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articles

Entrepreneurship and Innovation: The Coevolution of Two Fields

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Both entrepreneurship and innovation play a key role for business growth and economic development and are conceptually highly intertwined. Both fields have received extensive attention that has resulted in a large number of publications. The aim of this work is to provide an overview on the coevolution of entrepreneurship and innovation over the last decades, with particular attention to recent research trends. To track the evolution at the intersection of both fields, we employ a bibliometric analysis, which allowed us to identify the key concepts, the backbone of research, and to provide a systematic classification of main research themes diagnosed including: 1) entrepreneurial innovation and digital transformation, 2) sustainable innovation and entrepreneurship, 3) product innovation and knowledge, 4) entrepreneurial orientation and leadership, and 5) regional entrepreneurship and innovation (innovative entrepreneurship and historical roots). The findings of this bibliometric review are reported in the form of a knowledge graph that represents the results obtained in terms of the knowledge base (key terms), knowledge domains, and knowledge evolution (themes and bursts), based on which themes for future research are suggested.

Introduction

The conceptual relationship of entrepreneurship and innovation can be traced back to Schumpeter (1934), who first described the nexus between entrepreneurs and innovation in theory and viewed the entrepreneur as an innovator (Zhao, 2005). In his seminal work, Schumpeter (1934) highlighted that innovation plays a crucial role in economic growth as entrepreneurs seek opportunities, and innovations provide the instrument through which they might succeed by exploiting change as an opportunity for a different business or a different service (Drucker, 2006). Entrepreneurship, as a process, involves capturing ideas, converting them into products (and/or services) and then building a venture to take the product to market (Alemany et al., 2021; D. Johnson, 2001). For an entrepreneurial venture to achieve commercial success, innovation requires entrepreneurial capacity, to make the necessary infrastructure and capital (Herbig et al., 1994), and has to address market needs (Zhao, 2005). This is especially relevant for small businesses, as they represent the backbone of most national economies, most nascent entrepreneurs start as small businesses, and even incumbent small businesses continually have to follow an innovation strategy to grow and survive.

According to Drucker (2006), a systematic approach is required to integrate entrepreneurship and innovation into studies as they are systematic behaviours (Schmitz et al., 2017). Ever since the early work of Schumpeter (1934), the fields of entrepreneurship and innovation have drawn extensive attention and produced a vast number of publications (Autio et al., 2014; Brazeal & Herbert, 1999; Brem, 2011; Landström et al., 2015; Schmitz et al., 2017). However, the research landscape is complex and difficult to oversee. Hence, the purpose of this study is to organize the literature by identifying research concepts, concerns, and trajectories that have contributed to the transformation of entrepreneurship and innovation overall, rather than focusing on a specific concept, context or process.

In particular, by using bibliometric tools, including performance analysis, keywords (and bursts) analysis, citations analysis, and main path analysis, we provide an overview regarding the co-evolution of entrepreneurship and innovation over the last few decades, with certain attention to recent research trends. The methodology applied in this paper, rather than utilizing a traditional type of literature review, allows for a less subjective investigation of knowledge flow, and it is especially useful when the aim of analysis is to determine the overlap between two (or more) fields

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of study on a wide range of topics (Comerio & Strozzi, 2019). After describing, evaluating, and monitoring the published research, and structuring the existing lines of research (Glinyanova et al., 2021; Zupic & Čater, 2015), we contribute to the literature by developing a unifying, the so-called knowledge graph, framework. At the intersection of entrepreneurship and innovation, this framework provides a big picture of key terms (knowledge base) and knowledge domains that are developed over time. The framework also highlights the key interlinked concepts overlapping with entrepreneurship and innovation literature, especially those that have been developing over recent years (e.g., sustainability, social innovation, higher education, and SMEs). Based on the recognition of recent lines of research, we finally suggest directions for further research and provide insight into the factors that managers, chiefly in SMEs, should consider with respect to performance enhancement in terms of innovation and entrepreneurship.

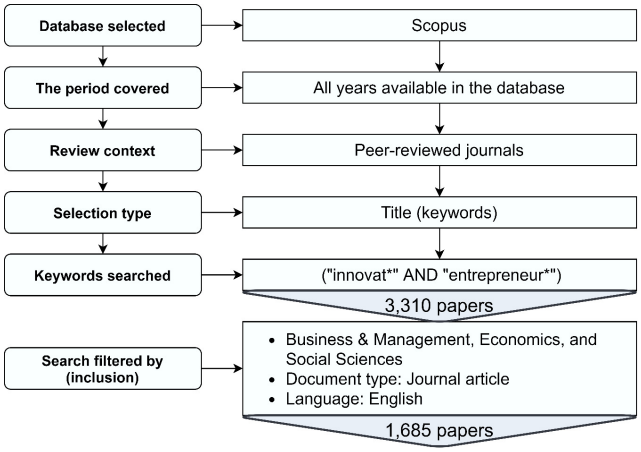

Figure 1. Sample selection

Research Methodology

Review Method

Reviewing the current state of research is a major contribution to a field, as it is intended "to provide a historical perspective of the respective research area and an in-depth account of independent research endeavours" (Mentzer & Kahn, 1995, p. 233). Compared to traditional methods of systematic literature review (Kraus et al., 2020; Tranfield et al., 2003), bibliometric analyses allow for the measurement of scientific research activities based on publication and citation data and provide a more transparent understanding of potential knowledge development by identifying the connectivity in the network of citations and references (Colicchia & Strozzi, 2012; Garfield, 1979; Glinyanova et al., 2021; Zupic & Čater, 2015). Therefore, bibliometric tools help to investigate the research state and trends and to track knowledge creation and development in a quantitative and, hence, more objective way (Hummon & Dereian, 1989; Zupic & Čater, 2015). As researchers contribute to the literature on the grounds of previous knowledge, a bibliometric network analysis can assist in identifying a system of channels which transforms scientific knowledge (Colicchia & Strozzi, 2012).

Bibliometric methods have drawn increased attention in different fields of research such as entrepreneurship (Baier-Fuentes et al., 2019; Cornelius et al., 2006; Filser et al., 2020; Hota et al., 2020; Kraus et al., 2020; Lampe et al., 2019; Liñán & Fayolle, 2015; Martínez-Climent et al., 2018; Pellegrini et al., 2020; Rey-Martí et al., 2016; Schildt et al., 2006; Tiberius, Schwarzer, et al., 2020; Vallaster et al., 2019) and innovation (Di Stefano et al., 2012; Fagerberg et al., 2012; Glinyanova et al., 2021; Randhawa et al., 2016; Tiberius, Rietz, et al., 2020). In this paper, we investigate the overall coevolution of both entrepreneurship and innovation fields by using bibliometric tools including performance analysis, co-occurrence analysis of keywords and burst detection analysis, citations analysis, and main path analysis. This combination of tools has been experimented within different fields (e.g., Afeltra et al., 2021; Alerasoul et al., 2021; Comerio & Strozzi, 2019; Strozzi et al., 2017) and appeared to fit with our aim to understand the intersection of entrepreneurship and innovation fields and identify key concepts, themes, and recent trends. It would certainly have been possible to use other bibliometric tools such as bibliographic coupling or co-citation analysis (individually or mixed with other tools), however, the usage of the above-mentioned tools in this study was found to provide a desirable combination.

Data collection and cleansing

The initial search for the literature sample was conducted in March 2021 on Scopus database, using the keywords "innovat*" and "entrepreneur*". We decided to use only the Scopus database because it is considered to have a wider and less selective coverage of many research fields, compared to other databases such as "Web of Science" (Mongeon & Paul-Hus, 2016). The use of more than one database usually does not generate better results (Harzing & Alakangas, 2016). The keywords were used as search terms in the 'Title' field in order to select the studies having 'entrepreneurship' and 'innovation', and their derivatives, as their main target of research (Strozzi et al., 2017); the symbol asterisk (*) was used at the end of the terms to cover the derivatives of entrepreneurship and innovation, e.g. entrepreneurial, entrepreneurs, or innovative (Granados et al., 2011). The search yielded 3,310 documents. We included only 'white literature' (Adams et al., 2017). In particular, peer-reviewed journals were chosen as the main source of the review because of their high standards that result in top-quality articles with validated knowledge and higher impact (Light & Pillemer, 1984). The dataset was then modified by excluding conference proceedings, editorial materials, book reviews, and meeting abstracts. We limited the results to the subject areas of "Business, Management and Accounting", "Economics, Econometrics and Finance", and "Social Sciences" and excluded non-English documents. The final sample extracted contained 1,685 articles (Figure 1). We decided not to limit the results to publications addressing small businesses because the dataset would have been much smaller. Additionally, small businesses can learn from the coevolution of entrepreneurship and innovation in general, not only specified for small businesses.

Table 1. The number of papers by top 10 most productive authors (source: Scopus)

Author	Articles
Guerrero M.	9
Urban B.	8
Urbano D.	8
Kraus S.	7
Link A.N.	7
Wright M.	7
Abramov R.A.	6
Huggins R.	6
Kuratko D.F.	6
Bagheri A.	5

Results

Performance Analysis

The first step in our bibliometric analysis consists of a performance analysis to provide an overall evaluation of the research field in statistical descriptive terms (Glinyanova et al., 2021; White & McCain, 1998; Yue & Wilson, 2004; Zupic & Čater, 2015). In particular, we assess the publications growth over time and identify the most productive and influential authors, countries, and journals.

As shown in Figure 2, research on the interrelationship between entrepreneurship and innovation has grown substantially over time. In this graph, the publications in the first quarter of 2021 are excluded so as to have only full years of coverage. An increase in the publication numbers is especially evident over the last decade. In particular, the number of papers published in 2017 (136 papers) almost doubled by 2020 (263 papers).

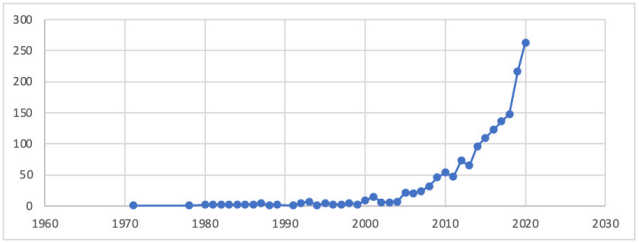

Figure 2. The number of published papers per year (source: Scopus)

The top ten most productive authors in the sample of this work contributed to 69 papers; Guerrero is recognized as the most productive author by contributing to 9 papers (Table 1).

Regarding the recent performance of authors in the sample, Figure 3 illustrates the network of the most influential authors (in terms of number of publications, citations, and the total strength of the citations links with other authors) over the last five years. In the network, generated in VOSviewer, out of 2,455 authors who published at least one paper between 2016-2021, 1,000 (by default) with the greatest total link strength were selected, out of whom the most influential authors were recognized in the output.

Concerning the productivity of authors (for the period 2016-2021), Guerrero M. (8 articles), Urbano D. (7 articles), Abramov R.A. (6 articles), Kraus S. (5 articles), Sokolov M.S. (5 articles), Urban B. (5 articles), Bagheri A. (4 articles), Fernandes C.I. (4 articles), McKelvey M. (4 articles), and Ratten V. (4 articles), were recognized as the top ten most productive authors, contributing to 4 or more papers during 2016-2021. Moreover, the most highly cited author in the same period was found to be Kraus S., with 302 citations, followed by Lüdeke-Freund F. (Citations: 203), Urbano D. (Citations: 187), Schaltegger S. (Citations: 183), and Hansen E.G. (Citations: 183). Based on the total link strength (TLS), we also identified Kraus S. (TLS: 80), Urbano D. (TLS: 65), Bagheri A. (TLS: 57), Guerrero M. (TLS: 53), and Bouncken R.B. (TLS: 41) as the authors with strongest citations links with other authors.

The most productive author in this network, Guerrero M., mainly co-authored with Urbano D. (second ranked most productive author). Entrepreneurship and Innovation in the academic setting, entrepreneurial universities, and social, entrepreneurial, and innovative organizations are at the core of her research (Guerrero & Urbano, 2017, 2019; Schmitz et al., 2017).

Bringing the number of publications, citations, and TLS together, we note that Kraus S. has been the most influential author over the last five years. Digital entrepreneurship, sharing economy, innovation ecosystem, and entrepreneurial orientation are some of the key concepts in his works. Through a strong link with Bouncken R., he has also developed contributions to the literature of alliances and coworking spaces in relation to entrepreneurship and innovation (Bouncken et al., 2016, 2020).

The 1,685 articles in the sample were (co)authored by 3,693 authors from 125 countries. Concerning country productivity, US authors contributed 372 articles to the sample, UK authors 184, Spanish authors 146, Chinese authors 126, and German authors 77 (making up around 53% of all papers in our sample). Among the 125 countries, the ten leading countries each produced more than 50 articles and received at least 1,000 citations. In terms of total citations/total papers (TC/TP) at the intersection of entrepreneurship and innovation, Canada is positioned at the top of the list

Table 2. The top 5 most productive and influential journals (source: Scopus)

Journal	Papers	Citations	Total Citations/Total Papers
Small Business Economics	41	2312	56
Journal of Business Research	31	1113	36
Sustainability	30	239	8
Technological Forecasting & Social Change	26	674	26
International Entrepreneurship & Management Journal	25	194	8

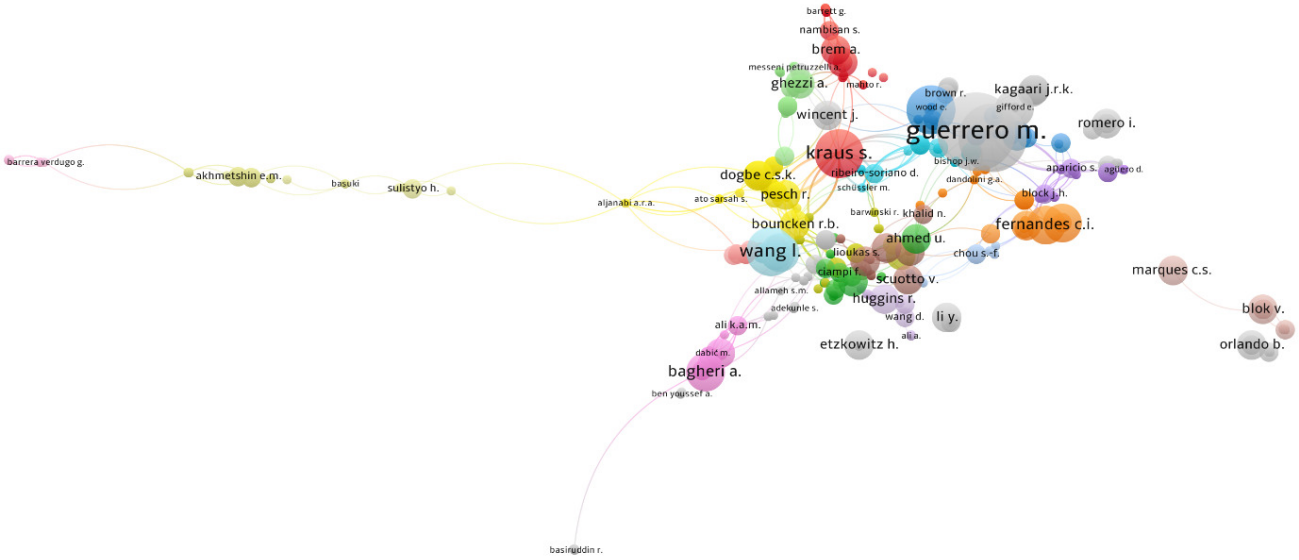

Figure 3. Network of the most influential authors from 2016-2021 (generated in VOSviewer)

in the sample, by receiving 48 TC/TP (2,522 citations per 52 published articles) and is followed by the United States (35 TC/TP), Germany (30 TC/TP), United Kingdom (28 TC/TP), Netherlands (26 TC/TP), France (24 TC/TP), Italy (23 TC/TP), Australia (23 TC/TP), Spain (21 TC/TP) and China (13 TC/TP). Regarding the co-country authorship strength (Appendix A), 53 countries (that met the threshold of at least 5 articles published) were evaluated, and the United States, United Kingdom, Spain, China, France, Netherlands, Germany, Finland, Italy, and Australia were identified, in this order, as the ten countries with the strongest total links.

We also identified the five most productive journals, as illustrated in Table 2. The most productive journal, in terms of publishing papers that concern both entrepreneurship and innovation (by the end of 2020), is Small Business Economics followed by Journal of Business Research, Sustainability, Technological Forecasting & Social Change, and International Entrepreneurship & Management Journal. In terms of citations, excluding 2021, the documents published in Small Business Economics received the highest number of citations (2312), followed by the documents published in Journal of Business Research (1113 citations), Technological Forecasting & Social Change (674 citations), Sustainability (239 citations), and International Entrepreneurship & Management Journal (194 citations) (Table 2). Regarding the TC/TP impact (excluding 2021), Small Business Economics is first positioned by 56 TC/TP, followed by Journal of Business Research (36 TC/TP), Technological Forecasting & Social Change (26 TC/TP), Sustainability (8 TC/TP), and International Entrepreneurship & Management Journal (8 TC/TP) (Table 2)

Analysis of Keywords

Co-occurrence of Keywords

The co-occurrence analysis of keywords was performed by building a co-word network (Callon et al., 1991). An important assumption behind this analysis is that the keywords of a paper represent an adequate description of the content. It is particularly useful to detect research patterns and trends in a field by measuring the association strength of words (Ding et al., 2001). To do so, we analysed the co-occurrence of keywords, which appeared in papers published between 2016-2021. By setting the VOSviewer's corresponding threshold (van Eck & Waltman, 2010) to a minimum of nine occurrences, we identified the 70 most relevant keywords (out of 3,310 keywords) assigned to six clusters (Figure 4).

The yellow-coloured cluster consists of the central terms of "innovation" and "entrepreneurship" connected to "creativity", "culture", "economic growth", "entrepreneurs", "institutions", "open innovation", and "technology". The

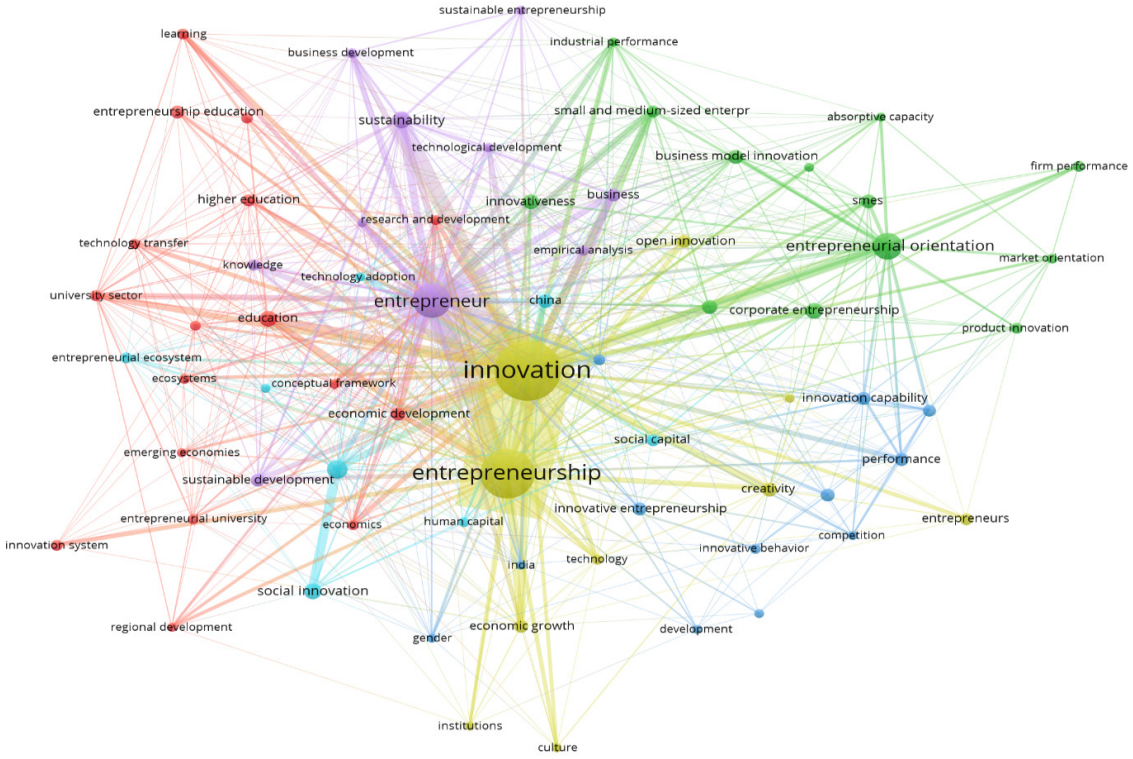

Figure 4. Keyword co-occurrence network, 2016-2021 (generated in VOSviewer)

cluster could be named “Innovation, Entrepreneurship, and Socio-economic factors”. It is worth mentioning that the links from the central keywords of this cluster (i.e., entrepreneurship and innovation) to the words of “entrepreneur”, “entrepreneurial orientation”, and “sustainability” in the other clusters appear to be the strongest.

The biggest detected cluster includes several keywords such as “education”, “university sector”, higher education", “learning”, “entrepreneurial university”, “entrepreneurship education”, “technology transfer”, “research and development”, “regional development”, “innovation system”, “innovation ecosystem”, “economic development”, and “emerging economies”. This cluster could be labelled “Innovation Ecosystem and Regional Development”.

The green-coloured cluster represents the concepts of “entrepreneurial orientation”, “market orientation”, “business model innovation”, “innovativeness”, “product innovation”, “innovation performance”, “absorptive capacity”, “firm performance”, “corporate entrepreneurship”, “industrial performance”, and “SMEs”. This cluster could be called “Entrepreneurial orientation, Innovativeness, and Performance”.

The keywords of “sustainability”, “sustainable entrepreneurship”, and “sustainable development” are revealed in the purple-coloured cluster, linked to other words including “entrepreneur”, “knowledge”, “technological development” and “business development”. This cluster could be labelled “Sustainable Entrepreneurship”.

The blue-coloured cluster consists of “innovative entrepreneurship”, “entrepreneurial leadership”, “innovation capability”, “innovative behaviour”, “competitiveness”, “competitive advantage”, “performance”, “gender”, and "India’. This cluster could be named “Innovative Entrepreneurship, Entrepreneurial Leadership, and Competitive Advantage”.

And the smallest cluster shown by a light-blue colour represents the keywords of “social entrepreneurship”, “social innovation”, “social capital”, “human capital”, “entrepreneurial ecosystem”, “technological innovation”, “technology adoption”, and “China”. This cluster could be called “Entrepreneurial Ecosystem, Social Entrepreneurship, and Technological Innovation”.

The simultaneous appearance of the above keywords in several clusters represents a pattern of research that has been followed by researchers in the field. Therefore, each cluster characterized by a set of relationships can be interpreted based on a specific concern and concentration in the overall body of knowledge in the field. In our sub-sample covering the period 2016-2021, it can be inferred from the co-occurrence analysis of keywords that recent scientific research is concerned overall about if/how external and internal environmental factors and resources in addition to firms’ orientations and processes towards innovative and sustainable entrepreneurship can lead to improved performance, corporate and social entrepreneurship, regional development, economic growth and development. The increasing attention to this area of research in emerging economies such as China and India is also noticeable. Other keywords identified represent either research methodologies applied (e.g., conceptual framework, empirical analysis, literature review, fsQCA) or some similar concepts to the ones that are already classified in the clusters including business, competition, firm performance, ecosystems, development, and small and medium-sized enterprises.

Figure 5. Citation burst of keywords over time (generated in CiteSpace)

Burst Detection of Keywords

Keywords that wax and wane substantially over a period of time can be interpreted as burst terms that have received particular attention from the scientific community and hence can provide useful insights into past and emerging trends (Pollack & Adler, 2015). By using CiteSpace (Chen, 2014), we identified 15 keywords with the strongest citation bursts (Figure 5), sorted in chronological order since 2002.

The keyword bursts with the strongest intensities (above 5) are "Entrepreneurialism" (strength: 11.7), "Sustainability" (strength: 8), "Education" (strength: 7.79), "Product Innovation" (strength: 6.3), "Corporate Entrepreneurship" (strength: 6.21), and "Social Innovation" (strength: 5.96). Some keywords such as "Policy" (2002-2010), "Entrepreneurialism" (2005-2013), and "Social Innovation" (2015-2021) are recognized with longer citation bursts. This may signal the significant role and influence of the topics (related to these keywords) on the coevolution of entrepreneurship and innovation. It can also be observed that research on the topics related to "Social Innovation" (started in 2015), "Sustainability" (started in 2018), and "Higher Education" (started in 2019) has continued to the present, implying their recent forefront role in innovation-entrepreneurship research.

Citation Analysis

As illustrated in Appendix B, 1,349 papers in our sample have been cited at least once, and the *h*-index was found to be 85, i.e., 85 papers were cited at least 85 times (Hirsch, 2005). The citations network of the 85 papers (represented by first authors) is shown in Appendix C, in which some works are highlighted due to their higher citations and stronger links. Table 3 represents the 20 most cited articles. The total citations of these 20 papers (8,733 citations) account for around 25 percent of total citations of the 1,685 papers in the sample, 35,181 citations out of which 22,714 citations were registered after 2017.

Most studies reported in Table 3 were published before 2010, and they mostly covered the fundamentals of the interaction between entrepreneurship and innovation. The topics mainly discuss the importance of entrepreneurship and innovation in firms' financial performance, industrial development, and economic growth, the role of contextual factors, the strategic aspects of entrepreneurship, the impact of mental models and entrepreneurial orientation on entrepreneurial behaviours and innovativeness, and the traits of entrepreneurs and their role in innovativeness. The most recent work in the list concerns the role of new financial alternatives in fuelling entrepreneurship. Entrepreneurial innovation, sustainable entrepreneurship, and sustainable innovation are other important concepts that have received particular attention over the last decade.

Due to their interdisciplinary and foundational nature, many of the highly cited articles appearing in Table 3 were published in journals with general (strategic) management and organization themes. However, some of the journals in the list are specialized in publishing entrepreneurial topics, also covering the complementary area of innovation. The appearance of Sustainability journal among the most productive journals in the field can be explained by the increased concern for sustainability issues and the growth of studies that investigate the nexus between sustainability and innovation as well as sustainability and entrepreneurship. It is also observable in Table 3 that the sixth most cited paper in the list, published in the journal Business Strategy & the Environment (Scopus H-index: 94), is a seminal work on the interactions between sustainable entrepre-

Table 3. Top 20 most cited articles (source: Scopus)

Year	Document Title	Authors	Journal Title	citations before 2017	citations 2017-2021	Total citations
1982	Innovation in conservative and entrepreneurial firms: Two models of strategic momentum	Miller D., Friesen P.H.	Strategic Management Journal	996	348	1,344
2001	Culture and entrepreneurial potential: A nine country study of locus of control and innovativeness	Mueller S.L., Thomas A.S.	Journal of Business Venturing	474	317	791
1997	Policy entrepreneurs and the diffusion of innovation	Mintrom M.	American Journal of Political Science	503	224	727
2005	Entrepreneurship, innovation and economic growth: Evidence from GEM data	Wong et al.	Small Business Economics	333	313	646
2001	An Empirical Investigation of the Effect of Market Orientation and Entrepreneurship Orientation Alignment on Product Innovation	Atuahene-Gima K., Ko A.	Organization Science	369	211	580
2011	Sustainable entrepreneurship and sustainability innovation: Categories and interactions	Schaltegger S., Wagner M.	Business Strategy & the Environment	152	420	572
2014	Entrepreneurial innovation: The importance of context	Autio et al.	Research Policy	48	405	453
2009	What do business models do? Innovation devices in technology entrepreneurship	Doganova L., Eyquem-Renault M.	Research Policy	152	205	357
1995	Metaphors and Mental Models: Sensemaking and Sensegiving in Innovative and Entrepreneurial Activities	Hill R.C., Levenhagen M.	Journal of Management	240	113	353
2011	The role of entrepreneurs in firm-level innovation: Joint effects of positive affect, creativity, and environmental dynamism	Baron R.A., Tang J.	Journal of Business Venturing	108	186	294
2005	When do incumbents learn from entrepreneurial ventures? Corporate venture capital and investing firm innovation rates	Dushnitsky G., Lenox M.J.	Research Policy	171	121	292
2010	The entrepreneur-environment nexus: Uncertainty, innovation, and allocation	York J.G., Venkataraman S.	Journal of Business Venturing	92	196	288
2009	Entrepreneurship, innovation, and corruption	Anokhin S., Schulze W.S.	Journal of Business Venturing	88	200	288

Year	Document Title	Authors	Journal Title	citations before 2017	citations 2017-2021	Total citations
2015	New financial alternatives in seeding entrepreneurship: Microfinance, crowdfunding, and peer-to-peer innovations	Bruton et al.	Entrepreneurship Theory & Practice	23	260	283
2007	Technology entrepreneurs' human capital and its effects on innovation radicalness	Marvel M.R., Lumpkin G.T.	Entrepreneurship Theory & Practice	110	168	278
2007	Entrepreneurial orientation of SMEs, product innovativeness, and performance	Avlonitis G.J., Salavou H.E.	Journal of Business Research	144	128	272
2006	Entrepreneurship, innovation and industrial development: Geography and the creative field revisited	Scott A.J.	Small Business Economics	178	80	258
2000	NGDOS as a moment in history: Beyond aid to social entrepreneurship or civic innovation?	Fowler A.	Third World Quarterly	143	83	226
2007	Strategic entrepreneurship: Creating competitive advantage through streams of innovation	Duane Ireland R., Webb J.W.	Business Horizons	102	117	219
2008	Why are some entrepreneurs more innovative than others?	Koellinger P.	Small Business Economics	108	104	212

neurship and sustainable innovation (Schaltegger & Wagner, 2011).

To gain a deeper understanding of the recent stream of research regarding entrepreneurship and innovation, we also extracted the top 20 most cited works that have been published within the last 5 years (Table 4). These works have received 1,703 citations out of the total citations of 7,393 received by 970 articles published between 2016-2021. Compared to Table 3, in Table 4, it is possible to see a wider range of journals with different thematic interests from innovation specific journals (i.e., *Creativity & Innovation Management*, and *Industry & Innovation*) to tourism (i.e., *Tourism Management*) and economics (i.e., *Journal of Evolutionary Economics*) journals.

Notably, three out of the five most cited authors (Lüdeke-Freund, Schaltegger, and Hansen) received their outstanding work citations thanks to their joint contribution (the first ranked paper in Table 4) to the literature of sustainable innovation and entrepreneurship.

As described above, research on sustainability in relation to entrepreneurship and innovation has received particular attention over the last decade (as also underlined in the burst detection analysis). The work by Schaltegger et al. (2016) at the top of the ranking, published in the journal of *Organization & Environment* (H-Index: 55), demonstrates the increasing interest in the interplay of entrepreneurship and innovation with respect to sustainability.

The most recent publications in the list that are also positioned among the top 10 highly cited works (Table 4) are linked to the themes of agile business model innovation in digital entrepreneurship (Ghezzi & Cavallo, 2020), digital transformation of entrepreneurship and innovation (Nambisan et al., 2019), and relational capabilities and value cocreation (Indriastuti, 2019).

Main Path Analysis

To find the 'skeleton' of studies and illustrate papers that have contributed substantially to the transfer of knowledge across both fields over time, we conducted a main path (MP) analysis by using Pajek software (Lucio-Arias & Leydesdorff, 2008). This method is used to identify major trajectories in the so-called "biggest connected component" extracted from the large network of 1,685 papers (Hummon & Dereian, 1989). The communities in the MP network, recognized by different colours in Figure 6, were detected by using the Louvain method, an algorithm to identify communities in large networks (Blondel et al., 2008).

By reviewing all the papers (nodes) in the MP output, classified by different paths and colours, we identified and named five main clusters (themes) and 10 sub-clusters.

Table 5 represents the references and key concepts corresponding to each sub-cluster and theme determined. The essence of each theme is briefly overviewed in the following sections.

Table 4. Top 20 most cited articles, published between 2016-2021 (source: Scopus)

Year	Document Title	Authors	Journal Title	Citations before 2017	Citations 2017-2021	Total citations
2016	Business Models for Sustainability: A Co-Evolutionary Analysis of Sustainable Entrepreneurship, Innovation, and Transformation	Schaltegger et al.	Organization & Environment	3	180	183
2018	Fuzzy-set qualitative comparative analysis (fsQCA) in entrepreneurship and innovation research – the rise of a method	Kraus et al.	International Entrepreneurship & Management Journal	0	119	119
2016	Entrepreneurial orientation and performance: Is innovation speed a missing link?	Shan et al.	Journal of Business Research	1	116	117
2019	The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes	Nambisan et al.	Research Policy	0	114	114
2018	Blockchain tokens and the potential democratization of entrepreneurship and innovation	Chen Y.	Business Horizons	1	105	106
2016	Innovation, entrepreneurship, and restaurant performance: A higher-order structural model	Lee et al.	Tourism Management	3	92	95
2018	Entrepreneurial cyclical dynamics of open innovation	Yun et al.	Journal of Evolutionary Economics	0	93	93
2020	Agile Business Model Innovation in Digital Entrepreneurship: Lean Startup Approaches	Ghezzi & Cavallo	Journal of Business Research	0	76	76
2019	Entrepreneurial innovativeness, relational capabilities, and value co-creation to enhance marketing performance	Indriastuti H.	Humanities & Social Sciences Reviews	0	75	75
2017	Innovative and sustainable business models in the fashion industry: Entrepreneurial drivers, opportunities, and challenges	Todeschini et al.	Business Horizons	0	74	74
2017	Digital entrepreneurship: Innovative business models for the sharing economy	Richter et al.	Creativity & Innovation Management	0	74	74
2017	The Schumpeterian entrepreneur: a review of the empirical evidence on the antecedents, behaviour and consequences of innovative entrepreneurship	Block et al.	Industry & Innovation	0	73	73
2016	Entrepreneurial orientation in vertical alliances: joint product innovation and	Bouncken et al.	Review of Managerial Science	6	66	72

Year	Document Title	Authors	Journal Title	Citations before 2017	Citations 2017-2021	Total citations
	learning from allies					
2016	Corporate Entrepreneurship, Disruptive Business Model Innovation Adoption, and Its Performance: The Case of the Newspaper Industry	Karimi & Walter	Long Range Planning	1	67	68
2017	Innovation and entrepreneurship in the academic setting: a systematic literature review	Schmitz et al.	International Entrepreneurship & Management Journal	0	64	64
2018	On open innovation, platforms, and entrepreneurship	Nambisan et al.	Strategic Entrepreneurship Journal	0	62	62
2018	The role of ICT and innovation in enhancing organizational performance: The catalysing effect of corporate entrepreneurship	Yunis et al..	Journal of Business Research	0	62	62
2017	The impact of Triple Helix agents on entrepreneurial innovations' performance: An inside look at enterprises located in an emerging economy	Guerrero M., Urbano D.	Technological Forecasting & Social Change	0	60	60
2018	Entrepreneurial orientation and innovation in family SMEs: Unveiling the (actual) impact of the Board of Directors	Arzubiaga et al.	Journal of Business Venturing	0	58	58
2016	Mission impossible? Entrepreneurial universities and peripheral regional innovation systems	Brown R.	Industry & Innovation	3	55	58

Entrepreneurial Innovation and Digital Transformation

This theme represents a research path in the literature that chiefly concerns issues around 'dynamics of digital entrepreneurship and innovation ecosystem', 'digitalization of innovation processes', 'business model innovation and digital entrepreneurship', 'ecosystem intermediaries', and 'agile development and lean startup approaches'. As illustrated in Figure 6, this path starts with the work by Kenney (1986), discussing Schumpeter's theory of innovation to examine the first ten years of the U.S. biotechnology industry and showing that the independent entrepreneur recognized by the earlier Schumpeter of *The Theory of Economic Development and Business Cycles* was very active in the biotechnology industry; he showed that the earlier work described this industry more accurately by emphasizing the role of small firms rather than Schumpeter's later work *Capitalism, Socialism and Democracy* by suggesting that the large established firms pre-empted the role of small firms in innovation. Another starting point of this path is the work of Hung & Whittington (2011), studying how strategies of framing, aggregating, and networking (F.A.N.) are used by entrepreneurial firms to build legitimacy, mobilize local resources, and reach out beyond the limitations of their immediate contexts. Later, the guest editors of the special issue of the journal of Research Policy on 'Entrepreneurial Innovation: The Importance of context' argued that it was necessary to integrate the National Systems of Innovation (with a focus on structures and institutions) with the entrepreneurship literature that had been mostly about the individual or the firm, through understanding the contexts within which entrepreneurial innovation occurs (Autio et al., 2014). In another important work in the same path, Nambisan et al. (2019) focused on the role of digitalization in innovation and entrepreneurship and identified openness, affordances, and generativity as the key themes in the digital transformation of innovation and entrepreneurship.

The role of innovation ecosystem in digital entrepreneurship (Beliaeva et al., 2019), the impact of agile business model innovation on digital entrepreneurship (Ghezzi & Cavallo, 2020), the role of ecosystem intermediaries in the configuration of social entrepreneurship identities in social purpose organizations and their business model innovations (Guerrero et al., 2020), the linkage between entrepreneurial innovation and effectual logic (Ghorbel et al., 2021), and the technological and organizational drivers of transformation towards digitalization of innovation processes

Table 5. Main Path clusters, sub-clusters, and key concepts

MP Clusters	MP sub-Clusters	Representative References	Key concepts
Entrepreneurial innovation and digital transformation	Black	Beliaeva et al. (2019); Ghezzi & Cavallo (2020); Guerrero et al. (2020); Endres et al. (2021); Ghorbel et al. (2021)	Digital entrepreneurship, Agile business model innovation, Innovation ecosystem, Entrepreneurship ecosystem, Social innovations, Lean startup
	Dark green	Kenney (1986); Hung & Whittington (2011); Autio et al. (2014); Bruton et al. (2015); Nambisan et al. (2019)	Entrepreneurial innovation, Digital transformation, Entrepreneurial ecosystems, Innovation systems, Institutional entrepreneurship, Schumpeterian innovation, Entrepreneurial finance
Sustainable innovation and entrepreneurship	Blue	Johnson (2001); Zhao (2005); Schaltegger & Wagner (2011); Schaltegger et al. (2016); Presenza & Messeni Petruzzelli (2019); Lüdeke-Freund (2020); Matzembacher et al. (2020); Haftor & Costa Climent (2020)	Sustainability innovation, Sustainable entrepreneurship, Business model innovation, Ecological sustainability, Industrial entrepreneurship, Institutional entrepreneurship, Digital transformation; Entrepreneurialism
Product innovation and Knowledge	Carmine	Yoon et al. (2018); Leonidou et al. (2020); Piñeiro-Chousa et al. (2020); Beynon et al. (2021)	Knowledge, Stakeholder engagement, Government intervention, Innovation management, Entrepreneurship development, Innovative nascent entrepreneurship
	Light Purple	Atuahene-Gima & Ko (2001); Salavou & Lioukas (2003); Avlonitis & Salavou (2007); Soriano & Huarng (2013)	Product innovation, Entrepreneurship orientation, Market orientation, Knowledge industries, SMEs
Entrepreneurial orientation and leadership	Red	Bagheri et al. (2020b); Bagheri et al. (2020a); Akbari et al. (2020); Iqbal et al. (2020)	Entrepreneurial leadership, Innovation work behaviour, Creative self-efficacy, Employee innovative behaviour, Psychological safety, Affective commitment
	Orange	Miller & Friesen (1982); Kreiser & Davis (2010); Huang et al. (2014); Kollmann & Stöckmann (2014); Bagheri (2017)	Entrepreneurial orientation, Innovative behaviour, Performance Entrepreneurial firms, innovativeness, Risk taking, Proactiveness, Exploitative innovation, Exploratory innovation, Entrepreneurial leadership, Environmental dynamism, Opportunity recognition
Regional entrepreneurship and innovation (innovative entrepreneurship and historical roots)	Light green	Beugelsdijk (2007); Koellinger (2008); Block et al. (2013)	Regional innovativeness and growth, Entrepreneurial culture, Business opportunities, Knowledge spillovers, Commercialization of knowledge
	Dark purple	Marcati et al. (2008); Baron & Tang (2011); Ahlin et al. (2014)	Entrepreneurs' innovativeness and personality, Entrepreneurial self-efficacy, Entrepreneurs' Creativity, Entrepreneurs' affect (feelings and emotions), Innovative behaviour
	Pink	Block et al. (2017); Darnihamedani et al. (2018); Fritsch & Wyrwich (2018); Fritsch et al. (2019); Del Monte et al. (2020)	Innovative entrepreneurship, Regional knowledge, entrepreneurship-facilitating culture, Schumpeterian entrepreneur, Start-up costs, Corporate taxes, Personal income taxes, Innovative start-ups

(Endres et al., 2021), are the main issues studied in the other papers that emerged in the sub-path. Regarding the entrepreneurship contextual factors, new alternatives in funding entrepreneurship (microfinance, crowdfunding, and peer-to-peer innovations) is the topic of another work appearing in this path (Bruton et al., 2015).

Sustainable Innovation and Entrepreneurship

This research path starts with a paper, which can be considered one of the pioneering attempts to bring clarity to the usage of the terms of innovation and entrepreneurship (D. Johnson, 2001). The complementary nature of entrepreneurship and innovation was then discussed through a qualitative approach (Zhao, 2005). Research at the interactions between innovation and entrepreneurship continues and enters a new phase in which sustainability concerns are highlighted. These concerns are addressed in the following theoretical works by focusing on how sustainable entrepreneurship is positioned in relation to sustainability innovation (Schaltegger & Wagner, 2011) and how business model innovations undertaken by companies contribute to a sustainability transformation of markets (Schaltegger et al., 2016). The latter work is positioned in the path as a critical node that has been directly cited by the four papers at the end of the local path (the most recent ones). Out of the four papers, Lüdeke-Freund (2020) is recognized as another conceptual work that explains how sustainability

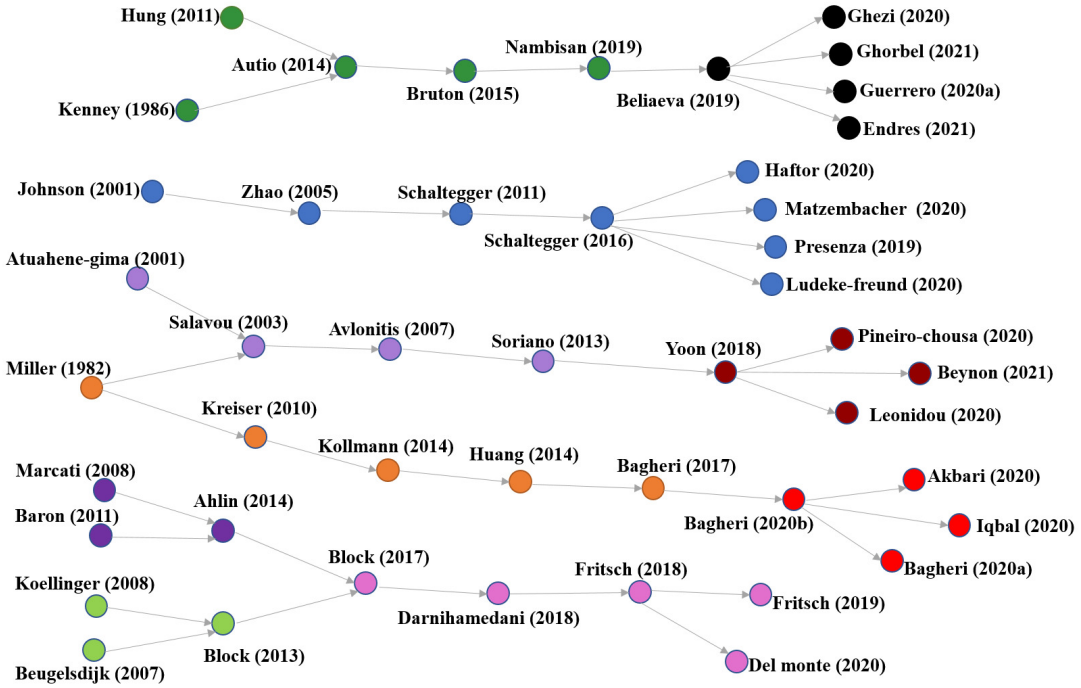

Figure 6. Main Path extracted from the biggest connected component

Note: Each node represents a paper which is labelled by the last name of the first author and the publication year.

product and/or process innovations require and thus motivate novel or modified business models to enter and diffuse in the market and finally to create business cases. The other three papers are case-study based works that (1) provide evidence on how sustainable entrepreneurs develop innovative business models to achieve environmental, social, and financial goals by overcoming their hybridity-related tensions (Matzembacher et al., 2020), (2) give an understanding of the main motivations and mechanisms that support the introduction of innovative business models by chef-entrepreneurs (Presenza & Messeni Petruzzelli, 2019), and (3) report results from a longitudinal case study of an industrial firm that has pursued development efforts to create a successful new offering that significantly reduces CO2 emissions (Haftor & Climent, 2021).

Product Innovation and Knowledge

The core of this compound local path is mainly represented by product innovation and knowledge studies and starts with the seminal work by Atuahene-Gima & Ko (2001) who examined the impact of market and entrepreneurship orientations alignment on product innovation activity and performance and provided empirical evidence on the significant role of the interaction between market and entrepreneurship orientations in fostering product innovation and its outcomes. The findings of the next study (Salavou & Lioukas, 2003) showed that SMEs taking proactive behaviour and having risk-taking posture assumed by top management are more likely to introduce radical product innovations, postulating that in SMEs "the notion of entrepreneurial-push outweighs both market-pull and technology-push arguments" (Salavou & Lioukas, 2003, p. 94). Furthermore, Avlonitis & Salavou (2007) built evidence concerning the way SMEs (classified according to entrepreneurial orientation, i.e., active and passive) approach product innovativeness to achieve higher levels of product performance. They specifically found that "entrepreneurial attitude instilled in active entrepreneurs as compared with passive entrepreneurs is mirrored in new product introductions, which embody in their characteristics higher uniqueness; an ingredient found to act as an important contributor to product performance" (Avlonitis & Salavou, 2007, p. 573).

'Innovation and entrepreneurship in knowledge industries' is the topic of the next work that is a summary of papers published in a special issue in the Journal of Business Research (Soriano & Huarng, 2013). It is then cited by a paper (Yoon et al., 2018), which emerged in the subpath (shown in carmine colour) that is a point of conjunction between the above-mentioned studies (shown in light-purple colour) and three other recently published papers in which the concept of knowledge is clearly highlighted. These papers specifically aimed at (1) understanding the role of government in transforming scientific and technological knowledge into innovative nascent entrepreneurship (Yoon et al., 2018), (2) reviewing the current research front at the intersection of innovation, entrepreneurship, and knowledge (Piñeiro-Chousa et al., 2020), (3) providing a conceptual framework (through a systematic review) to provide a deeper understanding of how stakeholder engagement can influence innovation management and subsequent entrepreneurship development (Leonidou et al., 2020), and (4) the most recent one (Beynon et al., 2021) entitled 'Innovation and the knowledge-base for entrepreneurship: investigating SME innovation across European regions using fsQCA' that sought "to test the multi conjunctional nature of SME innovation against a range of conditions of potential relevance, those conditions having dif-

fering requirements in terms of SMEs generating internal innovation as compared to generating it via networks and building external links" (p. 18).

Entrepreneurial Orientation and Leadership

This compound local path is linked to the 'product innovation and knowledge' theme in that, as illustrated in Figure 6, both paths are sourced from the seminal work by Miller & Friesen (1982) who compared and tested two models of product innovation in conservative and entrepreneurial firms. The next work in the same path (orange-coloured path), citing Miller & Friesen (1982), provides a theoretical framework explaining how organizations can maximize their organizational level of performance by utilizing an entrepreneurial orientation (Kreiser & Davis, 2010). In the same vein, Kollmann & Stöckmann (2014) examined the mediating role of exploratory and exploitative innovations (reflecting entrepreneurial behaviour) in the relationship between entrepreneurial orientation and performance. Also, by using exploratory and exploitative innovations as mediating variables, Huang et al. (2014) investigated the relationship between entrepreneurial leadership and new venture performance. The next work also highlights the importance of entrepreneurial leadership and provides empirical evidence on the effectiveness of entrepreneurial leadership in enhancing innovation work behaviour of employees in high-tech SMEs (Bagheri, 2017).

The first node appearing in the sub-path (red colour) is still focused on the relationship between entrepreneurial leadership and innovation work behaviour. It takes into account the mediating role of individual and team creativity self-efficacy and suggests that CEOs, playing the role of entrepreneurial leaders by enhancing employees' individual and team creativity self-efficacy, can improve their innovation work behaviour (Bagheri, Akbari, et al., 2020). Bagheri, Newman, et al. (2020), drawing on social cognitive theory, empirically examined "whether creative self-efficacy and passion for inventing explain the process by which the entrepreneurial leadership of CEOs influences employees' innovative behaviour in high-technology new ventures" (p. 1). Similarly, Akbari et al. (2020) found that employees' creative self-efficacy and leaders' support for innovation play a mediating role in the relationship between entrepreneurial leadership and innovation work behaviour. Iqbal et al. (2020) also found a positive relationship between entrepreneurial leadership and employee innovative behaviour and contributed to the literature by showing that this relationship is mediated simultaneously through affective commitment, creative self-efficacy and psychological safety.

Regional Entrepreneurship and Innovation (Innovative Entrepreneurship and its Historical Roots)

This theme, which appears at the bottom of the MP output (Figure 6), includes three sub-themes or communities distinguished by three different colours.

'The role of SME entrepreneurs' innovativeness and personality in the adoption of innovations' (Marcati et al., 2008) and 'The role of entrepreneurs in firm-level innovation: Joint effects of positive affect, creativity, and environmental dynamism' (Baron & Tang, 2011) are the topics of two papers emerging in the purple-coloured sub-path. Both papers are later cited by Ahlin et al. (2014) in the same community, which is entitled 'Entrepreneurs' creativity and firm innovation: the moderating role of entrepreneurial self-efficacy'. These three works, recognizable together as one of the sub-themes under the theme of regional entrepreneurship and innovation, are chiefly concerned with entrepreneurs' innovativeness, personality and innovative behaviour.

The role of individual and environmental factors in entrepreneurs' (product) innovativeness, and subsequently in economic growth, is parallelly addressed by researchers in another sub-theme (observable in light-green colour) in the same local path. The findings of Beugelsdijk (2007) show that regions that have experienced higher economic growth rates have an entrepreneurial culture. Cultural features, however, along with the institutional setting, jointly determine the allocation of entrepreneurial activity (Beugelsdijk, 2007). The role of policy makers to improve the general entrepreneurial atmosphere needs to be complemented by changing regulations and the formal rules regarding entrepreneurial behaviour (Beugelsdijk, 2007). Both individual factors and the environment in which the individuals act (e.g., education, employment status, and self-confidence) are significantly associated with entrepreneurial innovativeness at the individual level (Koellinger, 2008). The research findings also suggest that a large amount of commercializable new knowledge must be generated by human agents in a society different from the entrepreneur (Koellinger, 2008) and that a high rate of entrepreneurship can increase the chances that knowledge will become new-to-the-market innovation (Block et al., 2013).

The above-mentioned sub-paths are merged into another sub-path (pink-coloured) that is mainly concerned with the impact of contextual (historical) factors on (innovative) entrepreneurship. It begins with a review of empirical evidence on antecedents, behaviour, and consequences of innovative entrepreneurship (Block et al., 2017) and continues with a cross-country study that concludes that countries with high levels of start-up costs seem to have a higher share of innovative entrepreneurship (Darnihamedani et al., 2018). The next two related research works were conducted in Germany; one examines the impact of entrepreneurship culture and the historical knowledge base of a region on current levels of new business formation in innovative industries (Fritsch & Wyrwich, 2018), and the other investigates historical roots of entrepreneurship-facilitating culture and innovation activity (Fritsch et al., 2019). By referring to the results of these studies, the findings of the last identified paper (Del Monte et al., 2020) in the local path (the most recent one) support the idea that characteristics of past cultural environment like a long-lasting culture of entrepreneurship, the regional knowledge base, and the level of human capital can lead to high long-term rates of regional formation of new businesses, and finally to innovation and economic growth.

Discussion, Implications, and Limitations

Discussion

The aim of this study was to track the co-evolution of innovation and entrepreneurship over the last few decades. In this regard, by using bibliometric tools, the significant interdisciplinary concepts and contributions to the literature were identified and main domains and strands of research were detected. The knowledge base, knowledge domains, and knowledge evolution relating to entrepreneurship and innovation were analysed and then integrated into an entrepreneurship-innovation knowledge graph (Shi & Liu, 2019), as shown in Figure 7, that "can help to comprehensively understand the knowledge framework and spatiotemporal development" (Yang et al., 2021), and based on which directions for future research are suggested.

The co-occurrence analysis of keywords (from 2016-2021) resulted in the identification of six clusters. Some clusters reflect innovation and entrepreneurship mainly with regard to firms' internal managerial and organizational aspects (inside-out), such as entrepreneurial orientation, entrepreneurial leadership, creativity, innovation capabilities, absorptive capacity, product innovation, business model innovation, corporate entrepreneurship, innovative entrepreneurship, social entrepreneurship, sustainable entrepreneurship, innovation and firm performance. The other clusters chiefly represented concepts that affect firms' performance in terms of innovation and entrepreneurship including culture, social capital, higher education, (national/regional) innovation eco/system, and entrepreneurship ecosystem.

Furthermore, the burst analysis of keywords demonstrated that social innovation, sustainability, and higher education are among the concepts that represent the most recent strands of research in entrepreneurship and innovation, which demonstrates the growing importance of entrepreneurship-innovation research at societal, environmental, and regional levels.

Reviewing the highly cited papers, reported in the section of citations analysis, allowed us to recognize some of the most important concepts, theories, and empirical studies that have substantially contributed to the development of entrepreneurship-innovation scientific research. The impact of entrepreneurial orientation (linked to market orientation) as well as entrepreneurs' traits in innovative and entrepreneurial behaviour, on the one hand, and the role of contextual factors such as (entrepreneurial) culture and knowledge in innovation, creation of new businesses, and economic growth, on the other hand, were identified as two important areas of research on entrepreneurship and innovation. The concepts of corporate entrepreneurship, strategic entrepreneurship, entrepreneurial innovation, innovative entrepreneurship, sustainability innovation, sustainable entrepreneurship, academic entrepreneurship, Triple Helix, digital entrepreneurship, business models for sustainability, and agile business model innovation were found to be shaped and significantly improved over the last two decades (most of which are highlighted in recent years).

By integrating the frequently used keywords, keywords underlined as bursts, and concepts appearing in the citation analysis and also main path analysis, we classified the important keywords as the knowledge base, upon which eleven domains of research (*knowledge domains*) were clustered including: 1) Schumpeterian entrepreneur, innovation, and environmental dynamics; 2) entrepreneurship education and entrepreneurial university; 3) innovation and entrepreneurship ecosystems; 4) digital entrepreneurship and transformation; 5) entrepreneurial orientation, innovativeness, and (corporate entrepreneurship) performance; 6) knowledge, stakeholder engagement, and innovative entrepreneurship; 7) sustainability innovation, business model innovation and sustainable entrepreneurship; 8) strategic entrepreneurship, innovation and competitive advantage; 9) entrepreneurial leadership and innovation work behaviour; 10) entrepreneurs' personality traits and innovativeness; and 11) social innovation and entrepreneurship (see Figure 7).

The main paths identified through the Main Path analysis helped to gain an understanding of the research skeleton and *knowledge evolution* at the intersection of entrepreneurship and innovation that provided five main research themes: 1) entrepreneurial innovation and digital transformation; 2) sustainable innovation and entrepreneurship; 3) product innovation and knowledge; 4) entrepreneurial orientation and leadership; 5) regional entrepreneurship and innovation (innovative entrepreneurship and historical roots). This picture was further clarified through the recognition of the very recent trends determined by the Burst detection analysis, i.e., social innovation, sustainability, and higher education.

Implications for Research and Practice

The existing lines of research discussed above represented by knowledge base, knowledge domains, and knowledge evolution, can also be used to define potential themes for future research (Figure 7) while at the same time they can provide implications for practice. Innovative sustainable business models, sustainable entrepreneurial ecosystems, entrepreneurial innovation and digital transformation, knowledge-intensive innovative entrepreneurship, economic and social open innovation and entrepreneurship, entrepreneurial leadership and employee innovation behaviour, entrepreneurial orientation, innovation and sustainability, innovative entrepreneurship education and academic entrepreneurship, digital innovation and venturing, and innovation and entrepreneurship in SMEs were suggested as research topics that can significantly shape future research work at the intersection of innovation and entrepreneurship. They may mainly signal the growing need for more effective dimensional integration of the 'triple bottom line' (Elkington, 1997) by redefining innovative and entrepreneurial practices in that they not only bring fruitful performance results for organizations, but they also proactively address the social and environmental facets of prosperity in favor of stakeholders and in a broader context (Nidumolu et al., 2009; Obal et al., 2020; Parmar et al., 2010; Porter & Kramer, 2011; Porter & van der Linde, 1995; Prahalad & Hart, 2002). This implies the crucial importance of innovative business models for sustainability, strengthened regional and national systems that support sustainability-oriented innovation and entrepreneurship, and

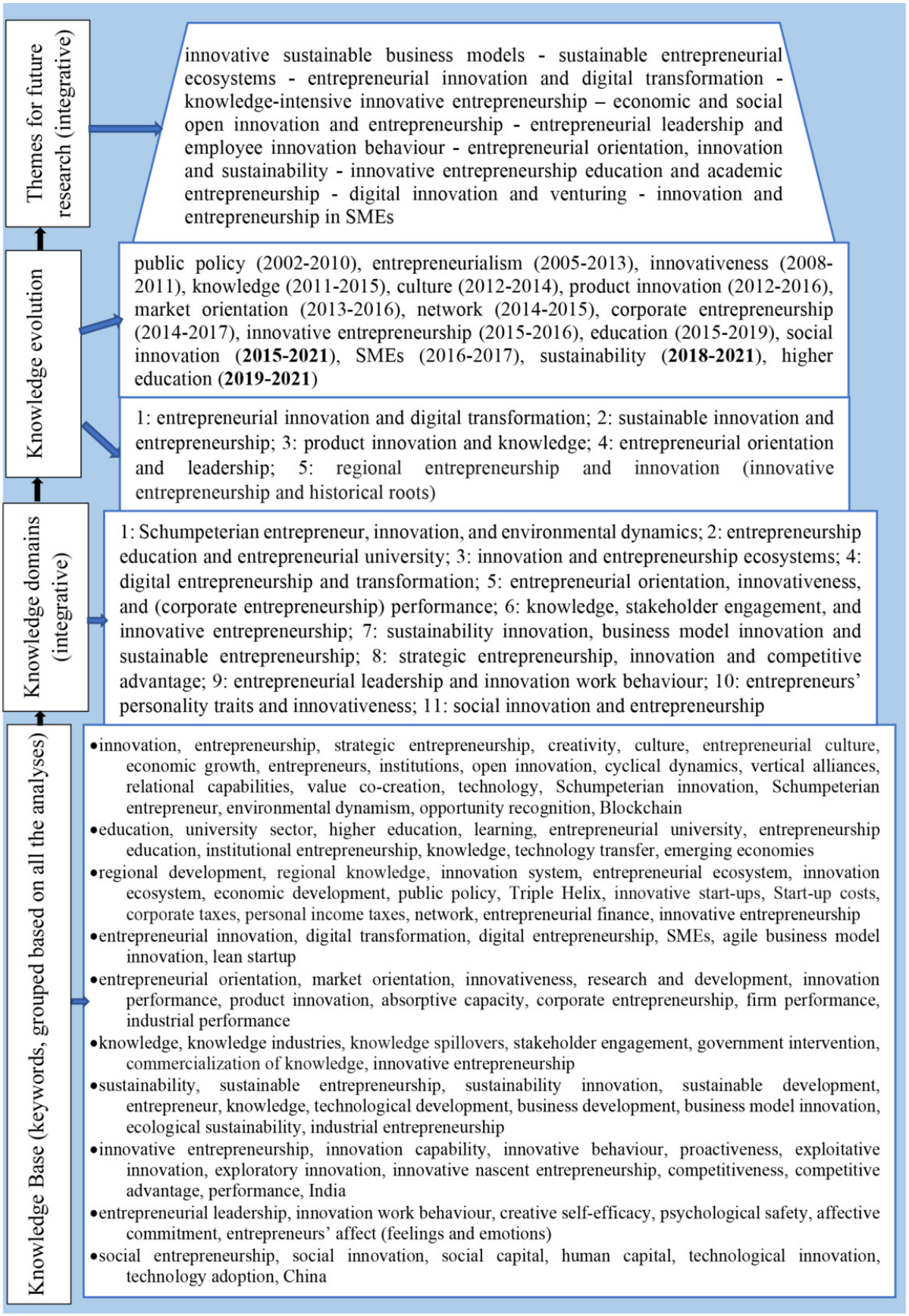

Figure 7. Knowledge graph (entrepreneurship and innovation)

Triple Helix agents and interactions that foster innovative entrepreneurship and entrepreneurial innovation in the context of sustainable development.

Sustainable innovation and entrepreneurship in SMEs can be considered a topic that provides opportunities for further research in the coming years. The internal and external drivers and barriers of sustainability-oriented innovation and entrepreneurship practices in different types of SMEs (e.g., family SMEs), within different contexts, could be further examined (M. P. Johnson & Schaltegger, 2016; Kasiri et al., 2020). In this vein, investigating the role of sustainability management tools in the improvement of organizational learning, innovativeness, and entrepreneurial performance in SMEs is recommended (M. P. Johnson & Schaltegger, 2016). Future research could also benefit from further exploration of the gap between awareness and application of sustainability tools by SME managers in order to provide insight on how to close these value-action gaps to finally provide support in accelerating sustainability innovations (M. P. Johnson & Schaltegger, 2016). Regarding entrepreneurial practices, several opportunities can be created through digitalization, of which entrepreneurs need to be aware to be ready for sustainable innovations (Kraus et al., 2019).

As suggested by the guest editors of the Research Policy special issue on 'Entrepreneurial Innovation: The Importance of context', it would be a significant academic advance to integrate the National Systems of Innovation, which are chiefly focused on structures and institutions, with entrepreneurship literature, which has been mostly concentrated on the individual or the firm, through understanding the contexts within which entrepreneurial innovation occurs (Autio et al., 2014).

How specific forms of knowledge facilitate innovation and entrepreneurship and ultimately lead to economic growth has been found to be an important research avenue in which several unexplored research themes exist and need attention (Piñeiro-Chousa et al., 2020). In addition, it is recommended to address the question of how policies can support learning and knowledge in young organizations and how they can develop effective links and networks able to help new ventures to use and absorb the knowledge needed for their innovative activities (Piñeiro-Chousa et al., 2020). It has been pointed out that an excessive focus on innovation has led policymakers to promote new knowledge and R&D while paying less attention to the commercialization and business creation processes (Piñeiro-Chousa et al., 2020), an imbalance that might suggest opportunities for future research.

While the impact of entrepreneurial orientation (mainly complemented with market orientation) on innovative and entrepreneurial behaviour was found to be investigated substantially, its role combined with learning orientation in sustainable or digital innovation and entrepreneurship seems to be a research theme that needs to be further explored. "SMEs with managerial values regarding commitment to learning can be combined with entrepreneurial proactiveness, innovation and risk taking to produce better performance" (Pett et al., 2019, p. 56). In this regard, it is suggested that the mediating role of entrepreneurial leadership and its impact on organizational future-oriented proactive behaviours should be examined more specifically, especially in SMEs and in the context of emerging countries.

SMEs can learn from the coevolution of entrepreneurship and innovation in general. The findings of this work, represented in the knowledge graph, offer insights into what should be important not only to the executives of large firms, but also to the managers of SMEs. In other words, the practical implications of this research are for SME practitioners to be more aware of the strategic linkage between innovation and entrepreneurship.

Constant learning from various trends and changes in the environment (e.g., in market, environmental, and social demands) may lead SMEs to use and absorb the relevant knowledge needed for their innovative activities (Piñeiro-Chousa et al., 2020). Learning orientation combined with entrepreneurial orientation can influence the SMEs' innovative and entrepreneurial behaviours aimed at exploiting opportunities to gain and sustain competitive advantage (Alerasoul et al., 2021; Ferreira et al., 2021; Hakala, 2011; Pett et al., 2019). Managers of SMEs, as clearly highlighted in this work, need to comprehend the importance of having a (proactive) sustainable approach to innovation and entrepreneurship, as an opportunity that can place them at an advantage when competing with larger firms. SMEs that value shared learning and open mindedness are more likely to have or develop other resources and capabilities that affect their growth and performance in terms of sustainability-oriented innovation and entrepreneurship, including risk taking, creativity, awareness and application of sustainability tools, and flexibility (Alerasoul et al., 2021; M. P. Johnson & Schaltegger, 2016; Pett et al., 2019). Therefore, the managers and leaders of small and medium sized firms need to create "open, emotionally positive cultures and allow for trial and error and that those working for the firm must stay emotionally engaged" (Pett et al., 2019, p. 56).

Limitations

Reflecting on the limitations and benefits of the methodology we used, a technical analysis alone cannot suffice to explain the whole contribution of the studies to which it is applied. However, we note that it is in fact highly effective, in this study, in identifying different streams of thinking spread across the extant literature at the intersection of entrepreneurship and innovation.

Beyond this, the usual limitations that relate to any systematic literature study such as the coverage of Scopus, appropriate keywords, inclusion/exclusion rules, coverage of the most recent references should be observed; however, most significant limitation for this type of study may be related to the so-called 'Matthew effect' (García-Lillo et al., 2017). The focus on citations, links, and clusters between studies "may serve to heighten the visibility of contributions to science by scientists of acknowledged standing and to reduce the visibility of contributions by authors who are less well known" (Merton, 1968, p. 62). Hence, while the method is not at its best in uncovering novelty, it is still useful in synthesising a large field of literature and finding its most evident concepts, domains, evolutional paths, and trends—indeed, as we have done here. While some degree of

subjectivity is difficult to avoid, we strongly believe that the analyses conducted in this review allowed us to illuminate a more objective representation of the flow of knowledge over time, as well as detecting the main domains and themes that led us towards the development of a knowledge graph, integrating knowledge base and knowledge evolution, that has implications for future research and practice.

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References

Adams, R. J., Smart, P., & Huff, A. S. (2017). Shades of Grey: Guidelines for Working with the Grey Literature in Systematic Reviews for Management and Organizational Studies. *International Journal of Management Reviews*, *19*(4), 432–454. https://doi.org/10.1111/ijmr.12102

Afeltra, G., Alerasoul, S. A., & Strozzi, F. (2021). The evolution of sustainable innovation: From the past to the future. *European Journal of Innovation Management*, *ahead-of-print*(ahead-of-print). https://doi.org/10.1108/ejim-02-2021-0113

Ahlin, B., Drnovšek, M., & Hisrich, R. D. (2014). Entrepreneurs' creativity and firm innovation: The moderating role of entrepreneurial self-efficacy. *Small Business Economics*, *43*(1), 101–117. https://doi.org/10.1007/s11187-013-9531-7

Akbari, M., Bagheri, A., Imani, S., & Asadnezhad, M. (2020). Does entrepreneurial leadership encourage innovation work behavior? The mediating role of creative self-efficacy and support for innovation. *European Journal of Innovation Management*, *24*(1), 1–22. https://doi.org/10.1108/ejim-10-2019-0283

Alemany, M. M. E., Vallés Lluch, A., Villanueva Lópe, J. F., & García-Serra García, J. (2021). E-learning in "innovation, creativity and entrepreneurship": Exploring the new opportunities and challenges of technologies. *Journal of Small Business Strategy*, *31*(1), 39–50.

Alerasoul, S. A., Afeltra, G., Hakala, H., Minelli, E., & Strozzi, F. (2021). Organisational learning, learning organisation, and learning orientation: An integrative review and framework. *Human Resource Management Review*, 100854. https://doi.org/10.1016/j.hrmr.2021.100854

Atuahene-Gima, K., & Ko, A. (2001). An Empirical Investigation of the Effect of Market Orientation and Entrepreneurship Orientation Alignment on Product Innovation. *Organization Science*, *12*(1), 54–74. https://doi.org/10.1287/orsc.12.1.54.10121

Autio, E., Kenney, M., Mustar, P., Siegel, D., & Wright, M. (2014). Entrepreneurial innovation: The importance of context. *Research Policy*, *43*(7), 1097–1108. https://doi.org/10.1016/j.respol.2014.01.015

Avlonitis, G. J., & Salavou, H. E. (2007). Entrepreneurial orientation of SMEs, product innovativeness, and performance. *Journal of Business Research*, *60*(5), 566–575. https://doi.org/10.1016/j.jbusres.2007.01.001

Bagheri, A. (2017). The impact of entrepreneurial leadership on innovation work behavior and opportunity recognition in high-technology SMEs. *The Journal of High Technology Management Research*, *28*(2), 159–166. https://doi.org/10.1016/j.hitech.2017.10.003

Bagheri, A., Akbari, M., & Artang, A. (2020). How does entrepreneurial leadership affect innovation work behavior? The mediating role of individual and team creativity self-efficacy. *European Journal of Innovation Management*, *ahead-of-print*(ahead-of-print). https://doi.org/10.1108/ejim-07-2020-0281

Bagheri, A., Newman, A., & Eva, N. (2020). Entrepreneurial leadership of CEOs and employees' innovative behavior in high-technology new ventures. *Journal of Small Business Management*, 1–23. https://doi.org/10.1080/00472778.2020.1737094

Baier-Fuentes, H., Merigó, J. M., Amorós, J. E., & Gaviria-Marín, M. (2019). International entrepreneurship: A bibliometric overview. *International Entrepreneurship and Management Journal*, *15*(2), 385–429. https://doi.org/10.1007/s11365-017-0487-y

Baron, R. A., & Tang, J. (2011). The role of entrepreneurs in firm-level innovation: Joint effects of positive affect, creativity, and environmental dynamism. *Journal of Business Venturing*, *26*(1), 49–60. https://doi.org/10.1016/j.jbusvent.2009.06.002

Batagelj, V., Ferligoj, A., & Squazzoni, F. (2017). The emergence of a field: A network analysis of research on peer review. *Scientometrics*, *113*(1), 503–532. https://doi.org/10.1007/s11192-017-2522-8

Beliaeva, T., Ferasso, M., Kraus, S., & Damke, E. J. (2019). Dynamics of digital entrepreneurship and the innovation ecosystem: A multilevel perspective. *International Journal of Entrepreneurial Behavior & Research*, *26*(2), 266–284. https://doi.org/10.1108/ijebr-06-2019-0397

Beugelsdijk, S. (2007). Entrepreneurial culture, regional innovativeness and economic growth. *Journal of Evolutionary Economics*, *17*(2), 187–210. https://doi.org/10.1007/s00191-006-0048-y

Beynon, M., Jones, P., & Pickernell, D. (2021). Innovation and the knowledge-base for entrepreneurship: Investigating SME innovation across European regions using fsQCA. *Entrepreneurship & Regional Development*, *33*(3–4), 227–248. https://doi.org/10.1080/08985626.2021.1872936

Block, J. H., Fisch, C. O., & van Praag, M. (2017). The Schumpeterian entrepreneur: A review of the empirical evidence on the antecedents, behaviour and consequences of innovative entrepreneurship. *Industry and Innovation*, *24*(1), 61–95. https://doi.org/10.1080/13662716.2016.1216397

Block, J. H., Thurik, R., & Zhou, H. (2013). What turns knowledge into innovative products? The role of entrepreneurship and knowledge spillovers. *Journal of Evolutionary Economics*, *23*(4), 693–718. https://doi.org/10.1007/s00191-012-0265-5

Blondel, V. D., Guillaume, J. L., Lambiotte, R., & Lefebvre, E. (2008). Fast unfolding of communities in large networks. *Journal of Statistical Mechanics: Theory and Experiment*, *2008*(10). https://doi.org/10.1088/1742-5468/2008/10/P10008

Bouncken, R. B., Plüschke, B. D., Pesch, R., & Kraus, S. (2016). Entrepreneurial orientation in vertical alliances: Joint product innovation and learning from allies. *Review of Managerial Science*, *10*(2), 381–409. https://doi.org/10.1007/s11846-014-0150-8

Bouncken, R. B., Ratzmann, M., Barwinski, R., & Kraus, S. (2020). Coworking spaces: Empowerment for entrepreneurship and innovation in the digital and sharing economy. *Journal of Business Research*, *114*(February), 102–110. https://doi.org/10.1016/j.jbusres.2020.03.033

Brazeal, D. V., & Herbert, T. T. (1999). The Genesis of Entrepreneurship. *Entrepreneurship Theory and Practice*, *23*(3), 29–46. https://doi.org/10.1177/104225879902300303

Brem, A. (2011). Linking innovation and entrepreneurship--literature overview and introduction of a process-oriented framework. *International Journal of Entrepreneurship and Innovation Management*, *14*(1), 6. https://doi.org/10.1504/ijeim.2011.040820

Bruton, G., Khavul, S., Siegel, D., & Wright, M. (2015). New financial alternatives in seeding entrepreneurship: Microfinance, crowdfunding, and peer-to-peer innovations. *Entrepreneurship: Theory and Practice*, *39*(1), 9–26. https://doi.org/10.1111/etap.12143

Callon, M., Courtial, J. P., & Laville, F. (1991). Co-word analysis as a tool for describing the network of interactions between basic and technological research: The case of polymer chemsitry. *Scientometrics*, *22*(1), 155–205. https://doi.org/10.1007/bf02019280

Chen, C. (2014). *The CiteSpace manual*. http://cluster.ischool.drexel.edu/~cchen/citespace/manual/CiteSpaceManual.pdf

Colicchia, C., & Strozzi, F. (2012). Supply chain risk management: A new methodology for a systematic literature review. *Supply Chain Management: An International Journal*, *17*(4), 403–418. https://doi.org/10.1108/13598541211246558

Comerio, N., & Strozzi, F. (2019). Tourism and its economic impact: A literature review using bibliometric tools. *Tourism Economics*, *25*(1), 109–131. https://doi.org/10.1177/1354816618793762

Cornelius, B., Landström, H., & Persson, O. (2006). Entrepreneurial studies: The dynamic research front of a developing social science. *Entrepreneurship Theory and Practice*, *30*(3), 375–398. https://doi.org/10.1111/j.1540-6520.2006.00125.x

Darnihamedani, P., Block, J. H., Hessels, J., & Simonyan, A. (2018). Taxes, start-up costs, and innovative entrepreneurship. *Small Business Economics*, *51*(2), 355–369. https://doi.org/10.1007/s11187-018-0005-9

Del Monte, A., Moccia, S., & Pennacchio, L. (2020). *Regional entrepreneurship and innovation: Historical roots and the impact on the growth of regions*. Small Business Economics. https://doi.org/10.1007/s11187-020-00425-w

Di Stefano, G., Gambardella, A., & Verona, G. (2012). Technology push and demand pull perspectives in innovation studies: Current findings and future research directions. *Research Policy*, *41*(8), 1283–1295. https://doi.org/10.1016/j.respol.2012.03.021

Ding, Y., Chowdhury, G. G., & Foo, S. (2001). Bibliometric cartography of information retrieval research by using co-word analysis. *Information Processing & Management*, *37*(6), 817–842. https://doi.org/10.1016/s0306-4573(00)00051-0

Drucker, P. F. (2006). *Innovation and entrepreneurship – practice and principles*. Harper.

Elkington, J. (1997). *Cannibals with forks: The triple bottom line of 21st century business*. New Society.

Endres, H., Huesig, S., & Pesch, R. (2021). Digital innovation management for entrepreneurial ecosystems: Services and functionalities as drivers of innovation management software adoption. *Review of Managerial Science*. https://doi.org/10.1007/s11846-021-00441-4

Fagerberg, J., Fosaas, M., & Sapprasert, K. (2012). Innovation: Exploring the knowledge base. *Research Policy*, *41*(7), 1132–1153. https://doi.org/10.1016/j.respol.2012.03.008

Ferreira, J. J., Fernandes, C. I., Kraus, S., & McDowell, W. C. (2021). Moderating influences on the entrepreneurial orientation-business performance relationship in SMEs. *The International Journal of Entrepreneurship and Innovation*, *22*(4), 240–250. https://doi.org/10.1177/14657503211018109

Filser, M., Tiberius, V., Kraus, S., Zeitlhofer, T., Kailer, N., & Müller, A. (2020). Opportunity recognition: Conversational foundations and pathways ahead. *Entrepreneurship Research Journal*, *0*(0). https://doi.org/10.1515/erj-2020-0124

Fritsch, M., Obschonka, M., & Wyrwich, M. (2019). Historical roots of entrepreneurship-facilitating culture and innovation activity: An analysis for German regions. *Regional Studies*, *53*(9), 1296–1307. https://doi.org/10.1080/00343404.2019.1580357

Fritsch, M., & Wyrwich, M. (2018). Regional knowledge, entrepreneurial culture, and innovative start-ups over time and space¯an empirical investigation. *Small Business Economics*, *51*(2), 337–353. https://doi.org/10.1007/s11187-018-0016-6

García-Lillo, F., Úbeda-García, M., & Marco-Lajara, B. (2017). The intellectual structure of human resource management research: A bibliometric study ofthe international journal of human resource management, 2000–2012. *The International Journal of Human Resource Management*, *28*(13), 1786–1815. https://doi.org/10.1080/09585192.2015.1128461

Garfield, E. (1979). *Citation Indexing: Its Theory and Application in Science*. Wiley.

Ghezzi, A., & Cavallo, A. (2020). Agile Business Model Innovation in Digital Entrepreneurship: Lean Startup Approaches. *Journal of Business Research*, *110*(February 2017), 519–537. https://doi.org/10.1016/j.jbusres.2018.06.013

Ghorbel, F., Hachicha, W., Boujelbene, Y., & Aljuaid, A. M. (2021). Linking entrepreneurial innovation to effectual logic. *Sustainability*, *13*(5), 2626. https://doi.org/10.3390/su13052626

Glinyanova, M., Bouncken, R. B., Tiberius, V., & Cuenca Ballester, A. C. (2021). Five decades of corporate entrepreneurship research: Measuring and mapping the field. *International Entrepreneurship and Management Journal*, *17*(4), 1731–1757. https://doi.org/10.1007/s11365-020-00711-9

Granados, M. L., Hlupic, V., Coakes, E., & Mohamed, S. (2011). Social enterprise and social entrepreneurship research and theory: A bibliometric analysis from 1991 to 2010. *Social Enterprise Journal*, *7*(3), 198–218. https://doi.org/10.1108/17508611111182368

Guerrero, M., Santamaría-Velasco, C. A., & Mahto, R. (2020). Intermediaries and social entrepreneurship identity: Implications for business model innovation. *International Journal of Entrepreneurial Behavior & Research*, *27*(2), 520–546. https://doi.org/10.1108/ijebr-10-2020-0679

Guerrero, M., & Urbano, D. (2017). The impact of Triple Helix agents on entrepreneurial innovations' performance: An inside look at enterprises located in an emerging economy. *Technological Forecasting and Social Change*, *119*, 294–309. https://doi.org/10.1016/j.techfore.2016.06.015

Guerrero, M., & Urbano, D. (2019). Effectiveness of technology transfer policies and legislation in fostering entrepreneurial innovations across continents: An overview. *The Journal of Technology Transfer*, *44*(5), 1347–1366. https://doi.org/10.1007/s10961-019-09736-x

Haftor, D. M., & Climent, R. C. (2021). CO2 reduction through digital transformation in long-haul transportation: Institutional entrepreneurship to unlock product-service system innovation. *Industrial Marketing Management*, *94*(June), 115–127. https://doi.org/10.1016/j.indmarman.2020.08.022

Hakala, H. (2011). Strategic Orientations in Management Literature: Three Approaches to Understanding the Interaction between Market, Technology, Entrepreneurial and Learning Orientations. *International Journal of Management Reviews*, *13*(2), 199–217. https://doi.org/10.1111/j.1468-2370.2010.00292.x

Harzing, A.-W., & Alakangas, S. (2016). Google Scholar, Scopus and the Web of Science: A longitudinal and cross-disciplinary comparison. *Scientometrics*, *106*(2), 787–804. https://doi.org/10.1007/s11192-015-1798-9

Herbig, P., Golden, J. E., & Dunphy, S. (1994). The Relationship of Structure to Entrepreneurial and Innovative Success. *Marketing Intelligence & Planning*, *12*(9), 37–48. https://doi.org/10.1108/02634509410069038

Hill, R. C., & Levenhagen, M. (1995). Metaphors and Mental Models: Sensemaking and Sensegiving in Innovative and Entrepreneurial Activities. *Journal of Management*, *21*(6), 1057–1074. https://doi.org/10.1177/014920639502100603

Hirsch, J. E. (2005). An index to quantify an individual's scientific research output. *Proceedings of the National Academy of Sciences*, *102*(46), 16569–16572. https://doi.org/10.1073/pnas.0507655102

Hota, P. K., Subramanian, B., & Narayanamurthy, G. (2020). Mapping the Intellectual Structure of Social Entrepreneurship Research: A Citation/Co-citation Analysis. *Journal of Business Ethics*, *166*(1), 89–114. https://doi.org/10.1007/s10551-019-04129-4

Huang, S., Ding, D., & Chen, Z. (2014). Entrepreneurial leadership and performance in chinese new ventures: A moderated mediation model of exploratory innovation, exploitative innovation and environmental dynamism. *Creativity and Innovation Management*, *23*(4), 453–471. https://doi.org/10.1111/caim.12085

Hummon, N. P., & Dereian, P. (1989). Connectivity in a citation network: The development of DNA theory. *Social Networks*, *11*(1), 39–63. https://doi.org/10.1016/0378-8733(89)90017-8

Hung, S.-C., & Whittington, R. (2011). Agency in national innovation systems: Institutional entrepreneurship and the professionalization of Taiwanese IT. *Research Policy*, *40*(4), 526–538. https://doi.org/10.1016/j.respol.2011.01.008

Indriastuti, H. (2019). Entrepreneurial innovativeness, relational capabilities, and value co-creation to enhance marketing performance. *Humanities & Social Sciences Reviews*, *7*(3), 181–188. https://doi.org/10.18510/hssr.2019.7328

Iqbal, A., Nazir, T., & Ahmad, M. S. (2020). Entrepreneurial leadership and employee innovative behavior: An examination through multiple theoretical lenses. *European Journal of Innovation Management*, *ahead-of-print*(ahead-of-print). https://doi.org/10.1108/ejim-06-2020-0212

Johnson, D. (2001). What is innovation and entrepreneurship? Lessons for larger organisations. *Industrial and Commercial Training*, *33*(4), 135–140. https://doi.org/10.1108/00197850110395245

Johnson, M. P., & Schaltegger, S. (2016). Two decades of sustainability management tools for SMEs: How far have we come? *Journal of Small Business Management*, *54*(2), 481–505. https://doi.org/10.1111/jsbm.12154

Kasiri, N., Movassaghi, H., & Lamoureux, S. (2020). Sustainability engagement or not? U.S. SMEs approach. *Journal of Small Business Strategy*, *30*(3), 16–32.

Kenney, M. (1986). Schumpeterian innovation and entrepreneurs in capitalism: A case study of the U.S. biotechnology industry. *Research Policy*, *15*(1), 21–31. https://doi.org/10.1016/0048-7333(86)90020-X

Kocak, A., Carsrud, A., & Oflazoglu, S. (2017). Market, entrepreneurial, and technology orientations: Impact on innovation and firm performance. *Management Decision*, *55*(2), 248–270. https://doi.org/10.1108/md-04-2015-0146

Koellinger, P. (2008). Why are some entrepreneurs more innovative than others? *Small Business Economics*, *31*(1), 21–37. https://doi.org/10.1007/s11187-008-9107-0

Kollmann, T., & Stöckmann, C. (2014). Filling the entrepreneurial orientation-performance gap: The mediating effects of exploratory and exploitative innovations. *Entrepreneurship Theory and Practice*, *38*(5), 1001–1026. https://doi.org/10.1111/j.1540-6520.2012.00530.x

Kraus, S., Breier, M., & Dasí-Rodríguez, S. (2020). The art of crafting a systematic literature review in entrepreneurship research. *International Entrepreneurship and Management Journal*, *16*(3), 1023–1042. https://doi.org/10.1007/s11365-020-00635-4

Kraus, S., Roig-Tierno, N., & Bouncken, R. B. (2019). Digital innovation and venturing: An introduction into the digitalization of entrepreneurship. *Review of Managerial Science*, *13*(3), 519–528. https://doi.org/10.1007/s11846-019-00333-8

Kreiser, P. M., & Davis, J. (2010). Entrepreneurial Orientation and Firm Performance: The Unique Impact of Innovativeness, Proactiveness, and Risk-taking. *Journal of Small Business & Entrepreneurship*, *23*(1), 39–51. https://doi.org/10.1080/08276331.2010.10593472

Lampe, J., Kraft, P. S., & Bausch, A. (2019). Mapping the field of research on entrepreneurial organizations (1937–2016): A bibliometric analysis and research agenda. *Entrepreneurship Theory and Practice*, *44*(4), 784–816. https://doi.org/10.1177/1042258719851217

Landström, H., Åström, F., & Harirchi, G. (2015). Innovation and entrepreneurship studies: One or two fields of research? *International Entrepreneurship and Management Journal*, *11*(3), 493–509. https://doi.org/10.1007/s11365-013-0282-3

Leonidou, E., Christofi, M., Vrontis, D., & Thrassou, A. (2020). An integrative framework of stakeholder engagement for innovation management and entrepreneurship development. *Journal of Business Research*, *119*(November), 245–258. https://doi.org/10.1016/j.jbusres.2018.11.054

Light, R. J., & Pillemer, D. B. (1984). *Summing Up: The Science of Reviewing Research*. Harvard University Press.

Liñán, F., & Fayolle, A. (2015). A systematic literature review on entrepreneurial intentions: Citation, thematic analyses, and research agenda. *International Entrepreneurship and Management Journal*, *11*(4), 907–933. https://doi.org/10.1007/s11365-015-0356-5

Lucio-Arias, D., & Leydesdorff, L. (2008). Main-path analysis and path-dependent transitions in HistCite™-based historiograms. *Journal of the American Society for Information Science and Technology*, *59*(12), 1948–1962. https://doi.org/10.1002/asi.20903

Lüdeke-Freund, F. (2020). Sustainable entrepreneurship, innovation, and business models: Integrative framework and propositions for future research. *Business Strategy and the Environment*, *29*(2), 665–681. https://doi.org/10.1002/bse.2396

Marcati, A., Guido, G., & Peluso, A. M. (2008). The role of SME entrepreneurs' innovativeness and personality in the adoption of innovations. *Research Policy*, *37*(9), 1579–1590. https://doi.org/10.1016/j.respol.2008.06.004

Martínez-Climent, C., Zorio-Grima, A., & Ribeiro-Soriano, D. (2018). Financial return crowdfunding: Literature review and bibliometric analysis. *International Entrepreneurship and Management Journal*, *14*(3), 527–553. https://doi.org/10.1007/s11365-018-0511-x

Matzembacher, D. E., Raudsaar, M., Barcellos, M. D. de, & Mets, T. (2020). Business models' innovations to overcome hybridity-related tensions in sustainable entrepreneurship. *Sustainability*, *12*(11), 4503. https://doi.org/10.3390/su12114503

Mentzer, J. T., & Kahn, K. B. (1995). Forecasting technique familiarity, satisfaction, usage, and application. *Journal of Forecasting*, *14*(5), 465–476. https://doi.org/10.1002/for.3980140506

Merton, R. K. (1968). The Matthew Effect in Science. *Science*, *159*(3810), 56–63. https://doi.org/10.1126/science.159.3810.56

Miller, D., & Friesen, P. H. (1982). Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. *Strategic Management Journal*, *3*(1), 1–25. https://doi.org/10.1002/smj.4250030102

Mongeon, P., & Paul-Hus, A. (2016). The journal coverage of Web of Science and Scopus: A comparative analysis. *Scientometrics*, *106*(1), 213–228. https://doi.org/10.1007/s11192-015-1765-5

Mueller, S. L., & Thomas, A. S. (2001). Culture and entrepreneurial potential: A nine country study of locus of control and innovativeness. *Journal of Business Venturing*, *16*(1), 51–75. https://doi.org/10.1016/s0883-9026(99)00039-7

Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy*, *48*(8), 103773. https://doi.org/10.1016/j.respol.2019.03.018

Nidumolu, R., Prahalad, C. K., & Rangaswami, M. R. (2009). Why sustainability is now the key driver of innovation. *Harvard Business Review*, *87*(9), 57–64.

Obal, M., Morgan, T., & Joseph, G. (2020). Integrating sustainability into new product development: The role of organizational leadership and culture. *Journal of Small Business Strategy*, *30*(1), 43–57.

Parmar, B. L., Freeman, R. E., Harrison, J. S., Wicks, A. C., Purnell, L., & De Colle, S. (2010). Stakeholder theory: The state of the art. *Academy of Management Annals*, *4*(1), 403–445. https://doi.org/10.5465/19416520.2010.495581

Pellegrini, M. M., Rialti, R., Marzi, G., & Caputo, A. (2020). Sport entrepreneurship: A synthesis of existing literature and future perspectives. *International Entrepreneurship and Management Journal*, *16*(3), 795–826. https://doi.org/10.1007/s11365-020-00650-5

Pett, T. L., Francis, J., & Wolff, J. A. (2019). The interplay of strategic orientations and their influence on SME performance. *Journal of Small Business Strategy*, *29*(3), 46–59.

Piñeiro-Chousa, J., López-Cabarcos, M. Á., Romero-Castro, N. M., & Pérez-Pico, A. M. (2020). Innovation, entrepreneurship and knowledge in the business scientific field: Mapping the research front. *Journal of Business Research*, *115*(December 2019), 475–485. https://doi.org/10.1016/j.jbusres.2019.11.045

Pollack, J., & Adler, D. (2015). Emergent trends and passing fads in project management research: A scientometric analysis of changes in the field. *International Journal of Project Management*, *33*(1), 236–248. https://doi.org/10.1016/j.ijproman.2014.04.011

Porter, M. E., & Kramer, M. (2011). *Creating Shared Value*. Harvard Business Review.

Porter, M. E., & van der Linde, C. (1995). Toward a new conception of the environment-competitiveness relationship. *Journal of Economic Perspectives*, *9*(4), 97–118. https://doi.org/10.1257/jep.9.4.97

Prahalad, C. K., & Hart, S. L. (2002). The fortune at the bottom of the pyramid. *Strategy and Business*, *26*, 1–15.

Presenza, A., & Messeni Petruzzelli, A. (2019). Investigating business model innovation in Haute Cuisine. Role and behavior of chef-entrepreneurs. *International Journal of Hospitality Management*, *82*(November 2018), 101–111. https://doi.org/10.1016/j.ijhm.2019.03.027

Randhawa, K., Wilden, R., & Hohberger, J. (2016). A bibliometric review of open innovation: Setting a research agenda. *Journal of Product Innovation Management*, *33*(6), 750–772. https://doi.org/10.1111/jpim.12312

Rey-Martí, A., Ribeiro-Soriano, D., & Palacios-Marqués, D. (2016). A bibliometric analysis of social entrepreneurship. *Journal of Business Research*, *69*(5), 1651–1655. https://doi.org/10.1016/j.jbusres.2015.10.033

Salavou, H., & Lioukas, S. (2003). Radical product innovations in SMEs: The dominance of entrepreneurial orientation. *Creativity and Innovation Management*, *12*(2), 94–108. https://doi.org/10.1111/1467-8691.00272

Schaltegger, S., Lüdeke-Freund, F., & Hansen, E. G. (2016). Business Models for Sustainability: A Co-Evolutionary Analysis of Sustainable Entrepreneurship, Innovation, and Transformation. *Organization & Environment*, *29*(3), 264–289. https://doi.org/10.1177/1086026616633272

Schaltegger, S., & Wagner, M. (2011). Sustainable entrepreneurship and sustainability innovation: Categories and interactions. *Business Strategy and the Environment*, *20*(4), 222–237. https://doi.org/10.1002/bse.682

Schildt, H. A., Zahra, S. A., & Sillanpää, A. (2006). Scholarly Communities in Entrepreneurship Research: A Co–Citation Analysis. *Entrepreneurship Theory and Practice*, *30*(3), 399–415. https://doi.org/10.1111/j.1540-6520.2006.00126.x

Schmitz, A., Urbano, D., Dandolini, G. A., de Souza, J. A., & Guerrero, M. (2017). Innovation and entrepreneurship in the academic setting: A systematic literature review. *International Entrepreneurship and Management Journal*, *13*(2), 369–395. https://doi.org/10.1007/s11365-016-0401-z

Schumpeter, J. A. (1934). *The Theory of Economic Development: An Inquiry into Profits, Capital, Credits, Interest, and the Business Cycle*. Transaction Publishers, Piscataway.

Shi, Y., & Liu, X. (2019). Research on the Literature of Green Building Based on the Web of Science: A Scientometric Analysis in CiteSpace (2002–2018). *Sustainability*, *11*(13), 3716. https://doi.org/10.3390/su11133716

Soriano, D. R., & Huarng, K.-H. (2013). Innovation and entrepreneurship in knowledge industries. *Journal of Business Research*, *66*(10), 1964–1969. https://doi.org/10.1016/j.jbusres.2013.02.019

Strozzi, F., Colicchia, C., Creazza, A., & Noè, C. (2017). Literature review on the 'Smart Factory' concept using bibliometric tools. *International Journal of Production Research*, *55*(22), 6572–6591. https://doi.org/10.1080/00207543.2017.1326643

Tiberius, V., Rietz, M., & Bouncken, R. (2020). Performance analysis and science mapping of institutional entrepreneurship research. *Administrative Sciences*, *10*(3), 69. https://doi.org/10.3390/admsci10030069

Tiberius, V., Schwarzer, H., & Roig-Dobón, S. (2020). Radical innovations: Between established knowledge and future research opportunities. *Journal of Innovation & Knowledge*. https://doi.org/10.1016/j.jik.2020.09.001

Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, *14*(3), 207–222. https://doi.org/10.1111/1467-8551.00375

Vallaster, C., Kraus, S., Merigó Lindahl, J. M., & Nielsen, A. (2019). Ethics and entrepreneurship: A bibliometric study and literature review. *Journal of Business Research*, *99*, 226–237. https://doi.org/10.1016/j.jbusres.2019.02.050

van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538. https://doi.org/10.1007/s11192-009-0146-3

White, H. D., & McCain, K. W. (1998). Visualizing a discipline: An author co-citation analysis of information science, 1972–1995. *Journal of the American Society for Information Science*, *49*(4), 327–355.

Wong, P. K., Ho, Y. P., & Autio, E. (2005). Entrepreneurship, innovation and economic growth: Evidence from GEM data. *Small Business Economics*, *24*(3), 335–350. https://doi.org/10.1007/s11187-005-2000-1

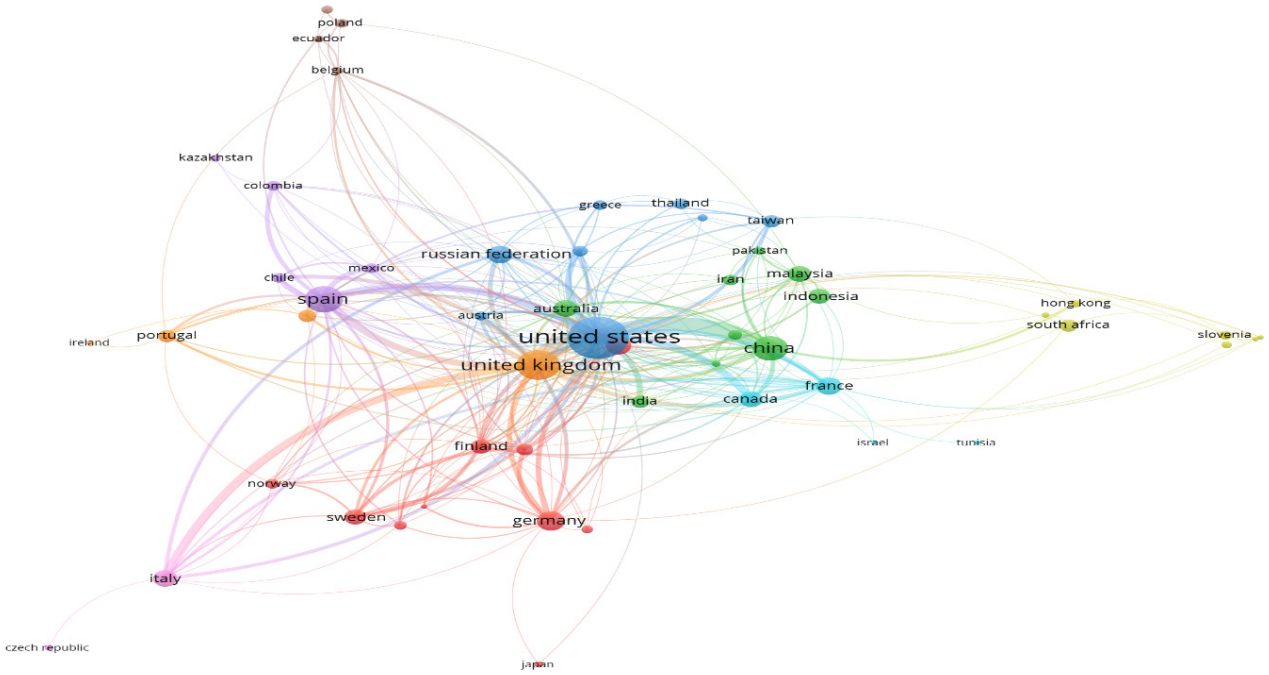
Yang, R., Wong, C. W. Y., & Miao, X. (2021). Analysis of the trend in the knowledge of environmental responsibility research. *Journal of Cleaner Production*, *278*, 123402. https://doi.org/10.1016/j.jclepro.2020.123402

Yoon, H. (David), Kim, N., Buisson, B., & Phillips, F. (2018). A cross-national study of knowledge, government intervention, and innovative nascent entrepreneurship. *Journal of Business Research*, *84*(March 2017), 243–252. https://doi.org/10.1016/j.jbusres.2017.11.040

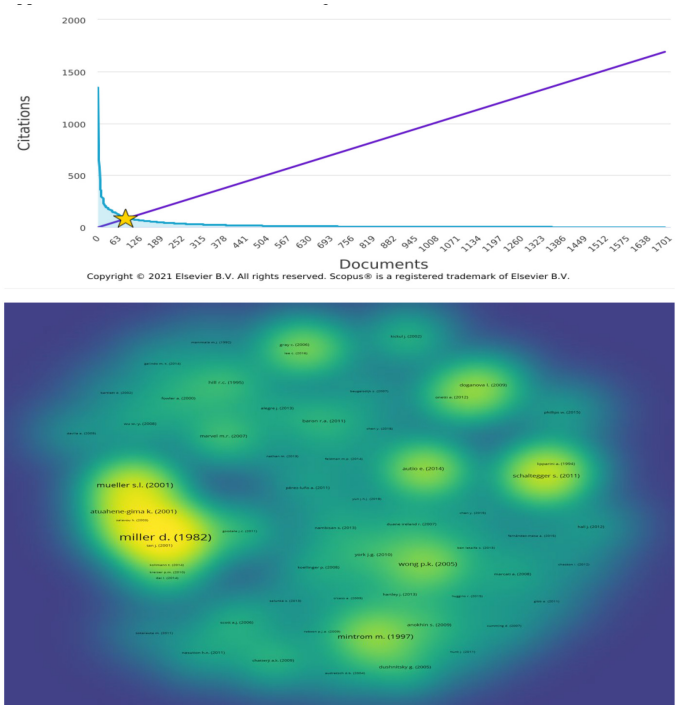
Yue, W., & Wilson, C. S. (2004). Measuring the citation impact of research journals in clinical neurology: A structural equation modelling analysis. *Scientometrics*, *60*(3), 317–332. https://doi.org/10.1023/b:scie.0000034377.93437.18

Zhao, F. (2005). Exploring the synergy between entrepreneurship and innovation. *International Journal of Entrepreneurial Behavior & Research*, *11*(1), 25–41. https://doi.org/10.1108/13552550510580825

Zupic, I., & Čater, T. (2015). Bibliometric Methods in Management and Organization. *Organizational Research Methods*, *18*(3), 429–472. https://doi.org/10.1177/1094428114562629



Appendix A. Total links strength of countries with more than 5 publications in the field



Appendix B. Document *h*-index in the sample: 85