	12	884
International Journal of Entrepreneurial Behavior & Research	28	709
Entrepreneurship and Regional Development	19	562
Entrepreneurship Theory and Practice	8	464
Sustainability	39	432
Journal of Entrepreneurship in Emerging Economies	20	409
Small Business Economics	11	354
Journal of Business Research	8	298
International Small Business Journal - Researching Entrepreneurship	4	288
Journal of Enterprising Communities-people and Places in the Global Economy	15	237

Note: AN – article number, CN – citation number

Source: Authors

To present a different type of bibliometric network, we focus on trends in journal article publication. In Figure 5, the nodes in this bibliometric network are coloured based on the average years of article publication, i.e. journals that have on average recently addressed the field of entrepreneurial resilience are brightly coloured (light green and yellow, legend in the figure). However, as the average year of publication of an article is only 2.26 years, all of the journals presented have published articles relevant to the topic of entrepreneurial resilience in the last four years.

It can be seen that the Journal of Business Venturing, the most frequently cited journal, published the most articles on average in 2020, as did the other two most frequently cited journals (International Journal of Entrepreneurial Behaviour & Research and Entrepreneurship and Regional Development). Journals with more recent articles include Technological Forecasting and Social Change, Journal of Small Business and Enterprise Development, Journal of Entrepreneurship in Emerging Economies, International Journal of Management Education and International Journal of Entrepreneurship and Innovation.

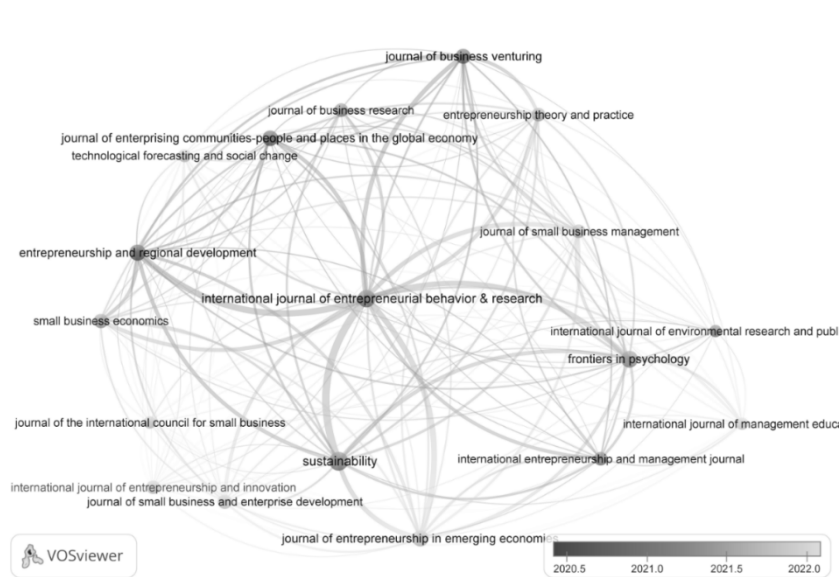


Figure 5 Bibliometric network of most productive journals with trends in publication

Source: Authors

According to the present results it can be emphasised that the top three cited journals, i.e. Journal of Business Venturing, International Journal of Entrepreneurial Behaviour & Research and Entrepreneurship and Regional Development, are currently the most relevant journals for the area of entrepreneurial resilience and should therefore be the starting point for researchers interested in this topic.

#### 4.4. Author keywords and thematic analysis

An area of particular importance in the research field are the main keywords used by authors, denoting the main topics of interest. A bibliometric co-occurrence analysis was used to analyse the use of author keywords. The most occurring author keywords are presented in table 5 and comprise of variations on entrepreneurship and resilience (e.g. entrepreneurial resilience, organisational resilience), followed by keywords related to the covid-19 crisis and several keywords related to sustainability and entrepreneurial intentions. For example, among the most occurring keywords, in addition to sustainability, are entrepreneurial orientation and entrepreneurial intentions, SMEs, innovation, self-efficacy and entrepreneurial ecosystems. Furthermore, education and social capital are also keywords which occurred frequently.



Table 5 Most occurring keyword

Keywords	Number of Occurrences
resilience	156
entrepreneurship	115
covid-19	84
entrepreneurial resilience	52
crisis	29
entrepreneurial orientation	28
smes	24
sustainability	23
organisational resilience	22
innovation	21
entrepreneurial intention	19
self-efficacy	19
entrepreneurs	17
pandemic	17
social capital	16
covid-19 pandemic	14
entrepreneur	13
entrepreneurial ecosystems	13
entrepreneurial intentions	13
entrepreneurship education	13

*Source: Authors*

Furthermore, we present both the bibliometric co-occurrence network of author keywords, with a particular focus on the keywords connected with the main keyword “entrepreneurial resilience” (Figure 6), and the bibliometric co-occurrence network of author keywords colored by the timeline of their usage across scientific articles (Figure 7). For example, entrepreneurial resilience is connected to both social and psychological capital, education of entrepreneurs, sustainability and self-efficacy, organisational resilience and economic crisis and finally, entrepreneurial failure. Furthermore, there is a strong connection between entrepreneurial resilience and in SMEs, family firms and family businesses, innovations and entrepreneurial intentions.

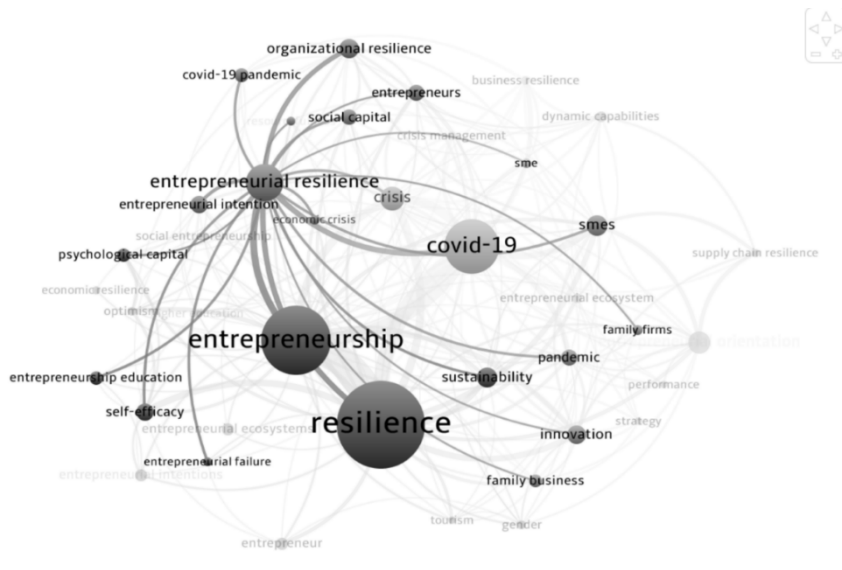


Figure 6 Bibliometric network of the most occurrent author keywords with emphasis on the keyword “Entrepreneurial Resilience”

Source: Authors

Figure 7 shows bibliometric co-occurrence network of author keywords colored by the timeline; darker colors represent keywords within older published sources, while lighter colors toward yellow indicate those that appear in more recent sources, indicating the development and maturation of certain thematic units within the field. Entrepreneurial intentions, SMEs, family business and dynamic capabilities seem to be the topics of the most recent research. This is confirmed by the results of table 2 on the most cited articles, in which the following more recent articles with the mentioned keywords stand out; *Did you save some cash for a rainy COVID-19 day? The crisis and SMEs* (Cowling et al., 2020), *Rethinking organizational resilience and strategic renewal in SMEs* (Herbane, Brahim, 2019) and *Economic effects of the COVID-19 pandemic on entrepreneurship and small businesses* (Belitski et al., 2022).

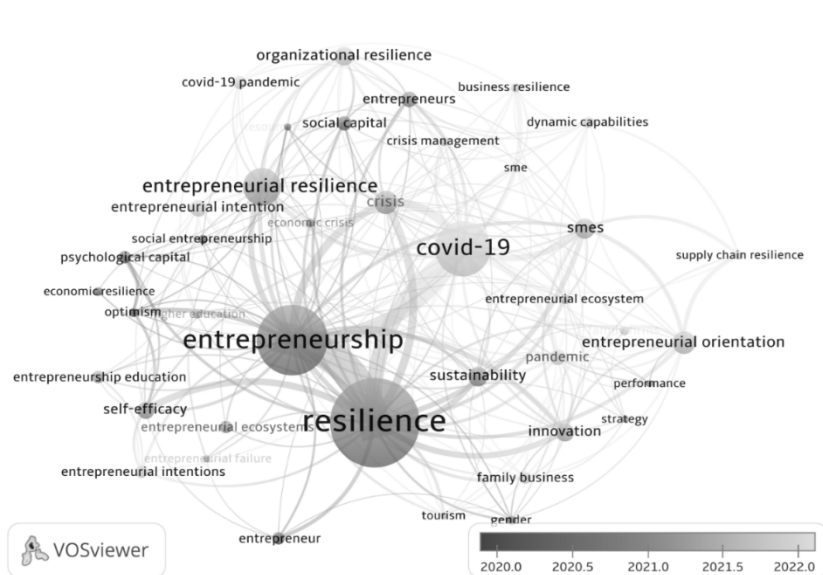


Figure 7 Bibliometric network of the most occurring author keywords with trends in occurrence

*Source: Authors*

We present a thematic analysis of the authors' keywords in four quadrants, based on the axis representing centrality or relevance and on the axis representing the development of the topic in the research field (Figure 8). Centrality or relevance is a measure of importance within the research area and density can be interpreted as a measure of development (Callon et al., 1991). The result of analysing keywords thematically is to identify the research frontier, i.e. the topics that have been studied by researchers to identify the most important issues. Motor themes contain topics that are driving the research area as they are both relevant and well developed (or researched). Therefore, motor themes contain developed topics that are essential to the research area. We note that there are almost no motor topics, which emphasises the need for further research and identification of essential topics related to entrepreneurial resilience research. Most topics related to entrepreneurial resilience are grouped under the basic themes. These topics are not dense or well developed, but they are very relevant or even central to the field of research. Basic or central themes in the research area of entrepreneurial resilience are, for example, higher education role in education entrepreneurs and resourcefulness during the COVID-19 pandemic (e.g., Zamfir, Mocanu & Grigorescu, 2018), the adaptability of entrepreneurs in transitioning businesses to greener choices in the context of climate change (e.g. Khan, Ameer, Bouncken & Covin, 2023), women in entrepreneurship (e.g. Njiwa, Atif, Arshad & Mirza, 2023), and the resilience of enterprises during the COVID-19 crisis (e.g., Purnomo, Adiguna, Widodo,

Suyatna,& Nusantara, 2021). Niche themes include topics that are very specific or thematically narrow, and well developed in the field of research but are not of central importance (high density, low centrality). They are generally of secondary importance, with established internal, but negligible external connections. Some of the niche themes are related to the empowerment of refugees and the government's commitment to strengthening the resilience of their businesses (e.g. Shepherd, Saade & Wincent, 2020) topics related to the sustainability of rural tourism and agriculture (e.g. Haddoud, Onjewu, Al-Azab & Elbaz, 2022) or topics on how public policies can contribute to the development of the entrepreneurial ecosystem. Topics that are not relevant enough or not developed enough are grouped under emerging themes (which could become more relevant or developed) or declining themes (no longer relevant and therefore of decreasing research interest). Economic resilience as an aspect of entrepreneurial resilience is grouped under emerging themes and can be seen as an area of research that could be used to expand research.

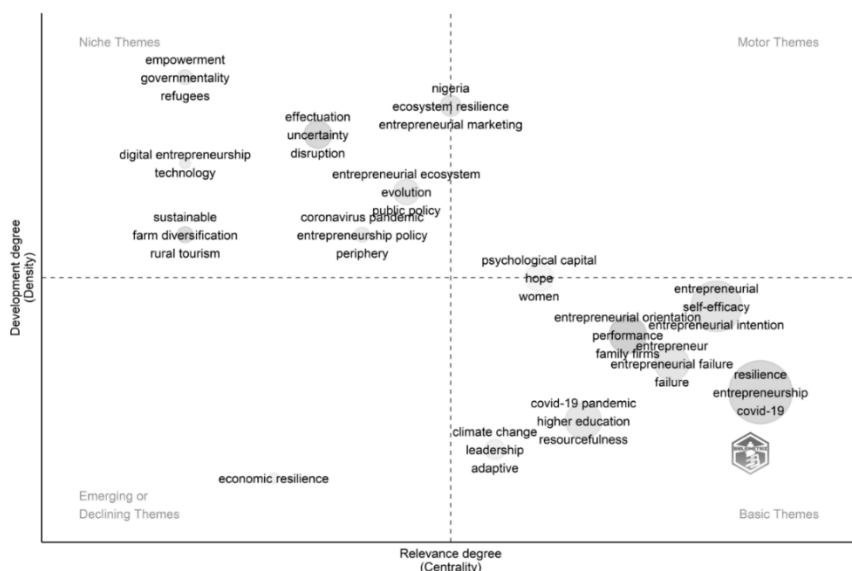


Figure 8 Thematic analysis

Source: Authors

## 5. DISCUSSION AND CONCLUSION

The significant increase in environmental turbulence and uncertainty, especially unpredictable events such as Covid-19, show more than ever the importance of the ability to deal with uncertainty and obstacles and to recover from setbacks, including adapting to new circumstances. In other words, resilience in general, and economically in particular with regard to entrepreneurship, occupies one of the highest places on the "list" "of key business survival factors. This study

used a bibliometric analysis to understand the current state and trends in academic research on entrepreneurial resilience. According to this study, there has been a significant increase in scientific publications on the topic of entrepreneurial resilience over the last ten years (2014 - 2023). Although there were not very many publications in total (651), the constant growth from 15 articles in 2014 (with a small setback of 13 in 2015) to 187 articles in 2023, the exponentially growing number of articles with a growth rate of 32.36% per year and an average age of the articles of only 2.26 years show the current, but also future importance of the researched topic. These findings are consistent with the results of previous bibliometric analyses conducted by Nautiyal and Pathak (2023) and Tiwari and Homechaudhuri (2022) using the Scopus database. In addition, the number of countries and institutions included in the research sample shows the prevalence and importance of the topic across continents, while the results of the citable years show the relevance of recent i.e. newer publications. Looking at the average number of citations per year, more recent publications focussing on SMEs and Covid-19 could be considered almost as important as the most cited ones. This means that environmental uncertainty topics that directly impact on entrepreneurial success stand out in the last ten years. This is also confirmed by the keyword analysis of this study, in which, in addition to resilience and entrepreneurship, Covid-19, crisis, entrepreneurial orientation, SME, sustainability, organisational resilience and innovation have been showing as the most frequently occurring keywords. More specifically, when looking at the trend of occurrence according to the timespan of their use, keywords such as covid-19, pandemic, organisational and business resilience, entrepreneurial intention, dynamic capabilities and SME stand out in recent publications. The fact that SME emerges as a relevant keyword alongside all the others can be interpreted with the argument of Branicki et al. (2017) that building the resilience of SMEs differs considerably from building the resilience of large organisations. However, it may also be related to the fact that the number of SMEs in the world is constantly increasing.

Furthermore, the results of this study show the distinct multidisciplinary nature of the field and are thus in line with the bibliometric analysis of Nautiyal and Pathak (2023). However, according to our findings, it can be emphasised that entrepreneurial resilience is mainly researched in the area of business economics, as 54% of the articles are published in this research area, while other areas had a share of 12% or less. Accordingly, among the ten most cited journals out of a total of 316 journals in the sample, all are in the research area business economics, except for the journal Sustainability. That is, five of them have the word entrepreneurial i.e. entrepreneurship in their title, and one of them is the one with the most published articles (if we exclude the journal Sustainability) and the second with the largest number of citations. In addition, the publications on entrepreneurial resilience included in this study mainly refer to the Sustainable Development Goal “SDG 09 - Industry, innovation and infrastructure” directed towards build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (United Nations [UN], 2015). With this study, which is a bibliometric review of existing research on

entrepreneurial resilience, we are also making a contribution to SDG 9, more precisely to SDG 9.5, which focuses, among other things, on enhancing scientific research.

This study also presents a thematic analysis of the authors' keywords. The result underlines the importance of several themes that are not yet well developed in the field of this research, but are central and relevant and should therefore be considered in future research. These are: resilience entrepreneurship covid-19, entrepreneurial self-efficacy, intention, orientation and failure, family firms, and climate change leadership adaptive. The analysis also points to the increasing relevance of entrepreneurial ecosystem evolution and resilience. That is, the result is partly consistent with the bibliometric mapping result of Korber and McNaughton (2017), i.e. resilience in relation to entrepreneurial failure.

Like any other study, this study has its limitations that arise from restrictions in methodology or research design. This work is limited by the choice of database and the constraints of data collection in terms of language, document type and timespan. The research was conducted using data extracted from WoS CC. Although Tiwari and Homechaudhuri (2022) did conduct a bibliometric analysis based on the Scopus database, the timespan and search query differ. Future research should consider using multiple databases simultaneously to analyse the future development of entrepreneurial resilience. Researchers should also consider minimizing data collection restrictions by including publications in languages other than English, including not only full articles and review articles but also proceeding papers and book chapters, and expanding or even shortening the timespan. This can add depth to future studies. In addition, the studies can be deepened by including synonyms for resilience in the search query, such as readiness, hardiness and perseverance. Following the results of this study, further research should consider in depth analyses of the importance and role of the entrepreneurial ecosystem as well as entrepreneurial intention, orientation and self-efficacy and, most importantly, the characteristics of entrepreneurial failure.

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**APPENDIX**

## Summary statistics

Timespan	2014 – 2023
Articles	651
Annual Growth Rate (%)	32.36
Document Average Age	2.26
Times cited	10241
Average citations per doc	15.73
Research Areas	53
Sources (Journals)	316
Publishers	78
Authors	1688
H-index	47
Countries	94
Affiliations	1023
Author's Keywords	2202
References	36866
Single-authored docs	83
Co-Authors per Doc	2.88
International co-authorships (%)	34.65

*Source: Authors*

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## **EVOLUCIJA PODUZETNIČKE OTPORNOSTI: BIBLIOMETRIJSKA ANALIZA**

***Sažetak***

*Danas, više nego ikada, opstanak poduzetnika ovisi o sposobnosti prevladavanja novih i kritičnih situacija i oporavka od nepredvidivih događaja. Dakle, poduzetnička otpornost postaje sve značajnija. Cilj je ovog rada istaknuti to područje istraživanja ispitivanjem glavnih karakteristika publikacija o poduzetničkoj otpornosti. U tu svrhu provedena je bibliometrijska analiza temeljena na bazi podataka Web of Science Core Collection kako bi se ispitala studije o ovom konceptu u posljednjih deset godina (2014. – 2023.). Analiza je provedena na ukupno 651 izdvojenom članku s pomoću VOSviewera i R. Rezultati pokazuju eksponencijalni porast studija s naglaskom na ključne riječi covid-19, kriza, orijentacija, MSP i inovacije. Rezultati sugeriraju da bi se daljnja istraživanja trebala usmjeriti na analizu važnosti i uloge poduzetničkog ekosustava te poduzetničkih namjera, orijentacije i samoučinkovitosti te obilježja poduzetničkog neuspjeha.*

***Ključne riječi:*** bibliometrijska analiza, poduzetnička otpornost, kriza, neuspjeh, MSP.

***JEL klasifikacija:*** L26, M13, M20.