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Article — Published Version

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International Entrepreneurship and Management Journal

Provided in Cooperation with:

Springer Nature

Suggested Citation: Glinyanova, Maria; Bouncken, Ricarda B.; Tiberius, Victor; Cuenca Ballester, Antonio C. (2021) : Five decades of corporate entrepreneurship research: measuring and mapping the field, International Entrepreneurship and Management Journal, ISSN 1555-1938, Springer US, New York, NY, Vol. 17, Iss. 4, pp. 1731-1757, <https://doi.org/10.1007/s11365-020-00711-9>

This Version is available at:

<https://hdl.handle.net/10419/287210>

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Five decades of corporate entrepreneurship research: measuring and mapping the field

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Accepted: 18 November 2020 / Published online: 8 February 2021
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Abstract

Research on corporate entrepreneurship—venturing activities by established corporations—has received increasing scholarly attention. We employ bibliometric methods to analyze the literature on corporate entrepreneurship published over the last five decades. Based on the results of citation and co-citation analyses, we reveal central works in the field and how they are interconnected. We investigate the underlying intellectual structure of the field. Our findings provide evidence of the growing maturity and interdisciplinarity of corporate entrepreneurship and provide insight into research themes. We find that resource-based view and its extensions still remain the predominant theoretical perspectives in the field. Drawing on these findings, we suggest directions for future research.

Keywords Corporate entrepreneurship · Bibliometric analysis · Co-citation analysis

Introduction

Corporate entrepreneurship has become paramount for established firms, because the intensified competition with both startups and incumbents forces them to sustain their competitive advantage with innovativeness, courage, risk propensity, and entrepreneurial leadership (Covin and Miles 1999; Kuratko 2009). Scholars have shown increasing interest in better understanding organizational entrepreneurial agency over the last 50 years (Covin and Wales 2019; Dess et al. 2003; Zahra et al. 2013). The high

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number of publications made corporate entrepreneurship (CE) a wide, complex, scattered, and inconsistently conceptualized research field, which is difficult to oversee (Covin and Lumpkin 2011; Kuratko et al. 2014; Sharma and Chrisman 1999; Stopford and Baden-Fuller 1994). To overcome this lack of clarity, there is a need to systematize and synthesize past research and to reflect about future research avenues (Low and MacMillan 1988; Zupic and Čater 2015).

Against this background, our research goal is to provide an overview of the current state of research in the field of CE and to make recommendations in regard to its further development. To achieve this goal, we employ bibliometric analyses. This methodology, rather than a more traditional literature review, allows handling large quantities of publications and is citation-frequency based and thus a less subjective approach (Zupic and Čater 2015). On our dataset of 674 documents published between 1937 and 2019, we employ citation analyses to examine the annual distribution of publications, productivity and impact of journals and authors and the most influential articles. Additionally, we use co-citation analysis to detect existing fields of research themes or “invisible colleges” in CE research (Crane 1972).

By employing multivariate analysis methods to process the results of co-citation analysis, we achieve results that are highly robust. Drawing on these findings, we discuss possible directions for future research. Our research contributes to the CE literature by offering deep insights into the structure and the evolution of the knowledge base and by identifying research gaps and pointing out future research opportunities.

Literature review

CE started to take shape as a separate research field in the 1980s with the appearance of works by Burgelman (1983a, b, c), Miller (1983), Ellis and Taylor (1987) and Pinchot (1985). Scholars still tend to describe the phenomenon of entrepreneurial activity within established organizations by different terms, e.g., corporate entrepreneurship (Burgelman 1983c; Zahra 1993a), corporate venturing (Biggadike 1979; Block and MacMillan 1993; von Hippel 1988), intrapreneuring (Pinchot 1985), internal or intra-corporate entrepreneurship (Jones and Butler 1992; Schollhammer 1982), new business venturing (Stopford and Baden-Fuller 1994), venturing (Hornsby et al. 1993), strategic entrepreneurship (Hitt et al. 2001; Ireland et al. 2003) and strategic renewal (Guth and Ginsberg 1990).

According to Sharma and Chrisman (1999), CE takes place within established organizations and refers to the creation of new businesses, strategic renewal, or innovation within this organization. Guth and Ginsberg (1990), Stopford and Baden-Fuller (1994), Thornberry (2001) and Zahra and Covin (1995) identify three dimensions of CE. The first dimension is innovation, which is considered to be “the heart of entrepreneurship” (Stevenson and Gumpert 1985). Innovation can refer to the introduction of new products, processes, technologies, systems, techniques or capabilities to the firm or to its markets (Burgelman et al. 1988). Innovation is vital to all types of entrepreneurship (Covin and Miles 1999; Stopford and Baden-Fuller 1994). The second dimension is corporate venturing (CV), which describes the process of entering, investing in new business or adding of new businesses to an existing organization (Kuratko et al. 2009; McGrath et al. 2006). Despite the existence of different types of CV, such as internal, external or cooperative CV, all these types possess one

commonality, i.e., adding a new business to an existing organization (Kuratko and Audretsch 2013). CV is considered to be one of the possible ways of achieving strategic renewal (Guth and Ginsberg 1990), the third dimension of CE. Strategic renewal aims to create wealth through new resource combinations (Guth and Ginsberg 1990) and involves major strategic or structural changes within the existing organization (Sharma and Chrisman 1999).

Covin and Miles (1999) suggest four possible manifestations of CE in established organizations: strategic renewal, sustained regeneration, domain redefinition, and organizational rejuvenation. Morris et al. (2011) outlined two major dimensions of CE, namely CV and strategic entrepreneurship. Although these conceptualizations may seem different, they still define innovation as the key element for CE (Covin and Miles 1999; Lampe et al. 2019).

The concept of intrapreneurship, separate from CE, takes a closer look at the entrepreneurial activity from the perspective of an individual within an existing organization (Stevenson and Jarillo 1990). Initially coined by Pinchot (1985), the term “intrapreneuring” focused on the creation of new business, exploitation of new opportunities or creation of economic value by an individual or a group of individuals within an existing organization. Some scholars suggested a broader definition of this term and defined it as “entrepreneurship within an existing organization” (Antoncic and Hisrich 2001, p. 496).

Strategic entrepreneurship (SE) emerged at the intersection of the fields of entrepreneurship and strategic management (Ireland et al. 2003). SE is the integration of opportunity-seeking (entrepreneurial perspective) and advantage-seeking (strategic perspective) behaviors (Hitt et al. 2001; Ireland et al. 2003). Opportunity-seeking behavior is aimed at the identification of new opportunities, whilst advantage-seeking behavior refers to the exploitation of these opportunities to establish and maintain the firm’s competitive advantage (Hitt et al. 2001). Whereas the concepts of CE and intrapreneurship reflect only the opportunity-seeking perspective, SE adds a focus on acting strategically in order to establish sustaining competitive advantage (Ireland et al. 2003). It emphasizes that, to create wealth, both advantage- and opportunity-seeking behavior is necessary (Hitt and Ireland 2000).

Another research theme is entrepreneurial orientation (EO), defined as “an organizational attribute that exists to the degree to which that organization supports and exhibits a sustained pattern of entrepreneurial behavior reflecting incidents of proactive new entry” (Covin and Wales 2019, p.3). EO and CE are tightly related but still separate concepts (Covin and Wales 2019). The former relates to the organizational attribute and does not address which forms entrepreneurial actions can take within the organizations (Covin and Wales 2019). The latter, on the contrary, describes the entrepreneurial activities in terms of their specific forms, such as venturing, innovation, and strategic renewal (Covin and Wales 2019; Miller 1983).

Methodology

Data collection and cleansing

We collected the bibliometric data from the Web of Science (WoS) by Clarivate Analytics, the Ebscohost Business Source Premiere Collection, and Google Scholar.

Due to its broad coverage of publications in the social sciences (Norris and Oppenheim 2007), the WoS database is the most used data source for bibliometric analyses (Zupic and Čater 2015) and has also been used in entrepreneurship research (Cornelius et al. 2006; Hota et al. 2019; López-Fernández et al. 2016; Vallaster et al. 2019). We complemented the dataset from Ebscohost Business Source Premiere Collection, and Google Scholar, because the WoS, despite being comprehensive, does not cover all potentially relevant literature gaplessly.

To cover the field of entrepreneurial activities employed by established corporations rather than startups, we broadly searched for the keywords “corp* entrep*”, “corp* ventur*”, “organi* entrep*”, “firm-level* entrep*”, “intrapreneur*”, and “internal* entrep*” in titles, abstracts, and keywords. The asterisk (*) was used as a truncation symbol allowing to search for the terms with a different ending, e.g. entrepreneur, entrepreneurship, or entrepreneurial (Granados et al. 2011). Several of the concepts and sub-concepts addressed in the previous section could not be used as search terms as they are not specific enough to relate only to corporate entrepreneurship. For example, innovation has as much broader meaning and is also employed in startups. Similarly, strategic renewal does not necessarily require an entrepreneurial context. As strategic entrepreneurship and entrepreneurial orientation depict distinct research fields with their own literature base, we also dropped it as a search term. On entrepreneurial orientation, just recently, a separate bibliometric analysis was conducted (Wales et al. 2020).

The search was restricted to articles, reviews, books, and book chapters written in English. We included books and book chapters, because they were the only source before the establishment of entrepreneurship journals, especially for European scholars (Aldrich 2012). We excluded publications from 2020 to have only full years of coverage. As they received no or only a few citations so far, they are not relevant for the co-citation analysis anyway.

As WoS and Ebscohost both contain a very limited number of books and book chapters, we conducted a Google Scholar search to add the missing documents to the sample. Due to the limited options of exporting the bibliometric data from Google Scholar (Zupic and Čater 2015), limited search opportunities (e.g., lack of keyword field search), and a high number of “grey literature”, the keyword search was only conducted in the title field of the documents. The results were exported with the help of Publish or Perish software (Harzing 2007) and were limited to the document types “Book” or “Book chapter”.

As a result of these searches, we retrieved 1512 documents from WoS, 1271 from Ebscohost, and 71 from Google Scholar. To ensure the quality of the dataset, first, we removed 449 duplicates. Second and as mentioned earlier, we also removed the 21 publications from 2020 to have only full years of coverage. Third, we applied a quality threshold by excluding all journals which were assigned to the third or fourth quartile of the Scimago Journal Rank (SJR). We opted for the SJR rather than the more common Journal Citation Reports (JCR), because the SJR covers more journals, which appear in our dataset, it weighs citations according to the “prestige” of the citing journal and excludes journal self-citations, and the evaluation period is three instead of two years (Falagas et al. 2008). This approach is justified by the maturing of entrepreneurship research (Aldrich 2012; Busenitz et al. 2003, 2014), which is evidenced by the increased percentage of entrepreneurship articles published in the leading business

and management journals as well as by increased citation numbers of top entrepreneurship journals (Busenitz et al. 2014). Therefore, we expect the knowledge base of the research field to be mainly formed by works published in high-quality business, management, and entrepreneurship journals. As a result, another 52 papers were excluded. Third, we screened the titles, abstracts, and keywords of all remaining papers and dropped the ones which did not mainly focus on corporate entrepreneurship, such as academic entrepreneurship, social entrepreneurship, or product innovation (Hill and Georgoulas 2016; Zupic and Čater 2015). To ensure accurate results in the analysis stage, different spellings of the author names and journal titles were unified and the references to multiple editions of same book were merged (Zupic and Čater 2015). Finally, the dataset for our performance analysis contained 674 documents with 41,294 references.

Bibliometric analyses

Bibliometric methods have received increased attention in entrepreneurship (Baier-Fuentes et al. 2019; Cornelius et al. 2006; Filser et al. 2020; Hota et al. 2019; Kraus et al. 2020; Lampe et al. 2019; Liñán and Fayolle 2015; Martínez-Climent et al. 2018; Pellegrini et al. 2020; Rey-Martí et al. 2016; Schildt et al. 2006; Tiberius et al. 2020a; Vallaster et al. 2019), innovation (Di Stefano et al. 2012; Fagerberg et al. 2012; Randhawa et al. 2016; Tiberius et al. 2020b), family business (Casillas and Acedo 2007; López-Fernández et al. 2016; Xi et al. 2015), strategic management (Ferreira et al. 2015; Ramos-Rodríguez and Ruíz-Navarro 2004), and many other fields. In contrast to systematic literature reviews (Tranfield et al. 2003), bibliometric methods allow the measurement of the scientific activity in the research field based on quantitative and thus more objective methods (Garfield 1979; Zupic and Čater 2015). Researchers can describe, evaluate, and monitor published research, structure the field, and draw conclusions about emerging research trends and opportunities, based on publication and citation data (Zupic and Čater 2015). Our bibliometric analysis consists of two parts (Noyons et al. 1999): performance analyses and a co-citation analysis as a science mapping technique.

The performance analyses comprise the statistical evaluation of publication numbers of journals and authors to measure their productivity and the citation frequencies of journals, authors, and publications to measure their impact (White and McCain 1998; Yue and Wilson 2004; Zupic and Čater 2015). These analyses help to identify key research, examine the citation growth over time (Hota et al. 2019), and track major research direction changes (Pilkington and Meredith 2009). We used the software Bibexcel for these analyses.

Co-citation analysis examines articles which jointly cite another article (Small 1973) in order to identify research themes within the CE field (Batistič and van der Laken 2019; López-Fernández et al. 2016). The higher the number of co-citations between two documents, the closer is their connection and the more likely they belong to the same research cluster (Crane 1972; Zupic and Čater 2015). We decided to employ a document rather than an author co-citation analysis because authors might contribute to different topics and schools of thought whereas a document usually has a stricter focus (Acedo et al. 2006; Gmür 2003; Hota et al. 2019). Co-citation data allows for the detection of the schools of thought (Pasadeos et al. 1998). We performed the following

six steps: (1) selection of the unit of analysis; (2) retrieval of co-citation frequencies; (3) compilation of raw citation matrix; (4) normalization of raw citation matrix; (5) conducting multivariate analyses of the correlation matrix; and (6) validation and interpretation of the results (McCain 1990).

Following this procedure, we further reduced the number of the most cited publications (Di Stefano et al. 2012; Pilkington and Meredith 2009; Schildt et al. 2006) to optimize its explanatory power (Grégoire et al. 2006; Lampe et al. 2019). To find the optimal sample size, we tested several thresholds for documents and references based on the stress value obtained from multi-dimensional scaling (Hota et al. 2019; Pilkington and Meredith 2009; Ramos-Rodríguez and Ruiz-Navarro 2004). McCain (1990) emphasizes the high noisiness of the co-citation data and suggests that stress values smaller than 0.2 combined with high values for R-squared are acceptable. As a result, the threshold was set to 31 citations, which resulted in 76 documents for the co-citation analysis, as it received the lowest stress value of 0.174, combined with a Dispersion Accounted For of 0.969 and Tucker's Coefficient of Congruence of 0.985, which indicate an acceptable goodness of fit.

The co-citation frequencies for the 76 most cited documents (cf. section 3.1) were retrieved with the help of BibExcel, and the raw co-citation matrix was compiled. The 76×76 square symmetrical matrix contains the co-citation counts, which represent how many times each pair of documents were cited together (Di Stefano et al. 2012; Hota et al. 2019).

Following White and Griffith (1981), the diagonal values in the matrix were calculated as the sum of the three highest co-citations for each document divided by two. In the next step, the raw co-citation data was normalized using Pearson's r correlation which allows the identification of the likeness of co-citation count profiles over all documents in the dataset (White and McCain 1998; Zupic and Čater 2015). The normalization was required because raw co-citation frequencies as simple similarity measures disregard different occurrence levels among items (Gmür 2003).

The normalized correlation matrix was then used as an input for conducting multivariate analyses. We used SPSS to conduct an Exploratory Factor Analysis as a principal component analysis (Di Stefano et al. 2012; Vogel and Güttel 2013). Factor analysis can identify documents that load on more than one factor and, thus, allows for a better exploration of the documents that may serve as a bridge between different approaches (McCain 1990). Kaiser's criterion was used to define the number of factors extracted and Varimax rotation was applied to interpret the results. Documents which had loadings ≥ 0.4 on more than one factor, were assigned to the factor on which they loaded highest (Vogel and Güttel 2013).

As researchers are advised not to solely rely on the results of a single clustering method (Zupic and Čater 2015), we triangulated the results with Multidimensional Scaling (MDS) (Di Stefano et al. 2012) using the SPSS scaling program PROXSCAL (Leydesdorff and Vaughan 2006). A bi-dimensional map was generated, where the heavily co-cited documents appear closer on the map (McCain 1990). High proximity of the papers within one group also indicates a high consistency of their conceptual domain (Di Stefano et al. 2012). We used UCINET NetDraw (Borgatti 2002) to visualize the co-citation results.

Results

Performance analyses

Figure 1 demonstrates the temporal distribution of the 674 documents in the CE and related fields. The first publication on CE is “The Corporate Entrepreneur” by Lewis (1937). Since then and until the mid-1970s, the CE field didn’t experience any significant development, as only two articles were published. The period from then until the early 1980s can be described as a development phase, with less than five articles published per year. The beginning of the introduction phase, where the scholars’ and practitioners’ interest in CE begins to grow, is marked by the release of the works by Schollhammer (1981, 1982), Burgelman (1983a, b, c), Kanter (1985), and Pinchot (1985). As a result of the discovered positive relation between CE and firm’s performance, competitive position, and revitalization (Antonicic and Hisrich 2001; Zahra 1991), the field of CE starts to gather increased attention from both practitioners and scholars. Since the beginning of the 1990s the field is in its growth stage, reaching the first peak in 1999. The release of two special issues on CE by the journal *Entrepreneurship Theory and Practice* has contributed to this peak. Papers devoted specifically to CE make up 17 out of 25 papers published in 1999. Whereas the number of papers published on the topics of CV and intrapreneurship was growing since the middle of the 1980s, the development of SE as a field of research first emerged at the beginning of the 2000s. In general, the majority (73%) of the records in the field of CE was published in the last 15 years.

The 674 documents in the sample were (co)authored by 1094 authors from 54 countries around the globe. In terms of country productivity (Fig. 2), US authors have contributed 336 documents in the sample, UK authors 69 and Spanish authors 53, whereas the contribution from the emerging countries was relatively smaller (Taiwan: 11, Turkey: 10, South Africa: 9, India: 5). Previous empirical findings (Cole and Phelan 1999; Gantman 2012; Schofer 2004) show that such over-representation of developed

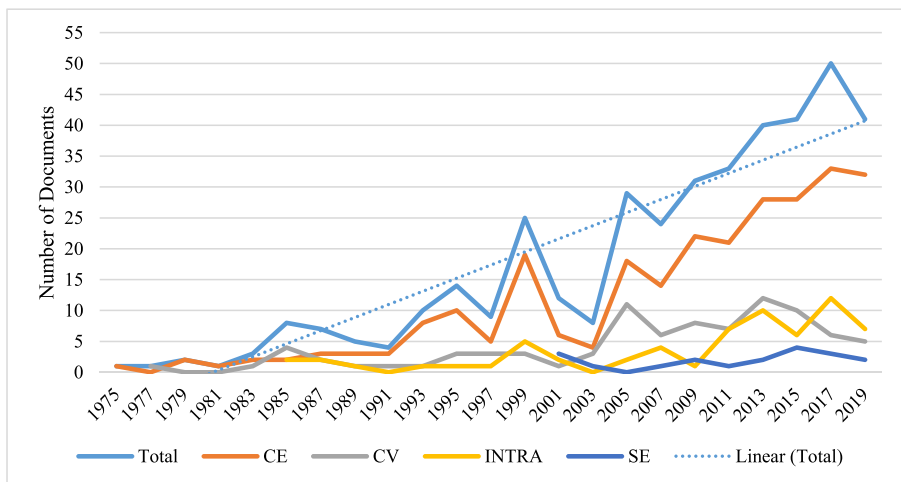


Fig. 1 Annual distribution of documents in the dataset. *Note.* CE = Corporate Entrepreneurship, CV = Corporate Venturing, INTRA = Intrapreneurship, SE = Strategic Entrepreneurship

countries can reside in the fact that there is a positive effect of the country's economic development on its scientific output due to a wider resource availability and access. Another possible explanation could be the language barriers (Gantman 2012; La Madeleine 2007).

Table 1 shows the 25 most cited works. The three journals *Entrepreneurship Theory & Practice*, *Journal of Business Venturing* and *Strategic Management Journal* account for 14 (64%) of the 22 journal articles. Apart from the two major entrepreneurship journals, the amount of papers in the *Strategic Management Journal* illustrates the relevance of CE for strategic management (Lampe et al. 2019) and indicates the maturity of (corporate) entrepreneurship due to the increased citations of top entrepreneurship journals (Busenitz et al. 2014).

Table 2 shows the most cited as well as most productive authors in the field. In terms of the author productivity, 26 of the most productive authors have (co)authored 266 works that account for 39.5% of all the documents in the sample. The h-index depicts the number of an author's articles that received at least the same number of citations (Hirsch 2005). The h-indices in the table refer only to the author's publications on a CE topic. Most authors' overall h-indices are higher.

We apply Lotka's (1926) law to examine if the productivity of CE research is based on a limited number of authors. By taking the number of authors that have contributed to a single study, Lotka's law allows to predict how many authors would have published n articles. Following the recommendation of Andrés (2009), the small group of four prolific authors contributing a very high number of papers was excluded from the calculation in order to not overestimate the results. The authors' productivity in the dataset examined fits Lotka's law. Compared to other research fields like data mining with $n = 3.629$ (Tsai 2012) or psychology in tourism with $n = 3.26$ (Barrios et al. 2008), the obtained $n = 2.635$ demonstrates that there is a greater concentration of papers in a fewer number of prolific authors in the CE field.

Table 3 gives an overview of the most influential journals for CE. The list is predominated by entrepreneurship or management journals, which proves that the formation of the field of CE took place at the intersection of strategic management

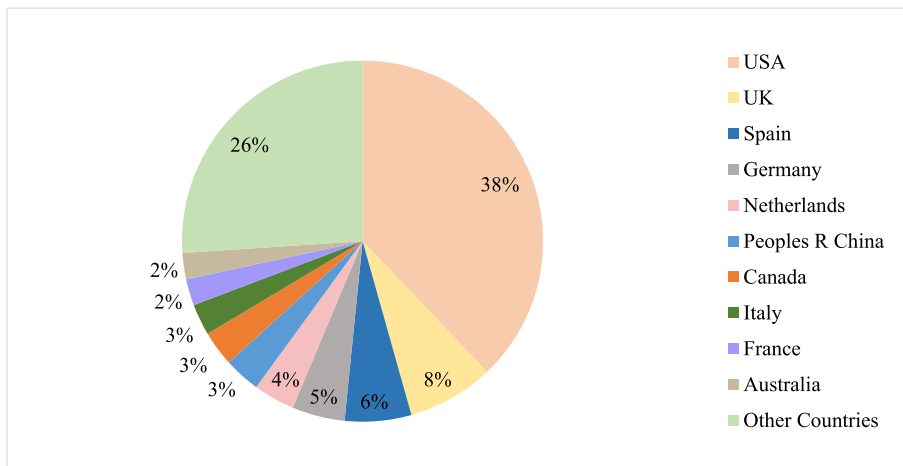


Fig. 2 Distribution of documents per country

Table 1 Top 25 most cited works

Rank	Reference	# Cit.
1	Guth and Ginsberg (1990) Guest Editors' Introduction: Corporate Entrepreneurship. <i>Strategic Management Journal</i>	159
2	Lumpkin and Dess (1996) Clarifying the Entrepreneurial Orientation Construct and Linking It To Performance. <i>Academy of Management Review</i>	142
3	Zahra (1991) Predictors and Financial Outcomes of Corporate Entrepreneurship: An Exploratory Study. <i>Journal of Business Venturing</i>	138
4	Covin and Slevin (1991) A Conceptual Model of Entrepreneurship as Firm Behavior. <i>Entrepreneurship Theory & Practice</i>	135
5	Miller (1983) The Correlates of Entrepreneurship in Three Types of Firms. <i>Management Science</i>	133
6	Zahra and Covin (1995) Contextual Influences on the Corporate Entrepreneurship-Performance Relationship: A Longitudinal Analysis. <i>Journal of Business Venturing</i>	126
7	Sharma and Chrisman (1999) Toward A Reconciliation of the Definitional Issues in the Field of Corporate Entrepreneurship. <i>Entrepreneurship Theory & Practice</i>	120
8	Pinchot (1985) Intrapreneuring: Why You Don't Have to Leave the Corporation to Become an Entrepreneur. New York: Harper & Row	111
9	Covin and Miles (1999) Corporate Entrepreneurship and the Pursuit of Competitive Advantage. <i>Entrepreneurship Theory & Practice</i>	110
10	Burgelman (1983b) A Process Model of Internal Corporate Venturing in the Diversified Major Firm. <i>Administrative Science Quarterly</i>	104
11	Zahra et al. (2013) Environment, Corporate Entrepreneurship, and Financial Performance: A Taxonomic Approach. <i>Journal of Business Venturing</i>	104
12	Burgelman (1983c) Corporate Entrepreneurship and Strategic Management: Insights from a Process Study. <i>Management Science</i>	99
13	Stevenson and Jarillo (1990) A Paradigm of Entrepreneurship: Entrepreneurial Management. <i>Strategic Management Journal</i>	95
14	Hornsby et al. (2002) Middle Managers' Perception of the Internal Environment for Corporate Entrepreneurship: Assessing a Measurement Scale. <i>Journal of Business Venturing</i>	94
15	Ireland, Covin, and Kuratko et al. (2009) Conceptualizing Corporate Entrepreneurship Strategy. <i>Entrepreneurship Theory & Practice</i>	91
16	Zahra (1996) Governance, Ownership, and Corporate Entrepreneurship: The Moderating Impact of Industry Technological Opportunities. <i>Academy of Management Journal</i>	88
17	Covin and Slevin (1989) Strategic Management of Small Firms in Hostile and Benign Environments. <i>Strategic Management Journal</i>	86
18	Block and MacMillan (1993) Corporate Venturing: Creating New Businesses Within the Firm. Boston: Harvard Business School Press	83
19	Kuratko et al. (1990) Developing an Intrapreneurial Assessment Instrument for an Effective Corporate Entrepreneurial Environment. <i>Strategic Management Journal</i>	82
20	Schumpeter (1934) The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and the Business Cycle. New Brunswick: Transaction Books	82
21	Antonicic and Hisrich (2001) Intrapreneurship: Construct Refinement and Cross-Cultural Validation. <i>Journal of Business Venturing</i>	81
22	Dess et al. (2003) Emerging Issues in Corporate Entrepreneurship. <i>Journal of Management</i>	81
23	Shane and Venkataraman (2000) The Promise of Entrepreneurship as a Field of Research. <i>Academy of Management Review</i>	81
24	Stopford and Baden-Fuller (1994) Creating Corporate Entrepreneurship. <i>Strategic Management Journal</i>	80
25	Cohen and Levinthal (1990) Absorptive Capacity: A New Perspective on Learning and Innovation. <i>Administrative Science Quarterly</i>	75

#Cit. = Number of citations

Table 2 Most cited and most productive authors

Most cited authors				Most productive authors		
Rank	Author	# Cit.	h-Index	Rank	Author	# Works
1	Zahra S	1163	16	1	Kuratko D	36
2	Covin J	582	11	2	Zahra S	31
3	Burgelman R	534	10	3	Hornsby J	21
4	Kuratko D	513	12	4	Covin J	18
5	Miller D	355	7	5	Ireland R	10
6	Hornsby J	289	6	5	Morris M	10
7	Ireland R	269	7	6	Hayton J	9
8	Morris M	242	7	6	Miles M	9
9	Dess G	241	6	6	Burgelman R	9
10	Kanter R	232	7	7	Shepherd D	8
11	Lumpkin G	215	6	7	Keil T	8
12	Hitt M	213	8	7	Birkinshaw J	8
13	Dushnitsky G	192	7	7	Urbano D	8
14	Eisenhardt K	183	6	7	Garcia-Morales V	8
15	Shane S	181	5	8	Garrett R	7
16	Block Z	180	4	8	Lee S	7
17	Guth W	178	3	8	Martin-Rojas R	7
18	Antoncic B	177	6	8	Dushnitsky G	7
19	Chesbrough H	168	6	9	Simsek Z	6
20	Stevenson H	163	5	9	Antoncic B	6
				9	Hisrich R	6
				9	Jennings D	6
				9	Yang Y	6
				10	Patzelt H	5
				10	Macmillan I	5
				10	Hitt M	5

#Cit. = Number of citations

Source: Author

and entrepreneurship (Kuratko et al. 2005; Peterson and Berger 1971; Zahra and Dess 2001; Zahra et al. 2013).

Co-citation analysis

Our factor analysis resulted in five factors explaining 95.3% of variance indicating an information loss of only 4.7%. An in-depth review of the documents assigned to the five factors revealed that Factors 3, 4, and 5 form individual research clusters, whereas the documents attributed to Factors 1 and 2 need a further segmentation. The clustering is depicted in Table 4.

Table 3 Most productive journals

Rank	Journal	# Articles	# Cit. (Rank)	CE	CV	Intra	SE
1	<i>Entrepreneurship Theory and Practice</i>	56	2190 (3)	45	8	4	2
2	<i>Journal of Business Venturing</i>	55	2495 (2)	28	25	3	–
3	<i>International Entrepreneurship and Management Journal</i>	35	195 (22)	23	5	11	7
4	<i>Strategic Management Journal</i>	24	3233 (1)	16	7	1	1
5	<i>Small Business Economics</i>	20	350 (14)	15	4	4	1
6	<i>Business Horizons</i>	15	167 (25)	12	2	3	–
7	<i>Journal of Business Research</i>	13	258 (18)	9	3	2	–
8	<i>Strategic Entrepreneurship Journal</i>	13	275 (17)	6	5	–	2
9	<i>Journal of Business Strategy</i>	11	102 (66)	5	6	2	–
10	<i>Journal of Management Studies</i>	11	549 (11)	8	2	1	–
11	<i>Research Technology Management</i>	11	66 (73)	1	10	–	–
12	<i>Journal of Management</i>	10	929 (6)	7	3	–	1
13	<i>Journal of Product Innovation Management</i>	10	255 (19)	7	3	–	1
14	<i>Organization Science</i>	10	912 (7)	4	6	1	–
15	<i>Journal of Small Business Management</i>	9	213 (21)	7	2	–	–

CE = Corporate Entrepreneurship, CV = Corporate Venturing, INTRA = Intrapreneurship, SE = Strategic Entrepreneurship, #Cit. = Number of citations. The sum of the articles in the subfields might exceed the total number of articles published in a journal, as one article may address issues from more than one subfield. The totals refer to the total number of articles and references in the sample

The content analysis revealed research clusters, which are ordered according to their appearance in the list in the following. The first subfield (*1a – Internal and External Determinants of CE Performance*) is formed by 21 papers loading on Factor 1 and examines internal (e.g. structure) and external (e.g. industry) determinants that influence entrepreneurship in established firms as well as their performance. Some scholars have highlighted that high dynamism and hostility of external environment contributes to the intensification of CE (Stopford and Baden-Fuller 1994; Zahra 1991; Zahra and Covin 1995). Others have focused on internal organizational factors that can foster the entrepreneurial activity, such as ownership and governance structures (Zahra 1996; Zahra and Garvis 2000; Zahra et al. 2000) or resource availability and top management support (Hornsby et al. 2002). Earlier works found in this subfield are devoted to the question what determines and promotes entrepreneurship in different types of firms (Miller 1983; Miller and Friesen 1982). Later works examine the correlation between organizational factors and agency problems that affect entrepreneurial behavior within an organization (Jones and Butler 1992) and focus on the link between human resource management practices and CE (Hayton, 2005; Hayton and Kelley 2006). In general, 10 documents belonging to this subfield were found amongst the 25 most cited works in this field of CE, which suggests that the studies focusing on the link between external and internal determinants, organizational entrepreneurship and firm performance have received an increased attention (Lampe et al. 2019).

Table 4 Results of the factor analysis. Source: SPSS, own elaboration

CL		F1	CL	F2	F3	F4	F5
1a	Zahra and Garvis 2000	0.96	2a	Covin and Miles 2007	0.93		
1a	Zahra et al. 2000	0.94	2b	Narayanan et al. 2009	0.92		
1a	Zahra 1996	0.93	2b	Miles and Covin 2002	0.89		
1b	Lumpkin and Dess 1996	0.90	2a	Floyd and Lane 2000 ¹	0.71		
1a	Zahra and Covin 1995	0.90	2a	Hornsby et al. 2009 ¹	0.70		
1a	Dess et al. 2003	0.89	2b	Sharma and Chrisman 1999 ¹	0.69		
1a	Zahra 1993a, b	0.89	2a	Ireland et al. 2003 ¹	0.67		
1b	Stevenson and Jarillo 1990	0.89	2c	Eisenhardt 1989 ⁵	0.65		
1a	Covin and Slevin 1989	0.88	2b	Kuratko 2005 ¹	0.64		
1a	Miller 1983	0.88	2a	Hitt et al. 2001 ¹	0.62		
1a	Jones and Butler 1992 ³	0.87	3	Burgelman 1983a		0.82	
1a	Barringer and Bluedorn, 1999	0.87	3	Kanter 1983 ¹		0.81	
1e	Baron and Kenny 1986	0.87	3	Drucker 1985 ¹		0.78	
1a	Covin and Slevin 1991	0.86	3	Burgelman and Sayles 1986 ¹		0.74	
1b	Antoncic and Hisrich 2001	0.86	3	Burgelman 1983b ^{1,2}		0.68	
1e	Podsakoff et al. 2003 ²	0.86	3	Burgelman 1984 ^{1,2}		0.67	
1a	Zahra 1995	0.86	3	Birkinshaw 1997 ²		0.67	
1d	Barney 1991	0.85	3	Burgelman 1983c ¹		0.65	
1c	Schildt et al. 2005	-0.85	4	Grant 1996			0.86
1a	Zahra 1991	0.84	4	Zahra and George 2002			0.81
1a	Miller and Friesen 1982	0.84	4	Kogut and Zander 1992			0.81
1b	Shane and Venkataraman, 2000 ²	0.83	4	Ahuja and Lampert 2001			0.79
1a	Stopford and Baden-Fuller 1994 ³	0.82	4	Eisenhardt and Martin 2000			0.78
1b	Antoncic and Hisrich 2003	0.80	4	Teece et al. 1997 ¹			0.74
1b	Guth and Ginsberg 1990 ²	0.79	4	Nelson and Winter 1982 ³			0.73
1c	Wadhwa and Kotha 2006	-0.78	4	Cohen and Levinthal 1990 ¹			0.68
1a	Hayton 2005 ²	0.78	4	March 1991 ¹			0.68
1c	Dushnitsky and Lenox 2006	-0.77	4	Cyert and March 1963 ³			0.65
1a	Kuratko et al. 1990 ²	0.77	5	Block and MacMillan 1993			0.77
1b	Pilkington and Meredith 2009 ³	0.77					
1c	Dushnitsky and Lenox 2005a	-0.77					
1c	Siegel et al. 1988	-0.77					
1c	Dushnitsky and Lenox 2005b	-0.77					
1a	Hornsby et al. 2002 ²	0.75					
1b	Zahra et al. 1999 ²	0.75					
1c	Chesbrough 2002	-0.75					
1d	Schumpeter 1934 ³	0.73					
1c	Levinthal and March 1993 ⁴	-0.73					

Table 4 (continued)

CL	F1	CL	F2	F3	F4	F5
1b Covin and Miles 1999 ²	0.72					
1a Hornsby et al. 1993 ^{2,3}	0.72					
1a Hayton and Kelley 2006 ²	0.71					
1b Dess et al. 2003 ²	0.70					
1d Penrose 1959 ^{3,4}	0.70					
1b Phan et al. 2009 ²	0.69					
1b Ireland et al. 2003 ²	0.67					
1a Zahra et al. 1999 ^{2,3}	0.63					
1d Kanter 1985 ^{2,3}	0.55					
% Variance explained	47.7		17.9	13.9	11.9	3.9

CL = cluster, F = factor. Superscripts next to the document name represent the secondary loadings, if those are $\geq \pm 0.4$ (i.e. 1 represents secondary loading on Factor 1)

The second subfield (*1b – Construct Exploration*) includes 12 documents loading on Factor 1 that explore various constructs in the field of entrepreneurial organizations, such as CE (Covin and Miles 1999; Stevenson and Jarillo 1990), entrepreneurial orientation (Lumpkin and Dess 1996), and intrapreneurship (Antoncic and Hisrich 2001, 2003; Pinchot 1985). Other works in this subgroup are summarizing prior research findings, defining state of research and suggesting further research directions (Dess et al. 2003; Guth and Ginsberg 1990; Phan et al. 2009; Zahra et al. 1999).

Eight papers also loading on Factor 1 form the third subfield (*1c – External Corporate Venturing*). These papers focus specifically on the form of external CV such as corporate venture capital (CVC) investments (Chesbrough 2002; Dushnitsky and Lenox 2005a, 2006; Siegel et al. 1988) and on knowledge creation through external venturing activity (Dushnitsky and Lenox 2005b; Schildt et al. 2005; Wadhwa and Kotha 2006). The papers display negative factor loadings, which indicates that given documents possess a reverse co-citation profile, meaning that whenever a document cites a paper positively loading on the given factor, it will unlikely co-cite the papers having negative loadings on the same factor (Acedo et al. 2006). This suggests the divergence in the theoretical developments or topics discussed by the papers with positive and negative loadings (Acedo et al. 2006). Indeed, some scholars (Narayanan et al. 2009; Lampe et al. 2019) emphasize that works on CVC activities of incumbent companies have rarely been connected to the broader field of CV. In addition, Phan et al. (2009) note that the application possibilities of the theories of radical innovation and venture capital to the fields of CE might be limited.

The fourth subfield (*1d – Theoretical Foundations*) encompasses four documents loading on Factor 1, which serve as theoretical foundations for the development of the field of CE. Schumpeter's work (1934) "The Theory of Economic Development", which discusses the role of the entrepreneur in driving innovations, is considered to belong to the core entrepreneurship works (Ferreira et al. 2015; Hota et al. 2019). Two

other documents in this subfield contributed to the development of resource-based view (RBV). Although scholars recognize that there is a need for contextualization of the RBV, particularly for entrepreneurship research (Kellermanns et al. 2016; Siqueira and Bruton 2010), Barney's (1991) seminal work on RBV still has a significant influence on the field of CE. RBV and its extensions, such as knowledge-based view (Grant 1996; Kogut and Zander 1992) and dynamic capabilities (Eisenhardt and Martin 2000; Teece et al. 1997), can be considered as a predominant theoretical perspective adopted by scholars in the field of CE, indicating the focus of the research on the contributions of entrepreneurial activities to the development of a firm's strategic resources, competences and capabilities (Ferreira et al. 2015). Kanter's work (1985), which is also identified in this subfield, discusses the obstacles in the innovation and venture development process in established firms and loads positively on Factor 1, 2 and 3. This indicates that this work might serve as a bridge between two or more approaches (Acedo et al. 2006).

The last two papers that load on Factor 1 form the fifth subfield (*Je – Research Problems*). They focus on the problems of common method bias (Podsakoff et al., 2003) and provide a distinction between the terms mediator and moderator variable (Baron and Kenny 1986).

The sixth subfield (*2a – Linking Entrepreneurship and Strategy*) covers five papers loading on Factor 2. This subfield focuses on the firms' value creation and on sustaining competitive advantages through SE as the integration of the fields of entrepreneurship and strategic management (Hitt et al. 2001). Ireland et al. (2003) elaborate the theoretical framework of SE, which involves advantage-seeking (strategic management perspective) and opportunity-seeking behaviors (entrepreneurship perspective), while Hitt et al. (2001) explore SE in various organizational domains. Furthermore, Covin and Miles (2007) empirically investigate the relation between CV and business strategy. Two papers examine the manager's role in the process of strategic renewal (Floyd and Lane 2000) or CE (Hornsby et al. 2009).

The seventh subfield (*2b – Construct Refinement*) includes four papers loading on Factor 2. It thematizes the growing maturity of CE as a field of research, which, on the one hand, leads to the urgency of domain definition and reconciliation of various existing terms and definitions (Sharma and Chrisman 1999), and on the other hand, triggers the emergence of entrepreneurial education (Kuratko 2005). Another work devoted to the synthesis of prior research and integration of its key findings in a narrower field of CV is the paper by Narayanan et al. (2009). A paper by Miles and Covin (2002) also explores the domain of CV and suggests the typology of CV forms by the focus of entrepreneurship and the presence of investment intermediation.

Only one paper (Eisenhardt 1989) loading on Factor 2 forms the eighth subfield (*2c – Case Study Research Method*). It discusses the use of case studies as a research method and thus, is not specifically related to the field of CE. However, the high citations of this paper indicate that CE research often uses case study methods.

The ninth subfield (*3 – CE, Structure and Empowerment*) encompasses all documents, which load on Factor 3. Interestingly, seven works in this subfield were written between 1983 and 1986. Five of these works are authored by Burgelman (1983a, b, c, 1984; Burgelman and Sayles 1986). Drawing attention to the fact that the Schumpeterian distinction between entrepreneurial and bureaucratic economic

activity becomes outdated, Burgelman (1983c) emphasizes that for entrepreneurial success, organizations need to experiment with various organizational forms and new resource combinations. The idea that innovation and entrepreneurship processes should be organized as a systematic and rational process fostered by management is also supported by Drucker (1985). In addition, Burgelman (1983a, b, c) claims that to achieve entrepreneurial success, organizations need to unlock the entrepreneurial potential on the operational levels by promoting autonomous strategic behavior. Kanter (1985) adheres to the same idea and suggests that people at all organizational levels should be empowered with information, resources and support to innovate inside of organizations.

The tenth subfield (4 – *Organizational Learning and Dynamic Capabilities*) comprises 10 documents, which load on Factor 4. It focuses on the knowledge-based view of a firm (Grant 1996; Kogut and Zander 1992) and dynamic capabilities (Eisenhardt and Martin 2000; Teece et al. 1997). Two documents include the work on behavioral theory of the firm (Cyert and March 1963) and evolutionary theory of the firm (Nelson and Winter 1982). Both of these works have served as a starting point for the development of dynamic capabilities concept (Pierce et al. 2008). Strongly intertwined with the knowledge-based view are the concepts of absorptive capacity (Cohen and Levinthal 1990; Zahra and George 2002) and organizational learning (Ahuja and Lampert 2001; March 1991) in four documents.

Finally, eleventh subfield contains the book by Block and MacMillan (1993), which is the only document loading on Factor 5. It discusses how established firms innovate through CV activities.

The results of the Multidimensional Scaling show a high consistency with the findings of factor analysis. Figure 3 depicts the graphical clustering in five groups, which resemble the factors identified by the factor analysis. In order to compare the results of MDS and factor analysis, the factors were highlighted on the MDS map. The majority of the papers that load on Factor 1 are clustered very tightly, which suggests that the documents in the group have similar co-citation profiles. Cluster 1c (*External Corporate Venturing*), which encompasses the papers that have negative loadings on Factor 1, is placed in the upper part of the map (F1– subfield 3). The documents that load positively on Factor 1 are located in the bottom part of the map (F1– clusters 1a, 1b, 1d, 1e). It supports the results of the Factor analysis and demonstrates that the field of CVC develops independently from the fields of CE and CV. At the same time, the external CV and CVC group is located in close proximity to the documents from Factor 4, specifically to the documents that focus on the topics of absorptive capacity, organizational learning and knowledge-based view. This shows that scholars show interest in the external CV and CVC activity from the perspective of knowledge creation for corporate investors (Dushnitsky and Lenox 2005a, b; Wadhwa and Kotha 2006) and examine different types of CVC investments as avenues for inter-organizational learning (Schildt et al. 2005). Moreover, the MDS map demonstrates that the documents loading on the Factor 1 and 2 cluster tightly, which serves as an indicator of their conceptual proximity. This also becomes evident through examination of the secondary factor loadings of the documents found in these groups, which appear to be bidirectional. The presence of the same authors in the groups loading on Factor 1 and 2, such as Hornsby, Kuratko and Ireland, can be one possible explanation of the

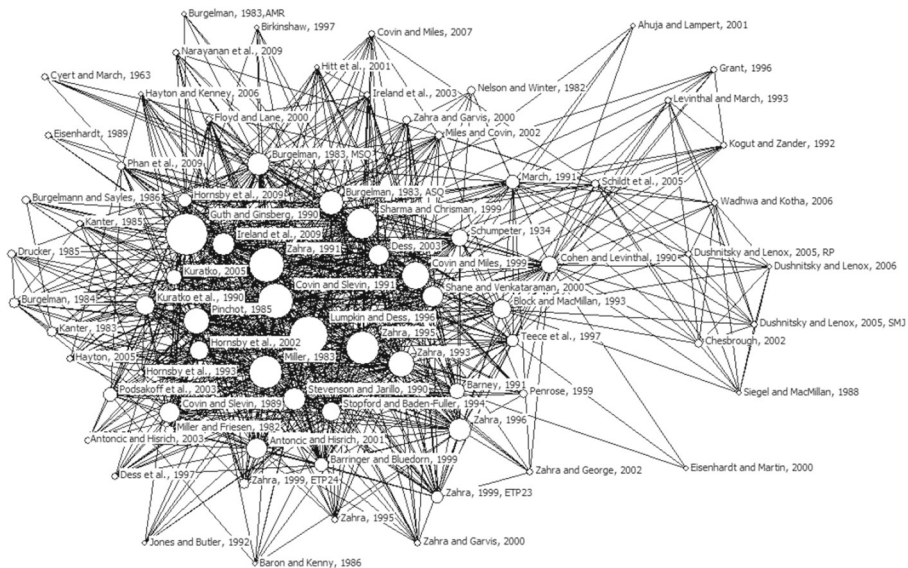


Fig. 4 Intellectual structure of CE and related fields

Discussion and future research opportunities

Overall, the field of CE has evolved significantly over the last decades and its maturity as a research field has been continuously growing as evidenced by the prevalence of entrepreneurship journals among the top cited and publishing journals (Busenitz et al. 2014), by the increasing average number of authors per publication (Lipetz 1999; Serenko et al. 2010) as well as by numerous attempts of scholars to resolve definitional issues in the field and define its boundaries. The intellectual structure of the field demonstrates theoretical diversity based on various management theories, such as resource-based view, knowledge-based view, organizational learning, and dynamic capabilities. However, some authors call for a greater engagement of CE research with other theoretical perspectives, such as transaction cost economics, real options, institutional theories and social network theory (Corbett et al. 2013; Hoskisson et al. 2011; Lampe et al. 2019; Narayanan et al. 2009). Other scholars emphasize that drawing from the established theories might prevent researchers from creative theory building, which can enrich the field of CE (Zahra 2005). This discussion indicates that the field of CE still has many opportunities to build a stronger theoretical and empirical foundation.

Our analyses have shown that external corporate entrepreneurship is largely unrelated to the other CE sub-clusters. We propose further research related to the largely overseen intersection and its embedded dynamics between internal and external CE. Firms might have a portfolio of corporate venture project that they pursue internal or external organizational forms for which they might choose specific spatial solutions that can be located at the firm premises or outside in incubator settings. Future research might analyze the portfolio configuration associated with the more internal or external governance of venture units and or the spatial setting.

The portfolio exploration might tie in characteristics that have been considered in the resource-based view, such as degree of relatedness of resources of the parent firm and the venture. Internal and external corporate venturing might be largely a question of autonomy of the new venture by resource endowments, operations, and strategic decisions. The considering of autonomy and of the venture stage might bridge internal and external corporate venturing and better explain the evolution of corporate entrepreneurship, which is poorly understood so far (Covin et al. 2015). Research on these criteria and the portfolio might inform research on corporate parenting styles simultaneously (Goold et al. 1998; Nilsson 2000).

Additionally, future research in this direction bring in more spatial and regional aspects which are particularly important when the knowledge needed for the venture evolution is sticky or embedded in a local space (Mudambi et al. 2018). The consideration of local contexts also ties in with novel developments with respect to the use of makerspaces and coworking-spaces by incumbent firms (Halbinger 2018; Waters-Lynch and Duff 2019). For improving the innovation potential, incumbent firms tend to use makerspaces and coworking-spaces of external providers or to establish internal coworking-spaces in which they allocate entrepreneurial or innovative projects (Spreitzer et al. 2015; Bouncken et al. 2020). Research in this area, ties in with previous CE research on knowledge, learning, dynamic capabilities, and also on empowerment and new organizational forms for CE (see subfield 9). The little knowledge about the evolution and performance of such projects in these dedicated locations and about their interdependencies or autonomy with an incumbent as the parent organization shapes an interesting path for future research.

In extension to the possible dynamics among internal and external corporate venturing and the learning focus of CE research, we advocate for future research on the evolution of venture units. Internal corporate venture units are founded by incumbent firm. While they have some autonomy, managers from the incumbent might still influence ideas and decisions of the venture unit (Gard et al. 2018). The autonomy and the location of the venture (at the firm premises, outside the premises, local embedding, etc.) will influence the venture evolution. Future research could examine the dynamics of internal and external corporate venturing and the conditions of venture evolution itself. These conditions might be affected by the resource connections between the venture unit and the parent and the spatial or local setting of the venture unit. The analysis of the venture evolution and its organizational and local embedding relate to the important notion that internal corporate venture projects are dependent on the corporate parents not only regarding the initial resources and knowledge and support (Govindarajan and Kopalle 2006). Different forms of spatial or local integration might come with different resources, knowledge, and support. For example, coworking-spaces might create a sense of community that brings social-emotional support to the entrepreneurs (Garrett et al. 2017). Considering the spatial setting in maker-spaces or coworking-spaces might also inform a better understanding of learning-by-doing which has been reported as a core driver of change related to internal CE (Block 1982; Garrett and Covin 2015).

Research on the location of CE connects to the question of the unit of the analysis of CE. Previous research mainly focuses on CE within large established corporations (Birkinshaw 1997, 2014; Halme et al. 2012; van Rensburg 2012; Zahra et al. 2013) and primarily on companies operating in the manufacturing

sector (Cucculelli and Bettinelli 2015; Jones 2005; Wadhwa and Kotha 2006). Future research could consider other sectors of the economy, especially the service sector (Rogan and Mors 2017) and put more emphasis on small and medium-sized firms (Kearney and Morris 2015) and on its international stretch. The globalization of the world's economy, the growing recognition of "born global" firms (Zahra et al. 2013) as well as the search of international competitive advantages through entrepreneurial behaviors (Simon 1996) have led to the creation of a new research domain of international entrepreneurship. This research field was initially formed at the intersection of the fields of international business and entrepreneurship (McDougall and Oviatt 2000) and continued to emerge as a separate field, which shifted the scholarly attention away from the topics around international CE (Zahra et al. 2013). Therefore, the amount of scholarly work devoted to the topics of international CE activity remains scarce. We follow Lampe et al. (2019) and Zahra et al. (2013) in the proposition that future research could explore the influence of institutional characteristics of different international settings on the form and success of CE or could focus on examination of the role that national cultures play in the CE activity. Furthermore, it would be also interesting to understand the differences of how various types of firms (e.g. family-owned firms) approach international CE.

Conclusion

Our bibliometric analysis assessed performance indicators and revealed research themes within the CE field. In essence, our contribution lies in providing insights about the ongoing discussions in the field as well as about shifts in research foci, whilst enabling other researchers to contribute to the field in a more effective manner. Although much work has already been accomplished in this field, scholars still have opportunities to build a stronger theoretical and empirical foundations within each of the subfields and to conduct exploratory research to further advance the field and extend its theoretical grounding. We suggest future research on the dynamics of CE on the evolution of venture units (perhaps morphing from internal to external ones), its factors and its location. We assume that autonomy and the support (knowledge, social networks) shapes strong influences as does the location of the venture unit e.g. within a coworking-space, so addressing of international entrepreneurship.

Despite these contributions, this study faces several limitations. First, as bibliometric analyses are based on citation data, they favor older over newer publications, which did not have sufficient time to accumulate citations (Zupic and Čater 2015). As a consequence, bibliometric analyses cannot assess the relevance and impact of newer publications adequately. Second, the assumption that citations objectively reflect ascribed relevance is questionable. For example, the so-called Matthew effect describes that highly cited articles are partly cited due to their previous high citations in the past (García-Lillo et al. 2017). Self-legitimization strategies, micropolitics, or citation cartels (Vogel and Güttel 2013) as well as the prestige of the journal where a paper was published (Hota et al. 2019) could direct citing behavior. Such biased citations would ascribe relevance to papers, which might only contribute to a limited extent. Third, while the clusters, which resulted from the factor analysis and the MDS, are objective, the

assignment of research themes is rather subjective. This becomes particularly obvious for the clusters 1 and 2, which consist of several sub-clusters, which cannot be explained by statistical means, but are based on a content analysis, which searches for a common thread in the sub-samples. However, also the remaining, more consistent clusters are somewhat blurry as they contain publications with divergent themes. Therefore, both labeling clusters and forming sub-clusters are interpretive tasks. Due to this partial subjectivity, other researchers might have assigned different research themes to the (sub-)clusters (Tiberius et al. 2020b). Fourth, the application of several thresholds, reduces the dataset, excluding a large part of extant research. Although we followed the established guidelines to identify the threshold values and applied different thresholds to test the robustness of the results, the limited dataset does not represent the whole body of research. Fifth, the distinctiveness of the factors obtained in the factor analysis may be overstated due to the fact that only highest factor loadings were considered when assigning documents to the factors. We tried to minimize this bias by examining cross-factor loadings of some documents and identifying them as bridges between different streams of research. Sixth, although we did not limit our scope to the records obtained only from the Web of Science and did not focus exclusively on journal articles, our data collection was still limited to the sources written in English language. In addition, we have examined only journal articles published in the journals of the first and second SJR quartile. This decision was justified by the purpose of focusing on the most influential works and journals in the field. Further studies may extend the dataset by including the journals of lower quartiles or sources in other languages than English in the sample.

Funding Open Access funding enabled and organized by Projekt DEAL.

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