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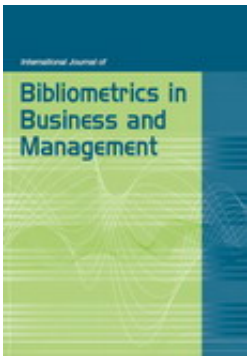

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A bibliographic analysis of the role of training in entrepreneurship

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Abstract: Entrepreneurship is vital for a country's economic success as it promotes social transformation through innovation. Leaders in the world of innovation, research, and ambitious individuals are some of the most developed nations, including the USA. So, for a country to develop, great entrepreneurs can bring the necessary change. Various institutions and the government have included entrepreneurship in their curricula. Though research related to entrepreneurship is abundant, existing research is scattered. Therefore, there is a need for a study that synthesises the existing research work. This study conducts a bibliometric analysis of research on entrepreneurship education and training using Scopus data. It enhances existing knowledge through qualitative and quantitative approaches, revealing that developed countries dominate the field, with increasing participation from developing nations. The findings offer insights for future research and highlight innovation as a growing theme in entrepreneurship studies.

Keywords: entrepreneurship; training; skills and development; bibliometric analysis; innovation; venture development.

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1 Introduction

The term 'entrepreneurship' was developed in the 17th century from the French word 'entrepreneurship', which meant taking a risk and doing something differently than others had done before (Shekhar, 2020). Many schools of entrepreneurship have been formed since the term 'entrepreneurship' is thought to have first appeared. The first of these is classical or traditional, with two branches within this school. Frederick Taylor founded the Administrative Science School, which is the first division. Entrepreneurship, according to Taylor, is understanding what you want to get out of your goals and how to get them best and cheapest. Henry Gantt, Frank (Frank), and Lillian Gilbert are a few of this school's advocates (Lillian Gilbreth). The emphasis at this school is on maximising efficiency while producing the highest level of output. In other terms, it emphasises outcomes. The traditional administrative school, which emerged from the need to create the course of managing big institutions, is the second branch of the classical school. The intellectual underpinnings of work are developed more in this school than the actual techniques. The most well-known leaders of this school were Henry Fayol and Max Weber, authors of the seminal work on management theory. However, some contend that the term 'entrepreneurship' first appeared in Western European nations during the Industrial Revolution, while others assert that Richard Cantlon first used it at the start of the eighteenth century to describe business ventures that involve a little bit of risk and adventure. Entrepreneurship is a dynamic process of creating value differently from the norm. Entrepreneurial skills make people more likely to participate in activities that require a different skill set than what is typically required. The company's expansion strategy is crucial to fostering innovation. As a result, entrepreneurs must improve their knowledge, skills, and competencies, which can only be accomplished through training. Many institutions and governments are now aware of entrepreneurship. Many leading business schools offer entrepreneurial training through projects and courses. As young minds are developed and instilled with innovative and creative thinking skills, the economy will benefit in the future. Higher degrees in entrepreneurship education boost female university students' entrepreneurial attitudes and self-efficacy (Anwar et al., 2020).

The development of entrepreneurial intention can be successfully supported by entrepreneurial education. Entrepreneurial cognition, entrepreneurial ability, and innovative spirit – the three pillars of entrepreneurship education – have a favourable effect on entrepreneurial inclinations. The perception of entrepreneurial risk and self-efficacy function as a mediating factor between entrepreneurship education and intention (Bian et al., 2021).

To meet the difficulties ahead, businesses must arm themselves with knowledge. Knowledgeable entrepreneurs are prepared to compete in a world of globalisation and technological change and to employ information communication technology (ICT) applications in their everyday operations.

In light of the aforementioned paragraphs, entrepreneurship is concerned with the administration of business and the prerequisites for participating in it. Thus, the concept of applying it to education and training to help young people get ready for the job market and address unemployment as a worldwide issue, in this regard, entrepreneurship education and training is one possible solution to the problem of unemployment, the growing lack of work opportunities, and the numerous global crises, such as the COVID-19 disaster. The International Labor Organization (ILO) predicts that by 2022, there will be 205 million more unemployed people globally and 23 million more job openings than there are people to complete them.

Policymakers are always looking for methods to encourage entrepreneurship. One important element that is thought to be able to help in this area is education. It has been discovered that entrepreneurship intention and education are positively correlated (Çera et al., 2021). The first course on entrepreneurship education and training was created by Myles Mace in 1947 at the Harvard Business School. 600 students in the second year of the master's in administration degree took this Management of New Enterprises course (Katz, 2003). Drucker (2014) introduced the idea of innovation into entrepreneurship education and training later, which resulted in the creation of the Entrepreneurship and Innovation course at New York University in 1953 (Katz, 2003).

Even though these courses have been provided for more than 70 years, entrepreneurship as a subject in academia is still in its infancy because there is not a set framework or agreement on the best practices for entrepreneurship business education (Finkle et al., 2009; Fiet and Samuelsson, 2000; Brockhaus and Horwitz, 1986; Solomon, 2007). Authors (Sexton and Bowman-Upton, 1987; Hynes, 1996; Adcroft et al., 2004; Matlay and Carey, 2007; Fayolle and Liñán, 2014; Abou-Warda, 2016) continue to dispute the best way to teach students how to become entrepreneurs. Regarding the development of an ontological perspective, several studies have addressed the many interpretations and definitions of entrepreneurship training that, in turn, result in a variety of pedagogical strategies.

Kourilsky (1995) asserts that entrepreneurship education enhances students' abilities in the areas of opportunity selection, resource organisation to manage risks, and business development. According to Jones and English (2004), entrepreneurship education is a process that equips people with the ability to see business opportunities, boosting their self-confidence, reflection, knowledge, and capacity for action. However, Fayolle et al. (2006) provide a more thorough definition of entrepreneurship education and training classifying any educational process or program that fosters entrepreneurial attitudes and abilities under this heading. The growth of enterprising citizens and the encouragement of entrepreneurial ambitions have both benefited greatly from entrepreneurship education. Education and training can therefore help to improve the psychological traits and behaviours linked with entrepreneurship as well as to increase management knowledge (Do Paco et al., 2013).

Entrepreneurship education has been the subject of much study. Many of these studies concentrate more on pedagogical 'good practice' than on proving the efficacy of the approach. In addition to fulfilling the societal aims of any curriculum, which are to help students reach their full potential and eventually find meaningful work, entrepreneurship may also be assessed to determine whether it achieves the intended goals or learning outcomes (Castaldi et al., 2020). As a result, education and training are required to survive in a dynamically changing society, with abilities that must be altered

and enhanced over time. The opportunity for entrepreneurs to advance their knowledge and abilities in generating and putting themselves in a position for challenges and international competition will be complementary to government and institutional enterprise education. India is a skill-based nation. The State Institute of Rural Development (SIRD), Assam, hosts several training courses each year for youth, entrepreneurs, farmers, women, and others. These courses focus on developing skills and management and are geared towards self-employment. Should China be compared to the global 'manufacturing factory', India ought to emerge as the 'human resource capital' of the globe (Hazarika, 2016). The performance of entrepreneurs is significantly affected by entrepreneurship education, with entrepreneurs reporting a need for further training and education in particular business difficulties (Jusoh et al., 2011).

We conducted a bibliometric analysis on prior studies of the role of entrepreneurship training to determine trends and relationships between various constituents. The VoS Viewer and Biblioshiny package of the bibliometrix library discover structural links in the study and research gaps. Bibliographic research is becoming increasingly popular due to its ease of use and graphical display, which provides a clear picture of prior findings. In our research, we used both techniques, bibliometric analysis, and came up with certain conclusions. An increasing proportion of academics are becoming interested in entrepreneurship. There is still a need for research in this area because entrepreneurship is such a broad and ever-evolving academic topic, this subject has become increasingly visible due to increased innovation and technology, particularly in developing countries.

As we already discussed entrepreneurship, the next section of the paper begins with research questions followed by research methodology. After collecting data, we performed a bibliometric analysis. The next part of the paper reports the findings and discussion. The paper concludes with the new trends or topics in entrepreneurship on which future research can be conducted.

2 Research questions

Bibliometrics is a branch of study that employs mathematical and statistical approaches to examine publishing trends in the distribution of information. It is a set of tools that researchers can use to analyse published data. These methods include bibliometric mapping, citation and co-citation analysis, and impact indicators.

The use of bibliometric approaches to map and study the knowledge published in diverse domains has been developing for years. Several areas of research have already been explored in the management field using these methods: management (Tahai and Meyer, 1999), strategic management (Nerur et al., 2008; Ramos-Rodríguez and Ruíz-Navarro, 2004), finance (Alexander and Mabry, 1994; Merigó et al., 2015), operations management (Pilkington and Liston-Heyes, 1999; Pilkington and Meredith, 2009), supply chain management (Charvet and Cooper, 2008) or innovation (Fagerberg et al., 2012).

Increased emphasis on the need for practical experience in entrepreneurship education is crucial, as is the expansion of programs that offer both theoretical and practical training in the subject (Breznitz and Zhang, 2021; Hysa, 2014). Numerous studies have looked into how universities teach entrepreneurs to succeed (Lüthje and Franke, 2003; Kariv et al., 2018; Popescu, 2019; Breznitz and Zhang, 2021). The decision between employee and entrepreneurial logic is influenced by entrepreneurial education. Entrepreneurship

courses affect students' entrepreneurial conduct, attitudes, and subjective norms when they are choosing their entrepreneurial jobs (Fitouri, 2023). Keeping this trend as a focal attempt, the following research questions have been formulated.

RQ1 Which countries, organisations, and authors are most important to the study of entrepreneurship and the role of training?

RQ2 Which countries collaborated the most in writing papers on the role of entrepreneurship training?

RQ3 Which are the most influential journals in which authors publish papers on entrepreneurship education and training?

RQ4 Which is the most used keyword in entrepreneurship and the role of training papers?

RQ5 What is the current theme to which researchers give utmost importance while writing papers on entrepreneurs?

RQ6 What is the past trend for entrepreneurship research?

3 Research methodology

The study was conducted to demonstrate the state of the intellectual structure and upcoming trends, and significant amounts of data on the role of training in developing entrepreneurial abilities are summarised. It comprised of the following procedures for bibliometric analysis:

3.1 Selection of the technique for bibliometric analysis

In the present study, two different types of approaches: performance analysis and science mapping were performed. Using performance analysis, we may examine the effectiveness of certain particular units using our bibliometric data however, Science mapping examines how various studies and components in our examination interact and are structurally connected.

3.2 Strategy

Advanced search using the relevant keywords like 'role of education and training in entrepreneurship', 'effects of education and training in building entrepreneurial skills', 'education and training's contribution to the development of entrepreneurial skills', 'the importance of education and training in 'entrepreneurship' were used to search for the study on Scopus databases'. Studies that included these terms in the title or at the heart of their discussion were selected for the study.

3.3 Collecting the data

To find relevant data for our study, it is imperative to select a database. There are a lot of databases available for collecting bibliometric data, such as Web of Science, Scopus,

Dimension, Lens, PubMed, etc. We used Scopus to collect data on the role of entrepreneurship education and training. From the beginning, many authors have produced studies on entrepreneurship training. A Canadian University published the first article on university experience in technological innovation and entrepreneurship by Hay in 1981. Therefore, the study period has been taken from 1981 to 2021.

3.4 Data extraction and quality assessment

Using the above-stated criteria, a total of 759 documents from 496 sources of the Scopus database were selected for the final analysis from Scopus on the role of education and training in entrepreneurship. As the data is large, the manual analysis would be complex. So, bibliometric research was conducted on these 759 studies. Original research publications, review papers, and conference papers are all used in this study. To ensure the review's quality, any duplication was extensively scrutinised. To ensure the quality and relevance of educational material included in the review process, the abstracts of the papers were rigorously verified for analysis and purification. Each research report was then carefully examined at a later point. Only papers written in English and disciplines related to business are considered.

3.5 Bibliometric analysis and the findings

The most widely used and recommended method of data analysis is bibliometric analysis. This study created a graphical mapping of the bibliometric information using the VoS Viewer 1.6.17 version and Bibloshiny. Bibliometrics allow us to summarise vast amounts of data that are difficult to analyse manually. It enables us to organise all of the studies conducted by numerous authors on a given topic or field. It aids in the analysis and interpretation of prior findings.

Performance analysis and science mapping are two types of bibliometric analysis. Science mapping lets us uncover the relationship between many constituents in research. In contrast, performance analysis helps us know the contribution of various units such as the total number of citations, h index, g index, etc.

3.6 Findings and discussion

The main purpose of this study was to determine how well and how much people were interested in researching entrepreneurship education and training. The first research question was: Which countries, organisations, and authors are the most important to study entrepreneurship and the role of education and training during the period of 1981 to 2021? The following analysis addresses this research question.

3.7 Most prolific countries

Table 1 shows that in our study the USA has the maximum number of citations, i.e., 6,365, followed by the UK with 1,307 citations, Spain with 558 citations, Finland with 496 citations, Germany with 370, Canada with 354 citations and India with 347 citations.

Figure 1 Steps for bibliometric analysis

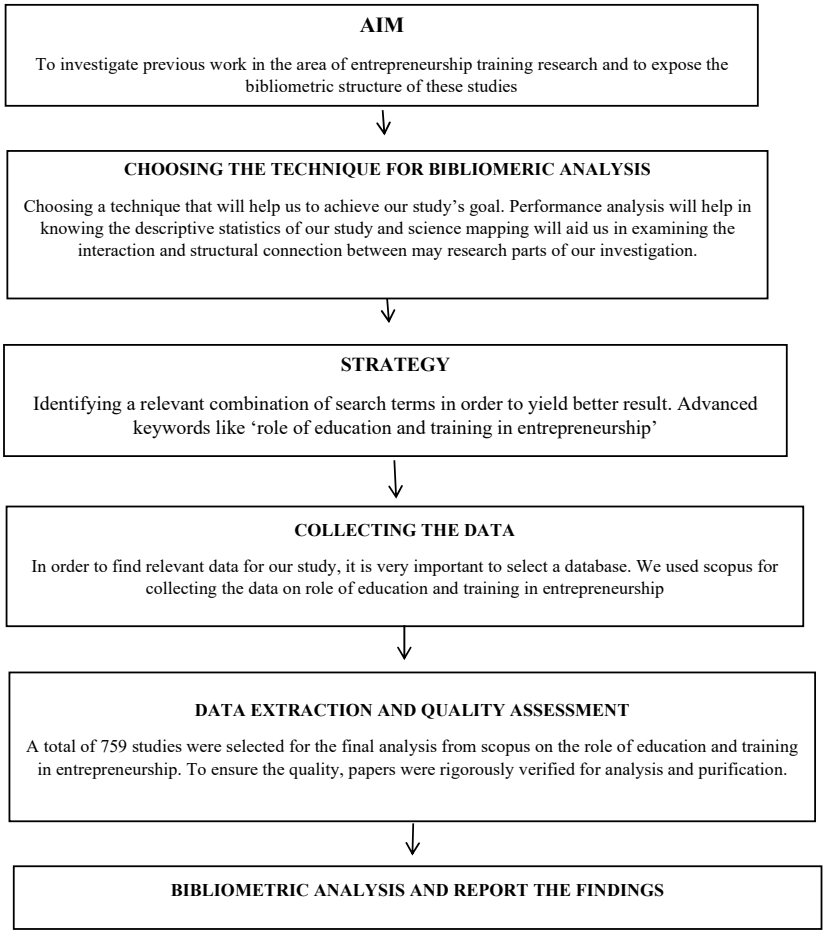


Table 1 Ten most prolific countries

S. no.	*Country*	*Documents*	*Citation*
1	US	106	6,365
2	UK	65	1,307
3	Spain	55	558
4	Finland	21	496
5	Germany	24	370
6	Canada	24	354
7	India	43	347
8	Italy	18	313
9	Denmark	13	236
10	France	24	216

Table 2 Clusters formed by various countries

Cluster 1 (indigo) (8 items)	*Cluster 2 (green) (6 items)*	*Cluster 3 (blue) (6 items)*	*Cluster 4 (yellow) (4 items)*
Brazil	India	Denmark	Australia
Colombia	Jordon	Finland	Austria
Germany	Oman	Norway	France
Mexico	Pakistan	Sweden	Romania
Netherlands	Saudi Arabia	Tanzania	
Portugal	UAE	Ukraine	
Spain			
Turkey			
Cluster 5 (purple) (4 items)	*Cluster 6 (light blue) (4 items)*	*Cluster 7 (orange) (4 items)*	*Cluster 8 (brown) (3 items)*
Canada	South Africa	Italy	China
Kazakhstan	Switzerland	Nigeria	Iran
Malaysia	Tunisia	Russian Federation	USA
Singapore	Zimbabwe	UK	

Likewise, if we analyse as per Table 1, the number of documents published on entrepreneurship, the USA has the maximum number, i.e., 106, followed by the UK with 65, Spain with 55, India with 43, and China with 38 papers published.

Table 1 shows the details of the document published, the number of citations, and the total link strength of various countries in the literature.

4 Science mapping

Science Mapping aids in examining the interaction between each item to discover connections between them, such as authors, terms, and countries.

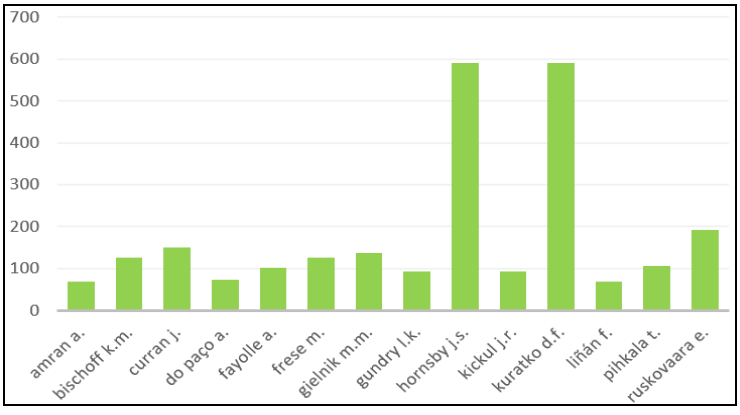
Table 3 Top 10 authors with their citations in the area of entrepreneurship education and training

S. no.	*Authors*	*Documents*	*Citation*
1	J.S. Hornsby	2	591
2	D.F. Kuratko	2	591
3	E. Ruskovaara	3	191
4	J. Curran	2	149
5	M.M. Gielnik	3	137
6	M. Frese	2	125
7	K.M. Bischoff	2	125
8	T. Pihkala	3	106
9	A. Fayolle	5	101
10	J.R. Kickul	2	92

4.1 Most cited authors

In our study, authors J.S. Homsby and D.F. Kuratko have the highest number of citations 591 each. Table 3 shows the top 10 authors with their number of documents published, and the number of citations by each author.

Figure 2 Maximum citations by various authors (see online version for colours)



The green bars in Figure 2 depict citation by some authors. The graph shows citations of different authors such as 125 citations by K.M. Bischoff, 149 citations by J. Curran, 101 citations by A. Fayolle, 125 citations by M. Frese, 137 citations by M.M. Gielnik, but the most important part of this research is that a large number of citations are received by J.S. Hornsby, i.e., 591.

4.2 Co-authorship of authors

The study looked into the author's co-authorship, using 'co-authorship' as the kind of analysis and 'author' as the unit of analysis. The goal is to investigate any connections between the authors of these works by the full counting method. It has been found that some of the writers of these studies have a co-authorship relationship.

We set criteria to filter the data. Here we took the minimum no. of documents for an author to be 2 in the VoS Viewer software, and 1,947 authors have participated in the publication of the role of training in entrepreneurship papers, out of which 109 meet the threshold limit.

As Figure 3 shows, all 109 authors are not connected. The complete set of connected authors is six authors. All six authors are connected, each other like a star as seen in Figure 5 – all six authors are interconnected. A. Dauletova, L. Tailmova, T. Pritvorova, S. Mazhitova, R. Zhashkenova and A. Kernebaev are connected as shown in the network map with 15 links and 30 link strengths. A. Dauletova, L. Tailmova, T. Pritvorova, S. Mazhitova, R. Zhashkenova and A. Kernebaev have all published two documents on the role of training in entrepreneurship.

Figure 3 Co-authorship of authors (see online version for colours)

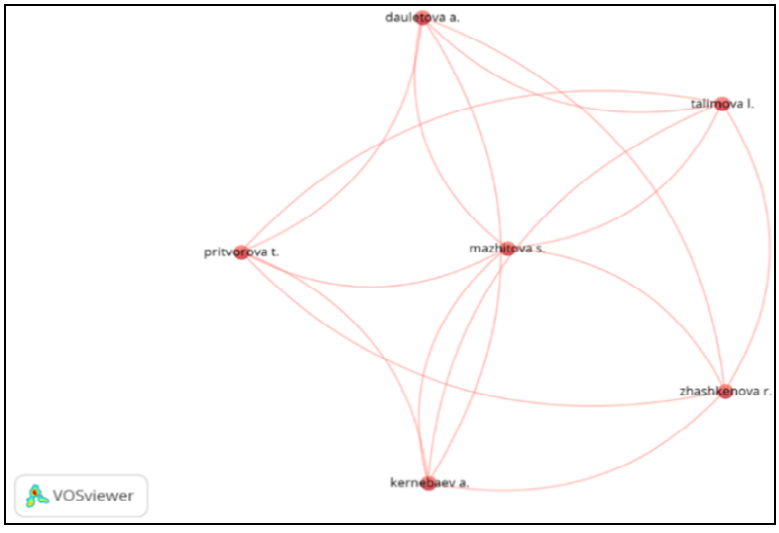
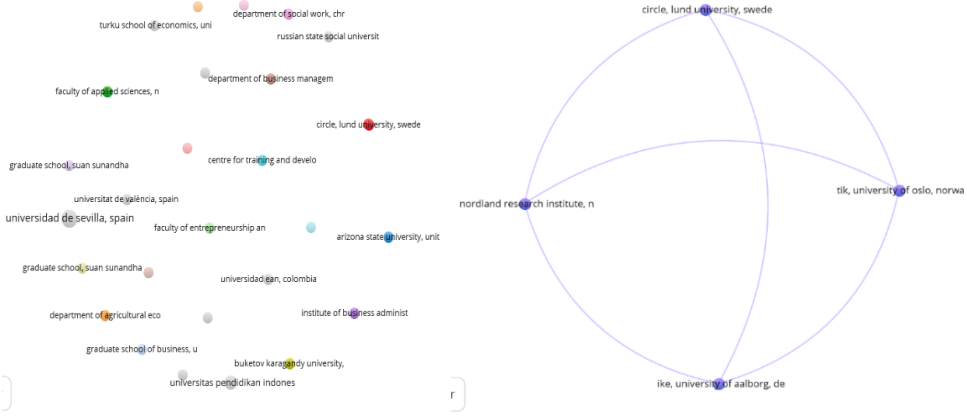


Figure 4 Network map of co-authorship of the organisations (see online version for colours)



4.3 Co-authorship of organisation

The study looked into the organisation's co-authorship, using 'co-authorship' as the kind of analysis and 'organisation' as the unit of analysis. The goal is to investigate and see any connections between the organisation. To identify the number of citations and documents published by different organisations, we use a network map to identify it. So, we used bibliometric analysis of the co-authorship of organisation in the literature on the role of training in entrepreneurship papers by using the full counting method, i.e., taking one organisation as one unit. We set criteria to filter the data. Here we took the minimum no. of documents an organisation to be 2 in the VoS Viewer software. A total of 1,395 organisations have participated in the publication of the role of training in entrepreneurship papers, out of which 35 meet the threshold limit. However, these 35 organisations are not connected. The complete set of connected authors is four

organisations. The scattered network map (Figure 3) shows all 35 organisations. It is difficult to find a connection between them.

Figure 5 Co-authorship of organisation with documents, citations, and total link strength (see online version for colours)

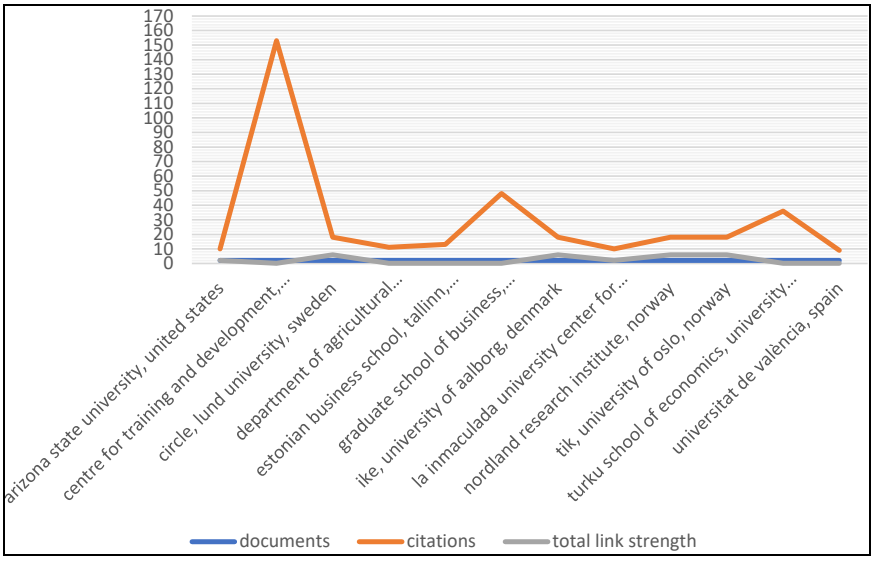


Figure 5 shows the maximum citations, the published document, and the total link strength of different organisations. The orange line shows the number of citations by a different organisation. The blue line indicates the number of documents published by various organisations, and the grey line shows the total link strength of multiple organisations.

4.4 Citation of documents

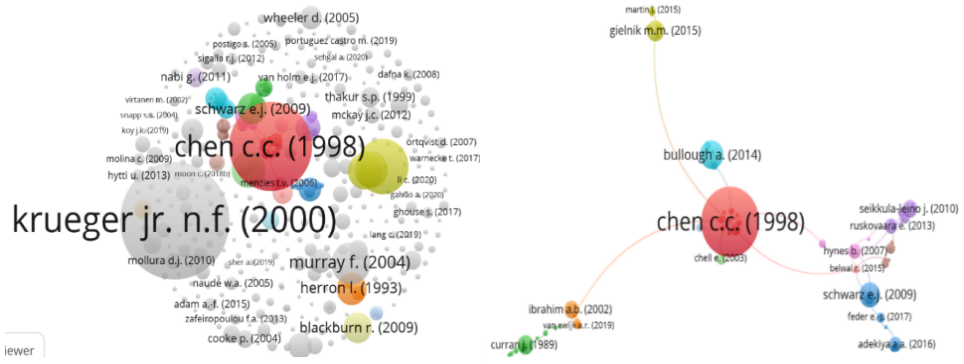
The study looked at the citation of documents using 'documents' as the unit of analysis and 'citation' as the kind of analysis. This function indicates how many times a document is cited in the study of the role of entrepreneurship training.

To identify documents cited in various papers, we use a network map by VoS Viewer to identify. So, we used bibliometric analysis of the citation of documents used in publications on the role of training in developing entrepreneur skills papers with the help of the full counting technique.

It will be impossible to put all the documents on the map. For this, documents are filtered by taking the minimum number of times the document is cited. This helps reduce the documents that the authors do not frequently use in these papers.

Therefore, we set the criteria by taking the minimum number of citations of documents to be 2. Out of 759 documents, 413 meet the threshold limit. But these 413 documents are not connected. The complete set of related items is 63 documents. The scattered network map in Figure 6 shows 413 papers. It is not easy to find the connection between them.

Figure 6 Scattered and network map of citations of documents (see online version for colours)

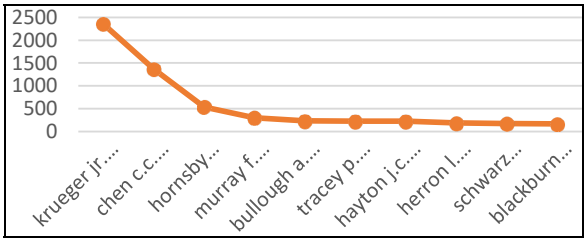


The network map of 63 papers and their connection is shown above. 63 documents are divided into 12 clusters for better analysis, with 69 links between them. As per the network map, the paper 'Does entrepreneurial self-efficiency distinguish entrepreneurs from managers?' published by Chen et al. in 1998 belonging to cluster 1 was cited by 1,365 authors and with 15 links with other documents.

The document 'Danger zone entrepreneurs: the importance of resilience and self-efficiency for entrepreneurial intention' published by Bullough et al. in 2014 belonging to cluster 6 was cited by 230 authors and with 3 links with other documents.

The document 'The effects of attitudes and perceived environment conditions on students' entrepreneurial intent: an Austrian perspective' published by Schwarz et al. in 2009 belonging to cluster 3 was cited by 174 authors and with 4 links with other documents.

Figure 7 Maximum citations of documents (see online version for colours)



The document 'Action and action regulation in entrepreneurship: evaluating a student training for promoting entrepreneurship' published by Gielnik et al. in 2015 belonging to cluster 4 was cited by 121 authors and with six links with other documents.

The document 'Promoting entrepreneurship education: the role of the teacher?' published by Seikkula-Leino et al. in 2010 belonging to cluster 5 was cited by 87 authors and with five links with other documents.

The document 'Entrepreneurial activities in Europe-oriented institutions' published by Hisrich and O'Cinneide in 1996 belonging to cluster 2 was cited by 11 authors and with two links with other documents.

Figure 7 above shows a clear view of the frequently cited documents in the literature.

The document published by N.F. Krueger Jr. in 2000 was cited the highest number of times by 2,357 authors.

The document issued by C.C. Chen in 1998 was cited the second-highest number of times by 1,365 authors.

The document published by J.S. Hornsby in 2002 was cited the third-highest number of times by 538 authors.

4.5 Citation of source

The study looked at the citation of sources using 'source' as the unit of analysis and 'citation' as the kind of analysis. This function indicates how many times a document is cited in the study of the role of education and training in entrepreneurship. To identify documents cited in various papers, a network map was used. So, a bibliometric analysis of the citation of documents used in publications on the role of education and training in developing entrepreneur skills papers with the help of the full counting technique. It will be impossible to put all the Sources on the map. For this, a filter was used. Sources are filtered by taking the minimum number of documents of a source to be 2. This helps reduce the number of sources from which authors do not frequently refer to documents in their literature on the role of training in developing entrepreneurial skills. Out of 496 sources, 108 meet the threshold limit. But these 108 documents are not connected. The complete set of related items is 44 sources. Given in Figure 8, the network map of 44 sources with their connection with each other.

The 44 sources are divided among ten clusters with 62 links and 76 total link strengths.

Figure 8 Network map of citations of sources (see online version for colours)

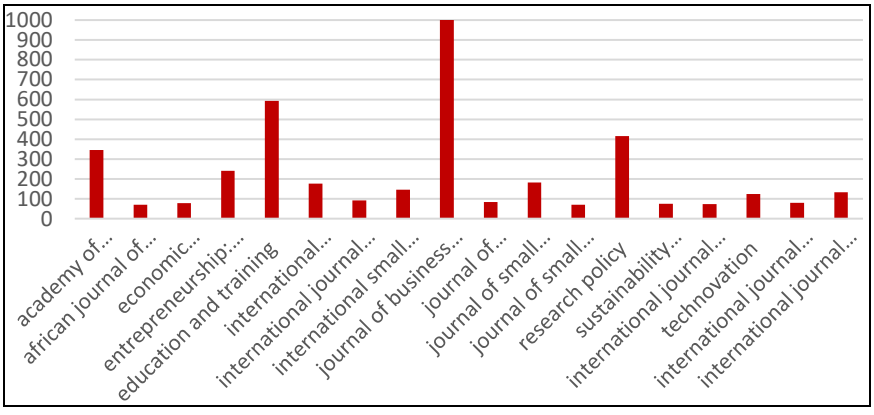
Cluster 1 consisted of nine sources, cluster 2 comprised of seven sources, cluster 3 consisted of six sources, cluster 4 consisted of four sources, cluster 5 comprised of four sources, cluster 6 comprised of four sources, cluster 7 comprised of three sources, cluster 8 consist of three sources, cluster 9 comprised of two sources, and cluster 10 consist of two sources.

Source *Education and Training* belongs to cluster 2 and has nine links with other sources have published 20 documents related to the role of training in entrepreneurship with 15 total link strengths.

Source *Journal of Small Business and Enterprise Development* belongs to cluster 3 has five links with other sources and has published 12 documents related to the role of training in entrepreneurship with nine total link strengths.

Source *International Journal of Gender and Entrepreneurship* belongs to cluster 5 and has six links with other sources have published 12 documents related to the role of training in entrepreneurship with eight total link strengths.

Figure 9 Maximum citations by different sources (see online version for colours)



According to Figure 9 on citation by different sources, sources such as *Academy of Management Learning and Education*, *Entrepreneurship: Theory and Practice*, *Education and Training*, *International Entrepreneurship and Management Journal*, *International Small Business Journal*, *Journal of Business Venturing*, *Journal of Small Business and Enterprise Development*, *Research Policy*, *Technovation* and *International Journal of Gender and Entrepreneurship* have been cited more than 100 times.

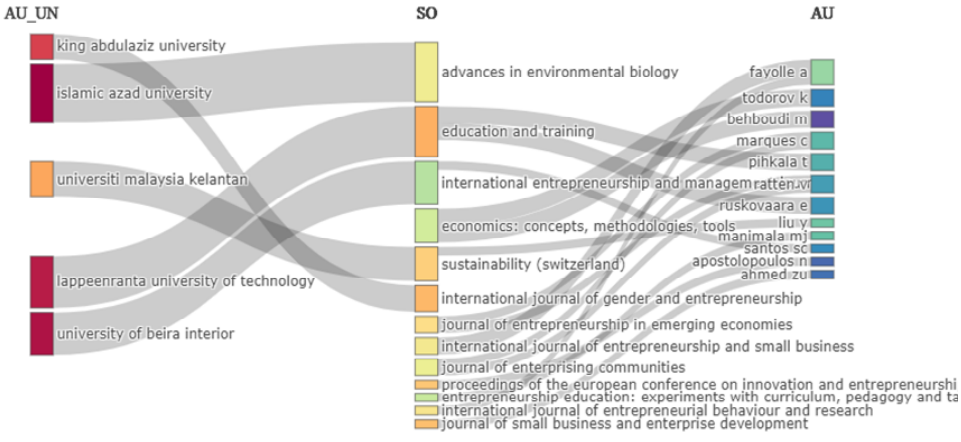
According to the document published by a source on the role of education and training in entrepreneurship, the source education and training published the highest number of documents, i.e., 20, followed by the *Journal of Small Business and Enterprise Development* and *International Journal of Gender and Entrepreneurship* both sources published 12 papers each, the sources sustainability (Switzerland) and proceedings of the European conference on innovation and entrepreneurship, ECIE both published ten documents each.

5 Three field plot

Three field plot maps depict comparisons of three factors. We contrasted the organisation to the publisher and the authors in this situation. It was found that organisations, like universities, publish their entrepreneur study in a specific journal. Islamic Azad University's papers are published in *Advances in Environmental Biology*, King Abdulaziz University's papers are published in *International Journal of Gender and Entrepreneurship*, University of Malaysia's papers are published in *Sustainability Journal*, and so on.

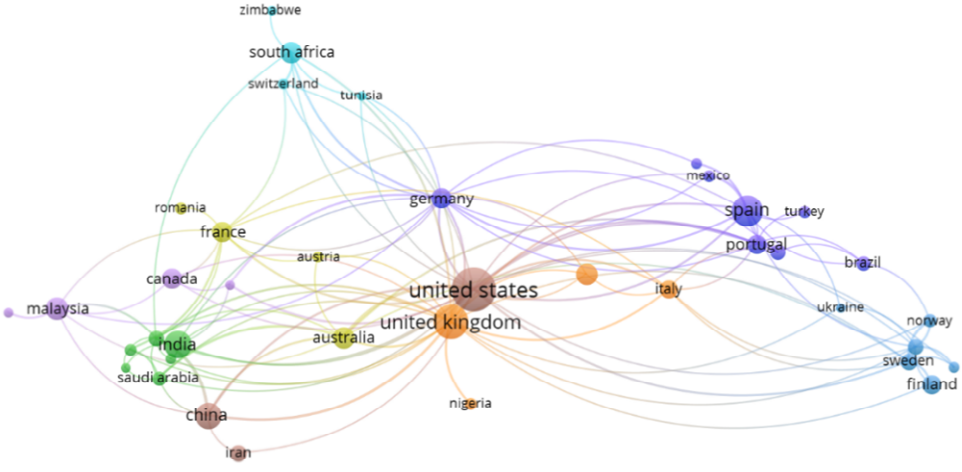
Figure 10 map shows connections between various universities, sources, and authors.

Figure 10 Three field map of organisation, sources, and authors (see online version for colours)



As evidenced by research question two: which countries collaborated most frequently in writing papers on the role of education and training in entrepreneurship between 1981 and 2021?

Figure 11 Co-authorship of countries (see online version for colours)



5.1 Co-authorship of countries

The study looked into the country's co-authorship (as shown in Figure 11), using 'co-authorship' as the kind of analysis and 'country' as the unit of analysis. The goal is to investigate and see any connections between the countries. To identify the number of citations and documents published by different countries, we use a network map by VoS Viewer. So, we used a bibliometric analysis of the co-authorship of countries in the literature on the role of education and training in developing entrepreneurial skills. We set criteria to filter the data. Here we took the minimum no. of documents by country to be 5, which is the default criteria in the VoS Viewer software, and 105 countries have

participated in the publication of the role of training in entrepreneurship papers, out of which 42 meet the threshold limit.

The above network map shows 39 countries correlated in the literature on the role of entrepreneurship training, eight clusters are formed with 121 links between countries and 172 total link strength.

As per research question three: which is the most influential journal in which authors published papers on entrepreneurial education and training during the years 1981 to 2021?

6 Performance analysis

This section of the bibliometric study primarily focused on a unit's productivity and contribution to the overall field of the research. First phase of analysis we find that the total publications on the topic role of entrepreneurship training are 759 which means the average years for publication is 6.09. However, the sole authored publication is 168. Total citations are 32,057 which suggest that the average citation per document is 15.5.

Figure 12 shows the average document cited each year. It depicts that between 1991 and 2001 the average no. of the paper cited was more than in other years. This could be a post-globalisation effect.

6.1 Most influential publication (H index)

H index measures the influence of publications that are cited. In our study (as shown in Figure 13), *Education and Training* is the most influential publication for the role of training in entrepreneurship papers with an h index of 11. The publishers *International Journal of Gender and Entrepreneurship*, the *Journal of Small Business and Enterprise Development* and *Sustainability* (Switzerland) have an h index.

Figure 12 Average document citations per year (see online version for colours)

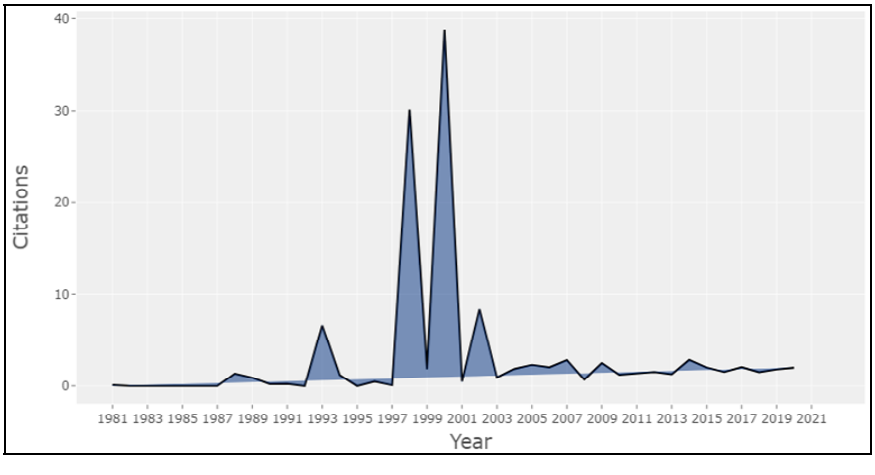
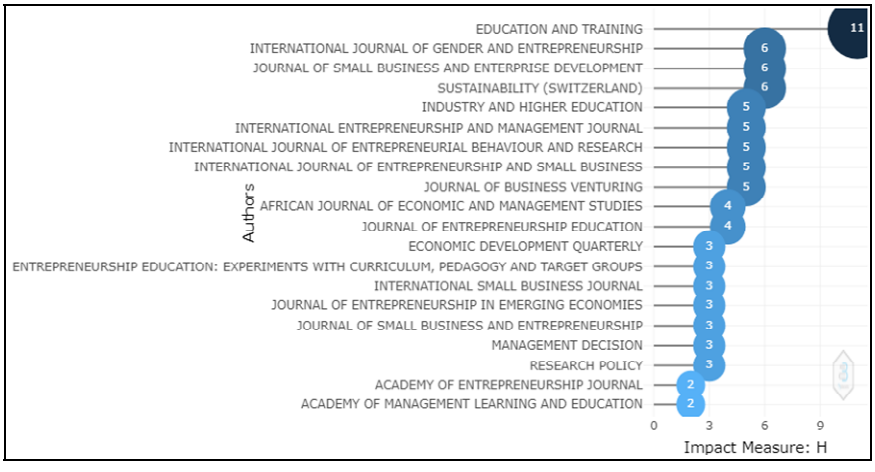


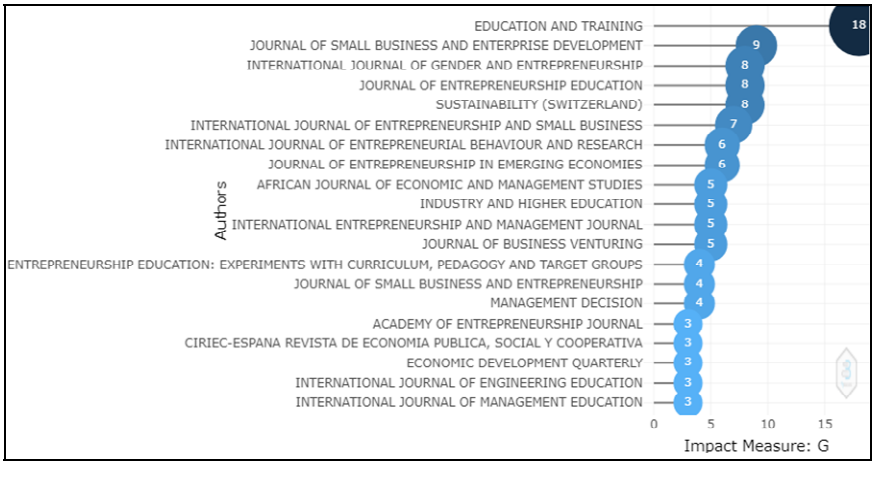
Figure 13 H index of journals (see online version for colours)



6.2 Most impactful publication (G index)

The g index measures the impact of publications that are cited. In our study (as shown in Figure 14) it is found that *Education and Training* is the most impactful publication for the role of training in entrepreneurship with a G index of 18. The publisher *Journal of Small Business and Enterprise Development* is the second most impactful journal with a G index of 9 followed by the *International Journal of Gender and Entrepreneurship*, and the *Journal of Entrepreneurship Education and Sustainability* (Switzerland) with a G index of 8 respectively.

Figure 14 G index of journals (see online version for colours)



The next question of this study states: which are the most used keywords in the entrepreneurship and role of education and training papers over the period of 1981 to 2021?

6.3 Co-occurrence of keywords

The study looked at the co-occurrence of keywords using 'keywords' as the unit of analysis and 'co-occurrence' as the kind of analysis. This function indicates that the provided keywords appeared in the same study. The networking map is represented by a line labelled 'link'. To identify keywords used in various papers, a network map was used to identify. So, we used a bibliometric analysis of the keywords used in publications on the role of training in developing entrepreneur skills papers. The author's keyword is analysed as one unit with the help of the full counting technique. In the co-occurrence map, the nodes' size shows the number of times the word has occurred. This helps in analysing which words are used the most. We can also measure the frequency of co-occurrences of two terms by measuring the distance between the two terms in the map. The greater the frequency of co-occurrences of two words, the shorter the distance between two nodes. It will be impossible to put all the keywords on the map. For this, keywords are filtered by taking the minimum number of times the keyword has occurred. This helps reduce the keywords that the authors do not frequently use in these papers. Therefore, we set criteria by taking a minimum number of keyword occurrences to be 5. Out of 3,392 keywords, 152 meet the threshold limit.

Figure 15 Co-occurrence of keywords (see online version for colours)

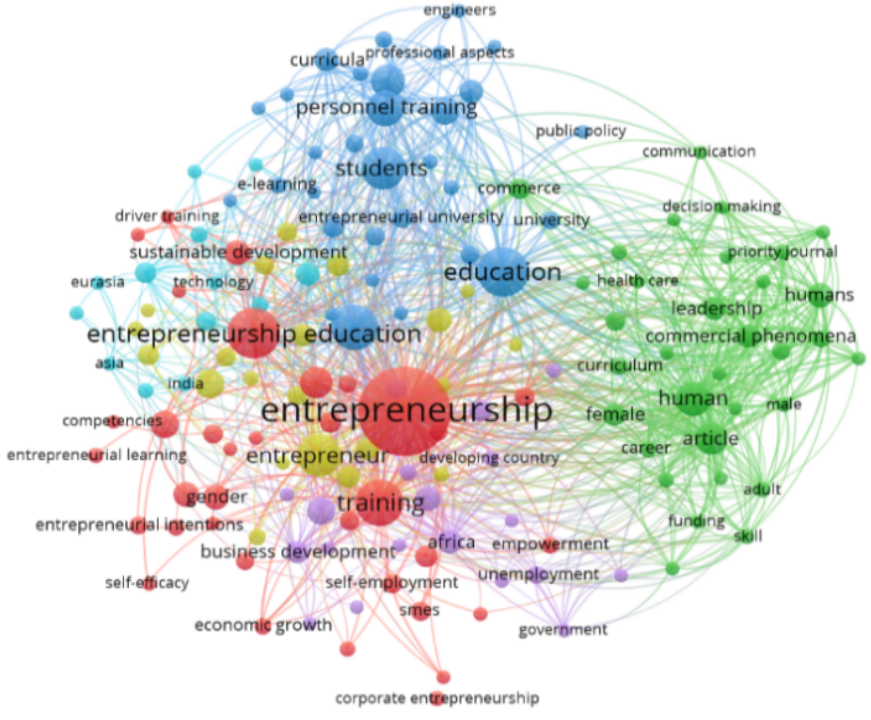


Figure 15 shows the most frequently used keywords by the authors who have been utilised in the literature on the role of education and training in developing entrepreneurial skills. 152 keywords form six clusters: red, green, purple, indigo, blue, and yellow, with 2,379 links and 4,456 total link strength. Cluster 1, which is a red

cluster, consists of 35 keywords. Cluster 2, which is a green cluster, consists of 31 keywords. Cluster 3, an indigo cluster, consists of 31 keywords, and Cluster 4, a yellow cluster, consists of 21 keywords. Cluster 5, which is a purple cluster comprised 19 keywords, and Cluster 6, which h is a blue cluster, comprised 13 keywords.

Figure 16 Occurrence of keywords

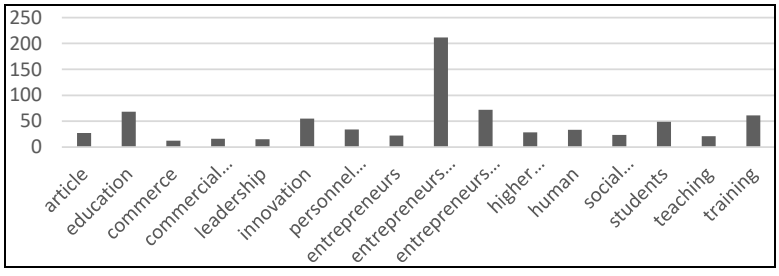
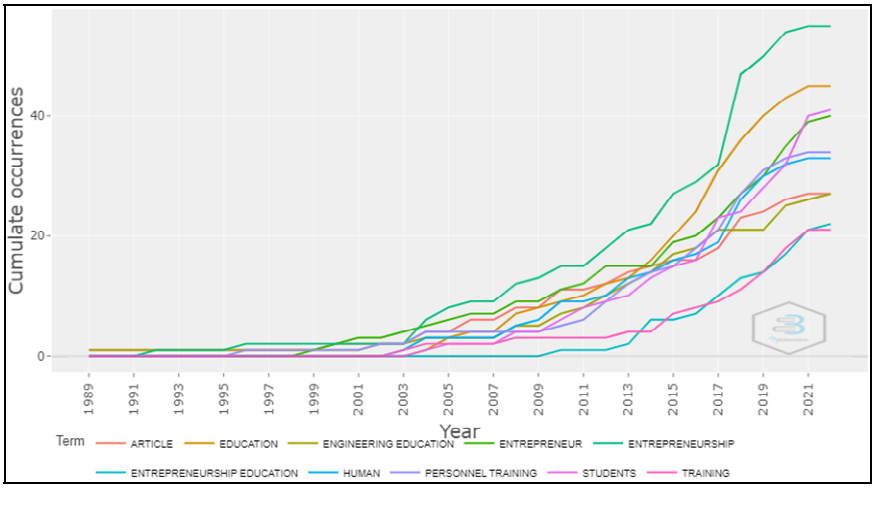


Figure 16 provides a vivid picture of the frequently occurring word in the literature.

The following 20 words are frequently used, i.e., article, education, engineering education, entrepreneurship, commerce, leadership, commercial phenomena, innovation, personnel training, entrepreneur education, higher education, human, social entrepreneur, students, teaching, and training. A grey bar diagram shows their occurrence in the literature. Words such as education, innovation, entrepreneurship, entrepreneur education, students, and training have occurred more than 50 times in the literature.

Words are based on their frequency of use over time. Figure 17 shows the growth of the word from 1989 to the present. It has been shown that people in their early '20s began to pay attention to entrepreneurship. With each passing year, the term 'entrepreneur' has become more popular. The words 'education', 'engineering education', and 'article' have become more common than the words 'training', 'human', and so on.

Figure 17 Word growth (see online version for colours)



Since the aim of this study is to know the current trend of the research on the aforesaid topic, the next research question is: Which is the current theme to which researchers give the utmost importance while writing papers on entrepreneurs?

7 Thematic analysis

The map in Figure 18 compares themes from 1981 to 2017 with those from 2018 to 2022. It demonstrates that research has radically changed its focus due to recent innovations, technology, and needs. Previously, researchers focused solely on entrepreneurs and humans, but now the focus has switched to sustainable development, necessitating the training of students. As it is futuristic, sustainability is a significant priority. To survive and meet immediate requirements, future needs must also be considered.

Figure 18 A comparative analysis of the theme of different years (see online version for colours)

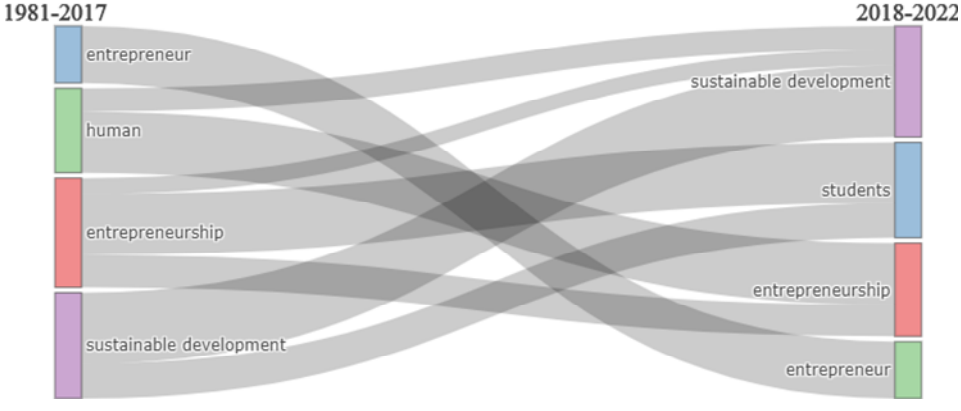
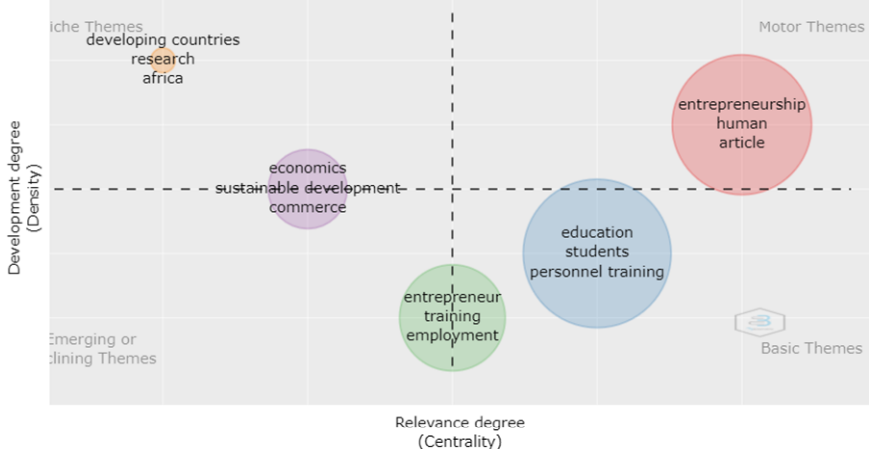


Figure 19 Theme matrix (see online version for colours)



We can create theme matrices as well. The map is organised into four areas in a theme matrix: basic themes, motor themes, niche themes, and emerging topics. We discovered

that education, students, people training, and training employment are the most common themes in our research. Human entrepreneurship is a prominent theme. While the study on entrepreneurs in underdeveloped countries falls under the Niche area, economics and sustainable development fall under the emerging theme.

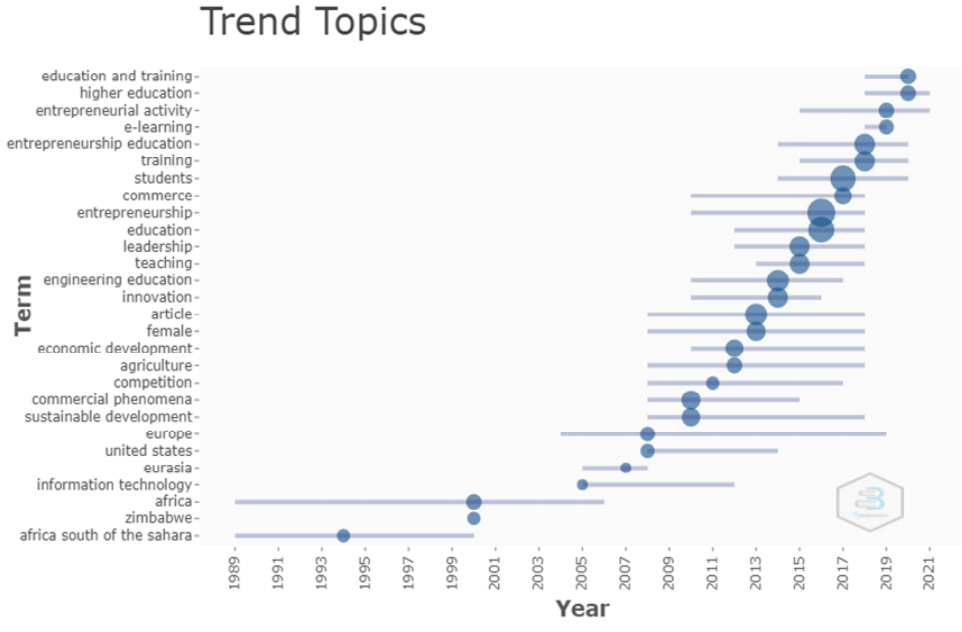
The last question of this study is focused on finding out the trends: What is the Past trend for entrepreneurship research?

8 Trends

A trend is a popular topic or issue during a specific period, in this case, the themes that researchers favour at a particular point in time, such as a year.

Figure 20 depicts the topic's trend over time. There has been a trend for e-learning in entrepreneurial education in recent years, from 2017 to 2021. Researchers are focusing their efforts on e-learning platforms that aid in developing abilities at any time and from anywhere. Previously, there was a tendency to use a physical learning environment to build entrepreneurship abilities. There has also been a dynamic change towards e-learning due to the pandemic.

Figure 20 Graph showing trends of various years (see online version for colours)



Sustainable training and development skills in entrepreneurship and e-learning are two of the most commonly used themes in entrepreneurship training. People have migrated to online mode due to the adverse effect of the pandemic, which has resulted in a surge in entrepreneurial training in e-learning portals such as MOOCs, Coursera, and LinkedIn training, among others. The tools utilised in entrepreneurship skills training primarily aimed to improve the trainee's analytical abilities. Students' tactical acumen is enhanced through the case study technique, life projects, and other practical modes of learning,

which will help them solve real-world situations and make good decisions. The right tools and approaches avoided traditional teaching methods in favour of online training, case studies, and life projects that provoke thought and aid in developing technical skills, which are critical in today's dynamic environment.

9 Conclusions

Different countries and authors have researched the role of education and training in developing entrepreneurship skills in the past 40 years. These research papers present a bibliometric analysis of the documents published on the role of training in entrepreneurship through a large number of bibliometric indicators. The research results indicate that authors such as A. Dauletova, L. Tailmova, T. Pritvorova, S. Mazhitova and R. Zhashkenova have all published most documents on the role of education and training in entrepreneurship. Also, the USA and the UK have published the highest number of papers in this field. This shows that developed countries are keen to develop their human resource. Centre for Training and Development, University of Technology, Lappeenranta, Finland, has the maximum number of citations, i.e., 153 for this paper. The results have also highlighted 'engineering education', 'entrepreneurship', 'commerce', 'leadership', 'commercial phenomena', 'innovation', 'personnel training', 'higher education', 'social entrepreneur', and 'training' was the most highlighted author keywords in the published literature. J.S. Hornsby and D.F. Kuratko with the most significant number of citations for the literature role of training in entrepreneurs.

It is vital to highlight the document 'Competing models of entrepreneurial intentions' published by Krueger et al. in 2000 was cited by 2,357 authors is the most cited paper. Therefore, a researcher working in a similar domain can refer to the above-cited paper.

The importance of entrepreneurship training has been published in different journals such as *Academy of Management Learning and Education*, *Entrepreneurship: Theory and Practice*, *Education and Training*, *International Entrepreneurship and Management Journal*, *International Small Business Journal*, *Journal of Business Venturing*, *Journal of Small Business and Enterprise Development*, *Research Policy*, *Technovation*, and *International Journal of Gender and Entrepreneurship*. Therefore, the *Journal of Business Venturing* is intensely being used by various authors across the globe for entrepreneurs.

10 Issues for future research

Our investigation uncovers various trends and upcoming themes that should be considered by researchers interested in entrepreneurship. Notably, sustainability development and the emergence of e-learning platforms have become integral to fostering entrepreneurial abilities.

In developing countries, there is a growing emphasis on entrepreneurship, driven by abundant opportunities compared to developed nations. Our study highlights a trend where scholars from underdeveloped nations collaborate with researchers from more advanced countries to explore entrepreneurship.

However, certain limitations must be acknowledged. Like other bibliometric studies, our paper search exclusively utilised the Scopus database, potentially excluding papers

and journals not indexed in Scopus. Future analyses could explore alternative databases such as Web of Science. Additionally, our study focused on English-language papers, excluding those in other languages. Future research could encompass a broader linguistic scope for a more comprehensive understanding.

It is important to recognise the non-exhaustive nature of this study due to the mentioned constraints. Nevertheless, the inclusion of significant publications contributes to a comprehensive bibliometric analysis. This study is expected to serve as a valuable resource for future research in entrepreneurial education and training, shedding new light on the existing literature.

The research work indicates a substantial increase in publications related to 'entrepreneurship training'. Future investigations could delve into sustainable aspects of the subject, addressing the need for specific research in this area. Furthermore, the effectiveness of online entrepreneurship training requires diverse approaches and modified evaluation matrices. Cultural factors influencing entrepreneurship training should be a focal point for future research endeavours.

To sum up, this study hopes to provide insightful information to the research community, direct other studies, and influence the changing field of entrepreneurial training.

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