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Entrepreneurship: Exploring the knowledge base

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ABSTRACT

Entrepreneurship research has a long tradition and since the 1980s the field has grown significantly. In this study we identify the 'knowledge producers' who have shaped the field over time and their core entrepreneurship research works. A unique database consisting of all references in twelve entrepreneurship 'handbooks' (or state-of-the-art books) has been developed. The chapters in these handbooks were written by experts within the field, and it can be assumed that the most frequently cited references represent 'core knowledge' with relevance to entrepreneurship research.

From our analysis, it appears that entrepreneurship is a rather changeable field of research, closely linked to disciplines such as 'management studies' and 'economics'. Over time, the field has become more formalized with its own core knowledge, research specialities and an increasing number of 'insider works'. However, it is still based on some fairly old theoretical frameworks imported from mainstream disciplines, although during the last decade we have seen the emergence of a number of new field-specific concepts and theories. We argue that to successfully develop entrepreneurship research in the future, we need to relate new research opportunities to earlier knowledge within the field, which calls for a stronger 'knowledge-based' focus. We would also like to see greater integration between the fields of entrepreneurship and innovation studies in the future.

1. Introduction

Entrepreneurship is an emerging research field that has received much attention over the last few decades. However, there is a lack of consensus on precisely what constitutes entrepreneurship and in many cases it has either been related to the 'entrepreneurial individual' or framed as the creation and running of one's own firm (Davidsson, 2005). In an attempt to refine these simple definitions of entrepreneurship, Shane and Venkataraman (2000, p. 218) offered a more comprehensive one: 'The field of entrepreneurship [is] the scholarly examination of how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated and exploited'. Thus, they argue that entrepreneurship involves *sources* of as well as the *processes* of discovery, evaluation and exploitation of opportunities, but also the set of *individuals* who discover, evaluate and exploit these opportunities (Hitt et al., 2011).

The evolution of research fields – their rise, institutionalization and possible demise – forms a central part of social science studies. An example is Fleck (1979), who talked about 'styles of thought' in the institutionalization of research fields, and this is also a theme discussed in Kuhn's famous paradigm theory (1970). Both Fleck and Kuhn stressed the collective nature of knowledge production and adhered to a structural understanding of scientific development, but paid very little attention to the contributions of individual scholars. In the present article we will contribute to this discussion by arguing that the emergence of a research field can be regarded as an entrepreneurial achievement in itself. Some individual scholars identify changes in society, recognise opportunities in the form of interesting research questions and exploit certain ideas by making the new phenomena visible. They thereby attract other researchers and gradually establish the field by creating an institutional framework including conferences, scientific journals, and chairs. Thus, the emergence of entrepreneurship research is characterized by many entrepreneurial initiatives pursued by scholars who created new research opportunities and launched novel concepts and theories that help us understand entrepreneurship as a phenomenon. It also involves scholars who have been instrumental in building an infrastructure within the field (e.g. created new journals, professional organizations and conferences) as well as contributing to entrepreneurial achievements at a 'micro-level' in which

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individual entrepreneurship scholars at universities around the world struggle against a rather un-appreciative and discipline-oriented academic organization in order to establish entrepreneurship as a field of research and education within the university.

In line with this reasoning, the evolution of entrepreneurship as a research field will be elaborated on. We will use bibliometric analysis and focus on those researchers who have contributed to the wide-ranging knowledge of entrepreneurship as a phenomenon and to a lesser extent those who have been instrumental in building institutional frameworks within the field (e.g. conferences, scientific journals and education programmes). Thus, we will focus on the *knowledge producers*, i.e. the core entrepreneurship research scholars who have been instrumental in the cognitive evolution of the field and their works that shaped it over time. In the study we will answer research questions related to the knowledge production of core works in entrepreneurship research, such as: 'Who are the leading knowledge producers within the field?' and 'What core works can be identified in entrepreneurship research?' In addition, we will also focus on the *knowledge users* of entrepreneurship research, i.e. those who have used the core works of the knowledge producers in order to contribute to and further develop our knowledge of entrepreneurship as well as other fields of research. Accordingly, we will pose the question: 'Who uses the entrepreneurship core works?' and relate our analysis to the geographic location of these knowledge users, where they publish their results and the subject areas in which they publish.

The field of entrepreneurship research is now approximately 30–40 years old and has become a significant field of intellectual activity involving thousands of scholars. Therefore, it is timely to look back and more systematically analyse what has been achieved and, not least, attempt to identify the main intellectual contributions made by researchers within the field. We believe that it is beneficial to periodically reflect on the knowledge acquired in order to establish a basis for the future development of entrepreneurship as a research field. In the study we have done this by using a unique database consisting of all references included in twelve 'handbooks' or state-of-the-art books published within the field of entrepreneurship since the 1980s, the chapters of which were written by experts and prominent scholars. It can be assumed that the most frequently cited references in these surveys represent the 'core literature' of entrepreneurship research. Thus, the method used involves a focus on the leading scholars who produced the core works within the field.

The rest of the paper is structured into five main sections. Firstly, we will present a broad overview of the history of entrepreneurship research (Section 2), followed by a discussion concerning the methodological aspects of this study (Section 3). The fourth section focuses on the knowledge producers and identifies the top-ranked scholars within the field as well as their most influential works. In the fifth section we change perspective and analyse the knowledge users within the field, including a discussion about their geographic location and the thematic focus of their research. The final section (Section 6) offers some concluding reflections.

2. Entrepreneurship as an evolving research field

Historical reviews of entrepreneurship as an evolving field of research, based on the reading and understanding of individual authors, have been carried out by several scholars (e.g. Hébert and Link, 1982, 2009; Swedberg, 2000; Parker, 2005; Landström, 2005; Landström and Benner, 2010). In this section we will elaborate on the early thinking on entrepreneurship as a specialised topic in several mainstream disciplines as well as on the evolving field of entrepreneurship in its own right.

2.1. Entrepreneurship as a topic in mainstream disciplines

The function of entrepreneurship is probably as old as exchange and trade between individuals, but it was not until the emergence of economic markets during the Middle Ages that the concept gained importance and authors started to take an interest in the phenomenon. The first author to endow entrepreneurship with a more precise economic meaning was Richard Cantillon in his *Essai sur la Nature du Commerce en Général* (1755/1999), in which he outlined the principles of the early market economy based on individual property rights and economic interdependency. In the mid-eighteenth century, classic economic theory was developed based on Adam Smith's seminal work *Inquiry into the Nature and Causes of the Wealth of Nations*, first published in 1776. To a large extent this work laid the foundation for the analysis of the way the market economy functions, but it also influenced the view of the entrepreneur in the economy, who more or less disappeared from economic theory for a considerable time.

Although interest in entrepreneurship among economists seemed to lessen, we can identify a few exceptions. In this respect Joseph Schumpeter is probably the best known of the economists with an interest in entrepreneurship in the early part of the 20th century (Schumpeter, 1912, 1934). Schumpeter's idea was to build a new economic theory based on change and newness. His basic realization was that economic growth resulted not from capital accumulation, but from innovations or 'new combinations' that create a disequilibrium on the market. Another view of the entrepreneur in economic theory was to be found in the Austrian School of economic thought, represented by Carl Menger in the 19th century and further developed by Ludwig von Mises and Friedrich von Hayek in the 20th century. Today, the most prominent disciple of the Austrian tradition is probably one of Mises' students, Israel Kirzner (1973), who regards the entrepreneur as a person who is alert to imperfections in the market and is able to coordinate resources in a more effective way thanks to information about the needs and resources of different actors. Finally, we should mention the work by Frank Knight, who in his thesis *Risk, Uncertainty and Profit* (1916, revised 1921) made an important distinction between insurable risk and non-insurable uncertainty, arguing that entrepreneurial returns result from activities that cannot be predicted and that entrepreneurial competence is the individual's ability to deal with uncertainty.

In the mid-twentieth century, economics as a discipline became increasingly formalized and mathematically oriented – an approach that made it difficult to include the entrepreneur in the models of economics. However, in the 1940s, a number of scholars anchored in economic history began to take an interest in entrepreneurship as an empirical phenomenon. The effort was organized at the Research Center in Entrepreneurial History at Harvard University and led by Arthur Cole. The studies typically employed a Schumpeterian approach and focused on the modernization process of societies around the world. Among the most influential are Alexander Gerschenkron's study on the Soviet Union (1947) and David Landes' study on France (1949). However, after a couple of decades this stream of research lost momentum among economic historians, and scholars from psychology and sociology entered the field with an interest in the entrepreneur as an individual and started to study the key traits and the personality of the entrepreneur. The best known study in this respect is David McClelland's work *The Achieving Society* (1961), in which he argued that norms and values in a society, particularly with respect to the 'need for achievement', are of vital importance for economic development. The works by McClelland and others meant that the personal qualities of the entrepreneur occupied a prominent position in entrepreneurship research during the 1960s and 1970s.

One conclusion to be drawn is that entrepreneurship never attracted a large number of researchers nor became institutionalized within mainstream disciplines. This marginalization may partly be explained by a limited interest in entrepreneurship and small businesses in society. Economic development and dynamics were assumed to be based more on mass-production; large companies were seen as superior in terms of efficiency and as the driving force behind technological development. The marginalization may also partly be explained by changes within mainstream disciplines. For example, economics became increasingly formalized and mathematically oriented, while economic history came to focus more strongly on 'business' history rather than the economic evolution of societies.

2.2. The evolving field of entrepreneurship research

However, the 1970s and 1980s were characterized by great economic and other changes in society. It was a period of 'creative destruction' in which new technologies were gaining ground, changes were taking place in the industrial structure, questions were being raised about the efficiency of larger companies, attitudes towards entrepreneurship and small business were evolving and there was increased political debate, supported by politicians such as Ronald Reagan in the USA and Margaret Thatcher in the UK. Against this background entrepreneurship and industrial dynamics became a more prominent theme.

From having been a rather marginal topic that only interested a few researchers in certain mainstream disciplines such as economics, economic history, sociology and psychology, many scholars from different fields, not least management studies, rushed into this promising field of research and started to elaborate on issues related to entrepreneurship and small businesses in a more systematic way. Entrepreneurship research since the 1980s can be described in terms of three phases: (1) take-off; (2) growth; and (3) a search for maturity. The phases include the development of the 'social dimension' of research, expressed in terms of the characteristics of the research community (e.g. organized forums for communication between scholars within the field, role models and positions at universities). The description also includes the 'cognitive dimension', which means the delimitation of the object of study and wide-ranging knowledge about the phenomenon as well as accepted methods and ways of reasoning.

2.2.1. The take-off phase: pioneering studies on entrepreneurship

At first, scholars interested in entrepreneurship picked up where the psychologists had left off – in the search for specific entrepreneurial traits and personalities. However, they were also interested in analysing entrepreneurship from several different angles. Given the newness of the field, it was easy for researchers from different fields to carry out research on entrepreneurship without experiencing obvious competence deficits – entrepreneurship was at that stage a 'low entry field'. It was a period when certain pioneering studies on entrepreneurship emerged that rendered the phenomenon 'visible'. In this respect, the seminal work by David Birch *The Job Generation Process*, published in 1979, should be mentioned. Birch showed that the majority of new jobs in the US were created by new and small firms – not large established firms. The report had an enormous impact on the entrepreneurship research community, but also on policy-makers and politicians, as it provided an intellectual foundation for the incorporation of small businesses into the analyses of economic development.

In terms of the social dimension of the field, the research community can be characterized as rather fragmented and individualistic, i.e. the entrepreneurship researcher was to a considerable extent dependent on individual initiatives and projects. As a consequence, many initiatives were taken to stimulate communication within the rather fragmented and individualistic research community. During this period we can find a great many 'entrepreneurial' contributions from individual scholars to the creation of professional organizations, academic conferences and scientific journals within the field. For example, scholars, such as Karl Vesper at Babson College, were instrumental in forming an interest group on entrepreneurship within the Academy of Management, while on the European scene Josef Mugler at the Vienna School of Economics and Business Administration was important for the creation of the European Council for Small Business (ECSB). Karl Vesper, together with John Hornaday, launched the first Babson Research Conference in 1981, while Allan Gibb and Terry Webb organized the first Small Firms Policy and Research Conference in the UK. During the 1980s there was also an increase in the number of scientific journals within the field, for example, *Journal of Business Venturing* (with Ian MacMillan as founding editor), *Entrepreneurship and Regional Development* (with Gerald Sweeney as founding editor) and *Small Business Economics* (with Zoltan Acs and David Audretsch as founding editors).

2.2.2. The growth phase: building an infrastructure and fragmentation of the research

Since the early 1990s there has been an enormous growth in entrepreneurship research, which is obvious irrespective of the measurements employed. The social dimension of entrepreneurship as a research field was to a very large extent characterized by the building of a strong infrastructure in terms of a greater number of scientific journals and conferences, role models (e.g. chairs in entrepreneurship) and an increase in educational programmes and courses. For example, at the start of the new millennium, the infrastructure in the US included more than 2200 courses in entrepreneurship at over 1600 schools, 277 endowed positions, 44 English-language refereed journals and over 100 research centres (Katz, 2003). In this respect, a large number of scholars became instrumental in building an infrastructure at individual universities as directors of research centres and creators of education programmes in entrepreneurship as well as 'infrastructure builders' at international level, such as editors of international scientific journals and chairmen of professional organizations (Finkle and Deeds, 2001; Katz, 2003; Landström, 2005). According to Merton (1973), a strong infrastructure is important, not least as it creates 'academic autonomy'. That is, emerging fields need to legitimate themselves in the eyes of scholars from other fields, and different kinds of institution are essential for this purpose.

In the 1990s there was not only large scale migration into the field, but the mobility of scholars in and out of the field was also quite extensive. As a consequence, the cognitive development of the field became highly fragmented, mainly consisting of atheoretical, empirical explorations of the phenomenon. Thus, Shane and Venkataraman (2000) argued that entrepreneurship research 'has become a broad label under which a "hodgepodge" of research is housed' (p. 217), Low (2001) spoke about a 'potpourri' of entrepreneurship research (pp. 20–21) while Zahra (2005) described the field as only loosely connected and with 'a mosaic of issues to be explored' (p. 254).

2.2.3. Searching for the maturity phase: domain discussion and increased understanding of the phenomenon

During the last decade, after almost 30 years of systematic study of entrepreneurship, the field has been searching for maturity, both in a social and a cognitive sense. As indicated above, entrepreneurship has grown significantly as a research field and become a popular theme of interest among scholars from many different disciplines. As a consequence, over the last decade entrepreneurship as a research field has become more heterogeneous in character. To some extent different subgroups of scholars (or 'tribes') have

emerged, and these 'tribes' are moving in somewhat different directions, thus creating a certain tension within the field. First, the seminal article by Shane and Venkataraman (2000) 'The promise of entrepreneurship as a field of research' triggered intense debate regarding how to define the domain of entrepreneurship research. In this debate we can find different arguments, from proponents who argue for the development of entrepreneurship research into a distinct domain of its own (the domain approach) to those who advocate the integration of entrepreneurship with other fields, for example, strategic management (the integrative approach), and scholars who argue that it is not possible to obtain a comprehensive entrepreneurship theory and that therefore scholars should actively divide themselves into more homogeneous communities studying specific topic areas, such as nascent entrepreneurship, venture capital, and growth (the multi-research approach). Second, during the past decade, groups of scholars have broadened entrepreneurship as a phenomenon – from creating economic value to a broader range of value creation including social values (e.g. social entrepreneurship and entrepreneurship in the public sector). Finally, there are some scholars who argue for 'recreating' entrepreneurship as a research field (Hjorth et al., 2008) and who stress, from a philosophical standpoint, the importance of addressing the social and cultural context in which entrepreneurship operates in addition to developing a closer relationship to 'the real world' with a stronger basis in the social and human sciences.

In the past decade we have also seen an increased theoretical focus within entrepreneurship research (Lohrke and Landström, 2010). In this respect entrepreneurship scholars have borrowed concepts and theories from mainstream disciplines, such as economics, psychology and sociology, and adapted them to the study of entrepreneurship. Importing theories from other fields of research is often a necessary first step towards creating a field that subsequently develops unique concepts and theories of its own, and in this respect, during the past decade we have seen entrepreneurship scholars launching and exploiting new concepts and theories in order to understand entrepreneurship, for example, Sarasvathy's 'effectuation' reasoning (2001) and Aldrich's evolutionary perspective (1999).

In conclusion, in this section we have shown that entrepreneurship research has a long tradition, beginning with individual contributions within mainstream disciplines such as economics, economic history, psychology and sociology. Since the 1980s entrepreneurship has grown significantly as a research field. As this paper focuses on 'the entrepreneurs' in entrepreneurship research, the above analysis indicates that we can find many different kinds of 'entrepreneur' who have been instrumental in the evolution of entrepreneurship as a research field: from the many pioneers who made the phenomenon visible in the 1980s, to scholars in the 1990s who played an important role in building an infrastructure within the field and more recently scholars who introduced new theoretical concepts and frameworks that help us to understand entrepreneurship.

3. Methodological approach – bibliometric analysis

As a complement to earlier historical reviews, in this study we have used bibliometric analysis to describe and understand the evolution of entrepreneurship as a field of research. In bibliometrics, various forms of citation analysis are based on the assumption that if a researcher cites a work, he/she has found it useful in some way, and therefore the more frequently a work is cited, the greater its role in the scholarly community (Garfield, 1972). This leads to the reinforcement and institutionalization of certain opinions and, as a consequence, individual researchers end up playing a substantial role in the development of a research field (Crane, 1972). However, bibliometric analysis is not without limitations. For example, we have to bear in mind that it is based on the assumption that research is essentially cumulative – new research is built on and cites earlier high quality foundations – i.e. a 'normal science approach' (Kuhn, 1970). However, we know that this is not the only way to communicate and organize research, particularly in new and evolving fields that are organized and communicated through 'negotiations' between researchers and policy actors (Knorr Cetina, 1999; Åström and Sándor, 2009). In addition, there are concerns about the databases typically used for bibliometric analysis (Watkins, 2005) such as the Social Science Citation Index (SSCI) using the Web of Science. Although the SSCI is a wonderful resource for citation analysis, it has some limitations. The literature indexed in the databases consists primarily of scholarly journals with less of a focus on conference proceedings. It is only now that Web of Science has started to index scholarly books. Other types of publications such as books are primarily found in databases of 'non-source items', i.e. items in the reference lists of indexed journal articles not covered by the Web of Science databases. Furthermore, the coverage of journals varies greatly due to three factors: (1) the research field, where the social sciences are significantly less well-covered than medicine and the natural sciences; (2) the language and origin of the publications, where English and US-based journals dominate the databases; and (3) the age of the journal, as a period of time usually elapses between the launch of a journal and the point where Web of Science starts indexing it. Thus, citation databases such as Web of Science have limitations when analysing entrepreneurship research, as it is a relatively new and evolving field of research as well as being positioned within the social sciences.

3.1. Methodological approach in the study

We have used several different methodological approaches. The starting point of the analysis is the 'handbooks' or state-of-the-art books published on entrepreneurship research and the core works cited in these were ranked using an index. We identified 135 core works, which constituted the basis of our analysis of citation patterns and employed the SSCI of the Web of Science in order to gain an understanding of how these entrepreneurship works are disseminated and used.

3.1.1. Knowledge producers – methodology

In an attempt to eliminate some of the major disadvantages of using generally available databases in bibliometric analysis, we exploited the fact that a number of authoritative contributions aimed at surveying the evolution of entrepreneurship research already exist. Since the 1980s, several 'handbooks' or state-of-the-art books have been published, containing commissioned surveys of the field or various topics of relevance to entrepreneurship. The chapters in these handbooks are generally written by experts and prominent scholars within the field, and it seems reasonable to assume that these authors will include references to the most important and relevant scholarly works. In this respect some works are referred to many times due to the fact that they are considered particularly important and could therefore be regarded as constituting the 'core knowledge' of the field. Thus, we assume that the subset of references referred to many times in the 'handbooks' constitutes the 'core works' of the field.

In order to identify these highly regarded works, we selected twelve handbooks with a total of 185 chapters on various aspects of entrepreneurship (Table 1). The twelve handbooks were chosen because they are generally highly regarded and together provide a reasonably balanced representation of the field. Since the early 1980s, Donald Sexton and colleagues (Kent et al., 1982; Sexton and Smilor, 1986, 1997; Sexton and Kasarda, 1992; Sexton and Landström, 2000) have published a state-of-the-art series on

Table 1
List of 'Handbooks'.

Editors	Title	Year	Publisher	Chapters[a]	References
Kent, C.A., Sexton, D.L. and Vesper, K.H.	Encyclopedia of Entrepreneurship	1982	Prentice-Hall	18	630
Sexton, D.L. and Smilor, R.W.	The Art and Science of Entrepreneurship	1986	Ballinger	11	381
Sexton, D.L. and Kasarda, J.D.	The State of the Art of Entrepreneurship	1992	PWS-KENT	22	1547
Katz, J.A. and Brockhaus, R.H.	Advances in Entrepreneurship, Firm Emergence, and Growth, vol. 1	1993	JAI Press	5	335
Katz, J.A. and Brockhaus, R.H.	Advances in Entrepreneurship, Firm Emergence, and Growth, vol. 2	1995	JAI Press	8	657
Katz, J.A. and Brockhaus, R.H.	Advances in Entrepreneurship, Firm Emergence, and Growth, vol. 3	1997	JAI Press	7	852
Sexton, D.L. and Smilor, R.W.	Entrepreneurship 2000	1997	Upstart	18	907
Sexton, D.L. and Landström, H.	The Blackwell Handbook of Entrepreneurship	2000	Blackwell	22	1427
Acs, Z.J. and Audretsch, D.B.	Handbook of Entrepreneurship Research	2003	Kluwer	19	1687
Alvarez, S.A., Agarwal, R. and Sorenson, O.	Handbook of Entrepreneurship Research: Disciplinary Perspectives	2005	Springer	11	652
Casson, M., Yeung, B., Basu, A. and Wadeson, N.	Oxford Handbook of Entrepreneurship	2006	Oxford	27	2079
Parker, S.	The Life Cycle of Entrepreneurial Ventures	2006	Springer	17	1627
Total				185	12,781

[a] Total number of chapters that have references. This has also been the basis for calculating *E* in the *J*-index.

entrepreneurship research approximately every fifth year, in which core researchers describe the current knowledge within the field. This book series provided the basis for the selection of five books included in our analysis. Likewise, Katz and Brockhaus (1993, 1995, 1997) undertook a similar task and have continued publishing volumes in the series, although these have become more focused on particular topics and methodologies, while Parker (2006) represents a new handbook with a broad overview of the field. In addition, we have included Acs and Audretsch's (2003) handbook, which represents a more explicit interdisciplinary profile. The same holds for Alvarez et al. (2005), who also have a stronger focus on economics and small business economics, whereas Casson et al. (2006) represent more of an economics and economic history approach.

We collected all the references cited in the handbook chapters in a database, a total of 12,781 references. The titles were checked individually and variations amended in terms of reference style and different editions, replacing a working paper with the later journal version, book chapter, etc. However, each title was only counted once within a chapter and repeated titles within a single chapter were removed (69 cases). The final database consisted of 12,712 references, of which 5228 (41%) had at least two citations. However, half of these works (2722) had been cited less than three times, indicating a relatively low degree of influence.

In order to ensure a fair comparison of the number of references and taking into account when the work was published, we calculated and used an age-adjusted *J*-index (see Fagerberg et al., 2012 for a more detailed discussion). We selected the top one per cent of works on the *J*-index, equivalent to a value of 4.0. In this way we identified 135 works that could be regarded as the core literature within entrepreneurship research. The list of the 135 core works is presented in Appendix 1.

In addition to the different rankings based on analyses of the references from the handbook chapters, we also explored the relation between the authors of the literature in the reference lists. Author co-citation analysis is a well established method for investigating the intellectual structure of the knowledge base in terms of research orientations within a larger field (White and Griffith, 1981). By defining how often works by different authors co-occur in the reference lists, we can map the intellectual structure of the field using co-occurrence frequencies as a measure of distance between authors, i.e. the more often two authors are cited together in the handbook chapters, the closer we can assume that they are related. This is done by using Bibexcel software (Persson et al., 2009), where co-citation frequencies and the strongest links within the set of authors selected for analysis are identified. In addition to the co-citation analysis based on relations between co-cited authors, we also used a clustering routine suggested by Persson (1994), where we scrutinised all pairs of co-cited authors, ranked by co-citation frequencies, looking for pairs that share one unit. For instance, if we have two pairs of co-cited authors, 'A and B' and 'B and C', these three authors form a cluster, whereas the pairs 'A and B' and 'C and D' do not. Thus, the clustering routine demands a higher level of connectivity and a multi-link connection between authors, rather than the single link co-cited pair connection. This information was exported to Pajek visualization software (De Noov et al., 2005), where the Kamada and Kawai (1989) algorithm was used to produce a graphic representation of the intellectual structure of how the core knowledge in the field was used by the authors of the handbook chapters.

3.1.2. Knowledge users – methodology

The list of 135 core entrepreneurship works was the starting point for our analysis of knowledge users. In order to identify the knowledge users of the core literature, a search was conducted in Web of Science, using the 'Cited Reference Search' option. Based on a combination of title and authors, the citations of the top 135 core works up to 2008 were retrieved and saved in text format. In total, 54,469 documents citing the core works were found in the Web of Science databases. To obtain knowledge of where the core works are used, we analysed the following information, using Bibexcel software (Persson et al., 2009):

- The 'address field' of the articles was used to analyse the geographic location of the knowledge users.
- The name of the journals publishing the articles citing the core works was analysed to investigate where the knowledge users published their research.
- The Web of Science 'subject area' field was analysed, i.e. the categories developed by Web of Science to classify journals indexed by content, in order to investigate in what research fields the core literature was used.

All three aspects were analysed by means of frequency rankings, and the subject areas by also carrying out a co-occurrence analysis, conducted and visualized on the same principles as the co-citation analysis described above.

3.2. Methodological reflections

All studies have strengths and weaknesses. In this respect we will elaborate on a couple of concerns that need to be raised in order to evaluate the contribution of the present study.

It is important to bear in mind that history can be depicted from many different perspectives and that various aspects of history can be focused upon. For example, on the one hand, we can emphasize the cognitive dimensions of the evolution of entrepreneurship research, or instead look more closely at the social dimensions of the field. On the other, we can highlight the individual achievements that have been influential over time or focus more strongly on collective action taken by different groups of scholars within the field (see Aldrich, 2012). In the present study, using a bibliometric analysis, we have chosen to focus on the individual scholars who have made significant cognitive contributions to the evolution of the field.

The selection of 'handbooks' is critical for our results and conclusions. In order to identify other handbooks, a search was carried out on Google, Worldcat and in the Library of Congress Catalogue. However, we could find no other handbooks that took a general view of entrepreneurship, indicating that the twelve handbooks selected for our analysis represent a reasonable choice. However, it must be emphasized that we have only chosen general handbooks and not those that cover specific topics within the field, such as *The Handbook of Qualitative Research Methods in Entrepreneurship*, *Handbook of Research on Ethnic Minority Entrepreneurship*, *Handbook of Venture Capital* and *Handbook of Bio-Entrepreneurship*. The same holds for volume 4 and onwards of the titles published by JAI Press in the series *Advances in Entrepreneurship*, *Firm Emergence and Growth*. As a consequence of the use of this broad selection of general handbooks, we can expect to find a wide selection of scholars with different disciplinary backgrounds, writing in a range of journals and 'subject areas' compared to bibliometric studies using more narrow approaches, for example, using specific management and entrepreneurship journals as the basis for their analysis (e.g. Shane, 1997; Crump et al., 2009). In addition, we have conducted a robustness test, comparing the citation structures in the handbooks with those in entrepreneurship journal articles indexed in the Web of Science databases. These analyses revealed substantial similarities in terms of citation structure when comparing the two forms of entrepreneurship research publications: the age of the references showed only minor variations between the two publication forms, while an author co-citation analysis of the top 120 most cited authors linked the same authors in both datasets to a substantial degree. When analysing the overlap of cited authors on a more comprehensive level, at least 50% of the cited authors were the same, while variations were primarily found among authors with few citations (Åström, 2011).

We checked the importance of the authors of the handbook chapters in order to satisfy ourselves that they can be regarded as experts and prominent scholars within the field. To do this, we analysed whether they were members of the editorial boards of the leading entrepreneurship journals (such as *Journal of Business Venturing*, *Small Business Economics*, *Entrepreneurship Theory and Practice*, *Journal of Small Business Management*, *Entrepreneurship and Regional Development* and *Strategic Management Journal*). The share of editorial board members among the authors of the chapters in the handbooks was generally high, in the range of 68–80%. We found a lower proportion of authors on editorial boards in the early handbooks edited by Sexton, Kent et al. (1982) (28%), Sexton and Kasarda (1992) (49%) and Sexton and Smilor (1997) (44%) as well as the handbooks edited by Casson et al. (33%) and Parker (32%). However, as the latter two have a more multidisciplinary focus, it seems reasonable that many of the authors were not members of the editorial boards of entrepreneurship journals.

Finally, we must be aware of the characteristics of handbook references. Authors of the chapters are often asked to be inclusive in their research reviews and therefore include their own works that might be of less importance. In addition, works that synthesize and are important for the evolution of the field (e.g. works that define central concepts) tend to be over-represented in such state-of-the-art reviews and also have a self-citation tendency, i.e. authors of handbook chapters tend to cite chapters in previous handbooks.

4. Knowledge producers in entrepreneurship research

In this section we will elaborate on the knowledge producers and core works of entrepreneurship research. In order to answer the first research question: 'Who are the leading knowledge producers within the field?', in the first two subsections we will focus on the *authors* of the core works in entrepreneurship. Initially, we conducted an analysis of all 12,712 references in the entrepreneurship research handbooks. From the analysis we identified the 20 top-ranked scholars within the field, who will be presented in the second subsection. We then turned to the second research question focusing on the *core works* of these influential scholars in entrepreneurship research, and in the third subsection the analysis focused on the 135 works that constitute the top one per cent of references in the handbooks. Finally, in a separate subsection, the 20 top-ranked works are described in detail.

4.1. References in entrepreneurship research handbooks

Of the twelve handbooks, two were published during the 1980s, five in the 1990s and five in the early 2000s. In order to identify the most influential scholars during each decade, we focused on an 'author co-citation analysis' that helped us to identify clusters of core scholars over time. The analysis revealed some interesting knowledge development paths within entrepreneurship research, and in this section we will elaborate on these changes over time.

Two clusters of scholars were identified in the 1980s (Fig. 1a).

- Cluster 1 (yellow circles): pioneers in entrepreneurship research during the 1980s. During this decade a large number of entrepreneurship research pioneers emerged, forming a rather eclectic cluster that includes scholars such as Cooper, Vesper, Roberts, Shapero, Brockhaus, Bruno, Hornaday, Birch and Timmons – almost all of US origin, indicating the strong US tradition in entrepreneurship research.
- Cluster 2 (green circles): classical scholars rooted in economics and psychology. It is obvious that at this stage entrepreneurship research was strongly anchored in economics and psychology. This cluster includes scholars from different disciplines who made early contributions to our knowledge of entrepreneurship, e.g. Schumpeter, Leibenstein, Kilby, Knight, Kirzner, Redlich, Baumol and Cole from economics, and McClelland, Winter and Aboud from psychology.

In the 1990s the focus of entrepreneurship research changed, and the number of clusters increased, indicating greater heterogeneity (Fig. 1b). In addition, the clusters illustrate the transformation of entrepreneurship research that occurred during the 1990s, from a trait-based to a more behavioural approach.

- Cluster 1 (yellow circles): scholars with an individual focus but also an emerging interest in the entrepreneurial process. In this cluster we can detect the transformation from an individual focus (represented by the strong nodes of Carsrud, Brockhaus and Sexton) to a 'entrepreneurial behaviour' focus (represented by the nodes of Vesper, Stevenson, Timmons and Bygrave).

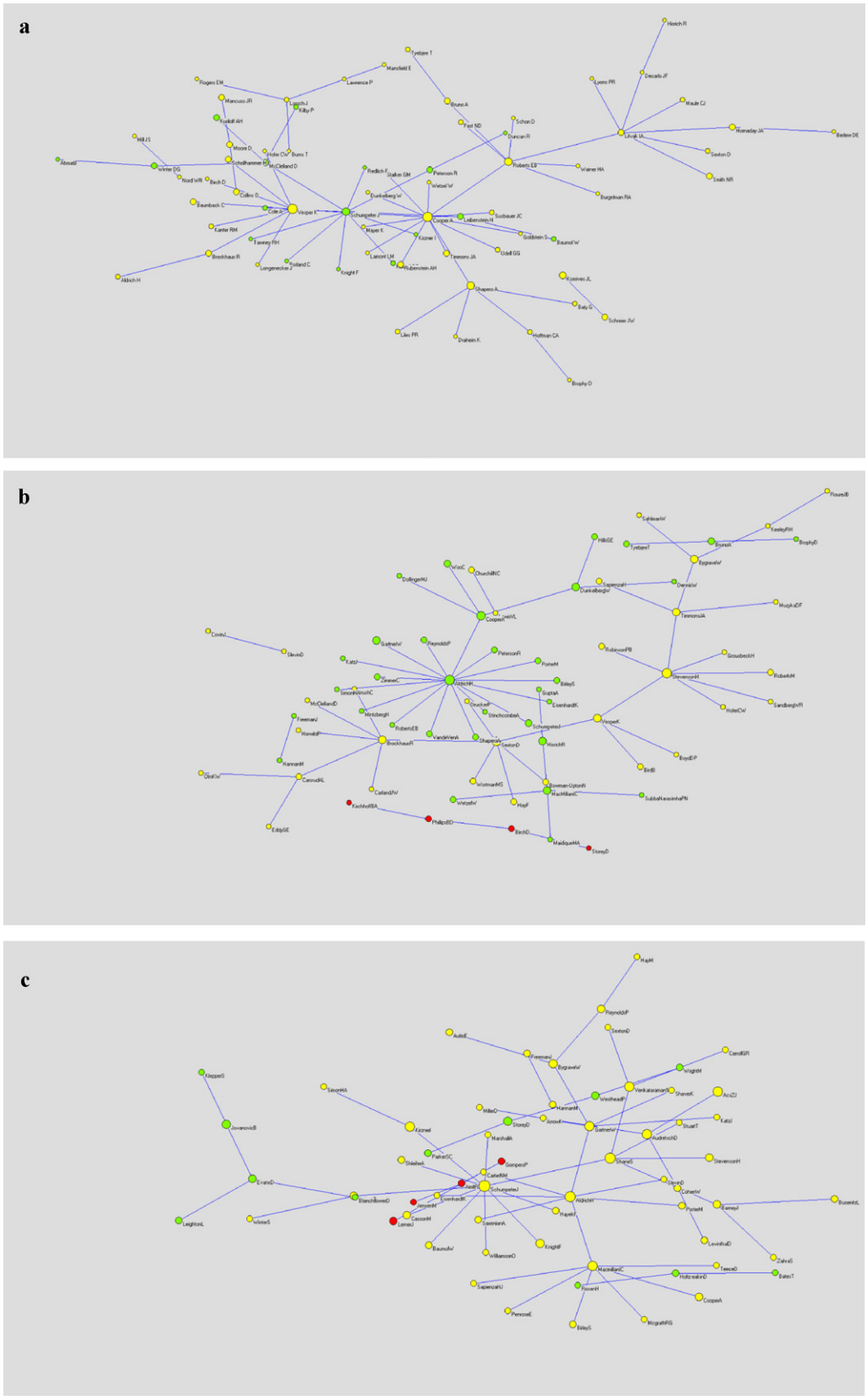

Fig. 1. (a) Clusters of scholars during the 1980s. (b) Clusters of scholars during the 1990s. (c) Clusters of scholars during the 2000s. (For interpretation of the references to color in the text, the reader is referred to the web version of this article.)

- Cluster 2 (green circles): scholars with a strong anchor in mainstream disciplines, such as sociology, in which Aldrich represents a very strong node in entrepreneurship, as well as strategic management, in which Cooper and the group around him became important. It is interesting to find a strong group of scholars researching the importance of venture capital in entrepreneurial ventures (represented by MacMillan).
- Cluster 3 (red circles): scholars with a focus on 'small business economics'. A small cluster comprising empirical studies on the importance and dynamics of new and small ventures, represented by Birch, Phillips and Kirchhoff, and Storey.

The 2000s witnessed more changes in the characteristics of entrepreneurship research and the authors of core contributions now seem to form one large and two smaller clusters (Fig. 1c).

- Cluster 1 (yellow circles): entrepreneurship scholars anchored in management studies. This is a very large and rather eclectic cluster with many 'key nodes'. It includes scholars who are regarded as core authors within the field, for example, Aldrich, Shane, Venkataraman, Gartner, Acs and Audretsch. In particular, it is interesting to note the increased theoretical emphasis in entrepreneurship research, for example, in this cluster we find theoretical contributions from Barney, Cohen and Levinthal, Nelson and Winter, Hannan and Freeman, Williamson, Porter and Penrose.
- Cluster 2 (green circles): entrepreneurship scholars anchored in economics. The increased interest in entrepreneurship during the 2000s among scholars rooted in economics is reflected by a fairly small cluster including Storey, Evans, Holtz-Eakin, Leighton, Parker, Blanchflower and Wright.
- Cluster 3 (red circles): scholars in the area of venture capital and financial economics emerged more strongly from cluster 2 in the 1990s and formed a separate cluster. This small cluster is made up of financial economics scholars with an interest in venture capital, such as Amit, Gompers, Lerner and Jensen.

In conclusion, as can be seen from Fig. 1a–c, entrepreneurship seems to be a rather changeable field of research, as few scholars appear to maintain their influence over a longer period of time. Apart from Schumpeter, only Arnold Cooper, Howard Aldrich and Donald Sexton (perhaps due to his editorship of several handbooks) are included in the clusters in all three decades. It is also interesting to note that over time, the structure of the maps presents networks that move increasingly closer to each other. This could be an effect of the greater use of a knowledge-base situated within the field itself rather than classics from other fields. For example, from the 1990s, the structure of these maps represents specialization within the field itself rather than classics from other fields or early pioneers of entrepreneurship research. This could be interpreted to mean that entrepreneurship is becoming more formalized as a field, with its own research specialities and the establishment of 'in-field' core knowledge, indicating an increased convergence also shown by Cornelius et al. (2006) and Grégoire et al. (2006).

4.2. Top-ranked scholars in entrepreneurship research

To be able to further elaborate on the first research question: 'Who are the leading knowledge producers in entrepreneurship research?', Table 2 ranks the top 20 scholars on the basis of their total contribution to the list of the 135 works in our database, i.e. their contribution to the field based on the overall *J*-index of their various titles within the core literature. The ranking includes both the main author and co-authors, and we used a ratio of co-authorship that takes into account the number of co-authors included in each work, i.e. in works that include two authors, each author received a 50% share of the *J*-index and SSCI citations.

The most influential scholars within a field typically publish several important contributions. Table 2 reveals that several top-ranked authors have made a number of contributions to the core works in entrepreneurship. For example, authors like Howard Aldrich and William Gartner have as many as 6 and 5 contributions respectively in the list of 135 core works, whereas six authors received their rankings based on a single work (Knight, Bhidé, McClelland, Storey, Casson and Saxenian).

Among the top-ranked scholars in entrepreneurship, some are extremely important and frequently cited in mainstream disciplines in general, not just in entrepreneurship. If we use the list of the 135 core works identified in Appendix 1 and calculate the ratio of each top-ranked scholar's total citations in SSCI in relation to the *J*-index[1] (see Table 2), it is obvious that the top-ranked scholars can be divided into two groups; the first is 'mainstream discipline researchers' with a high ratio, indicating that their impact (reflected by the total SSCI citations) is high in comparison to their internal influence in entrepreneurship (reflected by the *J*-index). This group includes top-ranked scholars such as Schumpeter (with a ratio of 83.08), Knight (112.56), McClelland (226.58), Barney (125.63), Porter (349.27) and Saxenian (113.92). The other group can be regarded as 'entrepreneurship researchers' and their ratio is, in general, less than 20. The only exception is David Storey with a ratio of 40.76. However, we have decided to regard him as an 'entrepreneurship researcher' as he has, over time, published extensively on entrepreneurship and small businesses and been very influential within the field.

Thus, we can identify fourteen scholars who stand out as being the most influential 'entrepreneurship researchers'. The most highly ranked, with a *J*-index of over 20, are William Gartner, Howard Aldrich, Israel Kirzner, Scott Shane and Sankaran Venkataraman. In general, these scholars have published several core works over a long period and have all shown a long-term interest in entrepreneurship. Researchers with a *J*-index of 15.00–19.99 include William Baumol and David Audretsch, both with a long-standing interest in entrepreneurship. Finally, there is a group of core researchers with a *J*-index of 10.00–14.99, including David Birch, Amar Bhidé, David Blanchflower, David Storey, Mark Casson, Josh Lerner and David Evans – who in many cases have only published one or two very influential works in the field.

In order to gain an understanding of the careers of these fourteen most influential entrepreneurship researchers, we conducted an analysis of their curricula vitae (CVs). One of the great advantages of studying the careers of researchers is the near universal reliance on the CV, as it functions as a personal advertisement, which gives the researchers a strong incentive to provide timely and accurate data (Cañibano and Bozeman, 2009). The data included in the CVs reflect changes in interests, jobs and collaboration, making the CV a rich source of longitudinal data (Dietz et al., 2000; Bozeman et al., 2001). At the same time, analysis of CVs as a data source is not unproblematic. For example, the information is self-reported and thus subjective in nature. In addition, the CV has a semi-structured and non-standardized format and some valuable information may be missing, which makes comparisons and analysis difficult (Dietz et al., 2000). Despite the disadvantages, the potential of the CV as a research tool is enormous, but it has rarely been used as a basis for research. A summary of the CVs of the fourteen 'entrepreneurship researchers' is presented in Appendix 2.

[1] (Σ SSCI Citations/Σ *J*-index)/Number of core works on entrepreneurship by the author.

Table 2
Top 20 scholars.

Rank	Total SSCI	Total *J*-index	Ratio SSCI/*J*-index	Ratio SSCI/*J*-index per core work	Author	Year(s)	Country	Affiliation(s)
1	7813	47.02	166.16	83.08	Joseph Schumpeter	1934, 1942	Austria/USA	Harvard University
2	504	29.52	17.07	3.41	William Gartner	1985, 1988, 1990, 1992, 1995	USA	University of Virginia Georgetown University University of Southern California San Francisco State University
3	1012	29.30	34.54	11.51	Israel Kirzner	1973, 1979, 1997	USA	New York University
4	2080	29.23	71.16	11.86	Howard Aldrich	1979, 1986, 1990, 1993, 1994, 1999	USA	Cornell University, University of North Carolina
5	351	27.71	12.67	6.34	Scott Shane	2000, 2000	USA	MIT University of Maryland
6	348	21.91	15.88	7.94	Sankaran Venkataraman	1997, 2000	USA	Rensselaer Polytechnic Institute University of Virginia
7	352	17.14	20.54	6.85	William Baumol	1968, 1990, 1993	USA	New York University
8	774	16.59	46.65	11.66	David Audretsch	1988, 1990, 1995, 1996	Germany/USA	Wissenschaftszentrum Berlin fur Sozialforschung
9	1765	15.68	112.56	112.56	Frank Knight	1921	USA	University of Chicago
10	572	14.62	39.12	19.56	David Birch	1979, 1987	USA	MIT
11	106	12.16	8.72	8.72	Amarnath Bhidé	2000	USA	Harvard Business School
12	154	11.90	12.94	12.94	David Blanchflower	1998, 2000, 2001	USA	Dartmouth College
13	2694	11.89	226.58	226.58	David McClelland	1961	USA	Harvard University
14	474	11.63	40.76	40.76	David Storey	1994	UK	Warwick Business School
15	184	11.38	16.17	16.17	Mark Casson	1982	UK	University of Reading
16	2789	11.10	251.26	125.63	Jay Barney	1991, 1997	USA	Texas A&M University Ohio State University
17	7663	10.97	698.54	349.27	Michael Porter	1980, 1990	USA	Harvard Business School
18	165	10.94	15.08	7.54	Josh Lerner	1999, 1999	USA	Harvard Business School
19	327	10.90	30.00	10.00	David Evans	1989, 1989, 1990	USA	NERA: National Economic Research Associates, Inc.
20	1236	10.85	113.92	113.92	AnnaLee Saxenian	1994	USA	University of California

In the CVs of top-ranked scholars in entrepreneurship research we looked at their (a) career trajectories, (b) mobility and (c) scientific productivity (Table 3).

Entrepreneurship is generally regarded as a research field closely connected to practice. Therefore, it is somewhat surprising to find that the top-ranked scholars seem to lack extensive industrial experience. Birch and Evans are the exceptions, as both have long experience of working in industry, although their industry careers started after they published their core works in entrepreneurship. Most of the top-ranked scholars have made an impressive and rapid career in the academic system. On average, they obtained their PhD at the age of 29 years (Casson was only 24 years old) and became full professors at the age of 39 (with Baumol being the youngest full professor at 27 years). It is also interesting to find that the top-ranked scholars in entrepreneurship are heavily rooted in a mainstream discipline, primarily economics but also sociology and the broader field of management studies, and few have changed their disciplinary focus over time. The fact that they are strongly rooted in their mainstream discipline is also reflected in their generally high age when they published their first major contribution to entrepreneurship research, i.e. their first work included in our list of 135 core works in entrepreneurship – the average age being 40 years with a range from 32 (Gartner) to 47 years (Storey).

When analysing the mobility of the top-ranked scholars, we find that it is rather low between universities, and only Baumol, Audretsch and Blanchflower have moved from one country to another. On average, after obtaining their PhD degree, the scholars moved from one university to another 3.3 times in their careers. On the other hand, eight out of fourteen reported receiving visiting professorships, the average number being 2.6, including a broad range of universities around the world.

The scientific productivity among the top-ranked scholars in entrepreneurship is extensive. On average, they have published almost 114 scientific works (including books, edited books, book chapters and refereed journal articles, but excluding conference papers and other reports). The high scientific productivity is not due to a large number of co-authorships, as in many cases the scholars are the sole author of the articles, with a single to co-authorship ratio of 0.50, indicating that almost five out of ten articles were written solely by the top-ranked scholars themselves. It is also interesting that books seem to play an important role in their publication strategies. Not only are many of their most highly cited works 'books', but in terms of quantity they have also published a large number – on average 7.8 – with Casson, Kirzner, Audretsch and Shane as the most productive scholars in this respect with more than ten books each.

Table 3
Top-ranked 'entrepreneurship scholars' – CV-analysis.

	Number	Average	Median
Career trajectories			
Age – PhD-degree	14	29.1 years	29.0 years
Age on becoming Assistant Professor	11	29.1 years	29.0 years
Age on becoming Associate Professor	10	34.1 years	34.0 years
Age on becoming Full Professor	13	39.0 years	39.0 years
Age when publishing the first major work in entrepreneurship	14	40.0 years	40.0 years
Mobility			
Number of employment institutions (academic)	14	3.3	3.0
Number of visiting professorships	11	2.6	1.0
Scientific productivity			
Total number of publications (books, edited books, book chapters and refereed journal articles)	13	114.5	101.0
Number of books	13	7.8	8.0
Number of edited books	13	5.2	2.5
Number of book chapters	13	35.4	24.0
Number of single authored refereed journal articles	12	22.7	23.5
Number of multi-authored refereed journal articles	12	45.2	46.5
Co-authorship ratio (single/multi-authored articles)		0.50	0.51

4.3. Core works in entrepreneurship research

In this section we will address our second research question: 'What core works can be identified in entrepreneurship research?' We will base our analysis on the top 135 core works. In this subsection we will describe these works with regard to age distribution, publication format, geographic distribution of the research and 'insider' versus 'outsider' works within the research field.

From the list of 135 core works, it is obvious that entrepreneurship is a fairly young research field. Of the 135 core works, 113 (84%) have been published since 1980 (Table 4). As the number of publications in entrepreneurship has increased enormously over time, it is important to relate the frequency with which the core works are cited by the authors of handbook chapters to that of other cited publications. If related to the number of titles in the sample database cited more than once, it is obvious that the field relies heavily, on the one hand, on some 'classic' works published before the 1980s and, on the other, on recent contributions mainly published in the 2000s. As titles with citations are considered a measure of the importance of the publication, in Table 4, a ratio of the core works in relation to cited titles (i.e. with at least two citations) is presented.

Of the 135 core works, 49 (36%) consist of books and book chapters, 81 works were published in scientific journals and five are reports. A closer look at the journal publications reveals that the *Journal of Business Venturing* (JBV) heads the field (with 15 out of 81 journal articles), followed by a number of rather theoretically oriented journals within management science (*Academy of Management Review* and *Administrative Science Quarterly*), economics (*American Economic Review*) and the social sciences (*Journal of Political Economy* and *American Journal of Sociology*). The results indicate that books play an important role in the social sciences, perhaps because a book-length exposition is needed in order to set out new theoretical contributions in an emerging field.

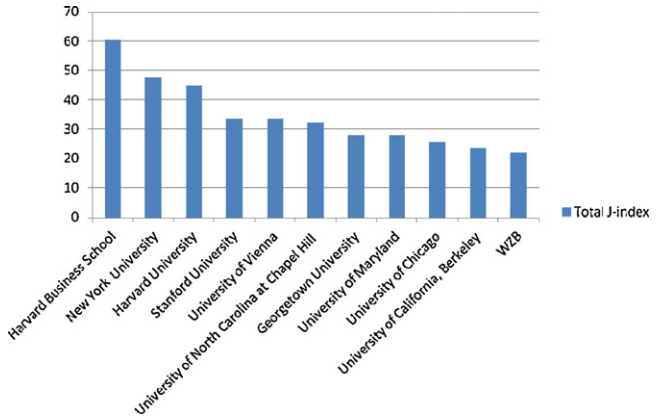

Fig. 2. Top research institutions in entrepreneurship (total *J*-index).

Scholars from the US dominate the field of entrepreneurship research, as revealed by the *J*-index (and adjusting for co-authorships). US scholars constitute 84.6% of the total *J*-index of the 135 core works, their counterparts in Europe 15.2% and Asian scholars a mere 0.2%. The US dominance is also reflected in the top-ranked institutions in the area of entrepreneurship (Fig. 2). The affiliation of all authors of the core works has been investigated. Affiliation corresponds to one year prior to the publication of the work and co-authorship has been taken into account. The calculation in Fig. 2 indicates that there does not seem to be a main centre of entrepreneurship research. One exception is Harvard Business School with a number of scholars contributing to the core works in entrepreneurship (e.g. Bhidé, Stevenson, Gompers, Lerner, Sahlman, Kanter and Porter) and to some extent Stanford University (with scholars such as Hellmann, Eisenhardt, Hannan and Arrow). Apart from that, most top research institutions in entrepreneurship are represented by a single or just a few scholars, for example, Kirzner and Baumol at New York University, Aldrich at the University of North Carolina, Gartner at Georgetown University, Shane at Maryland University, Saxenian, Freeman and Teece at the University of California, and Audretsch at the Wissenschaftszentrum Berlin für Sozialforschung (WZB).

In order to obtain a sense of the importance of insider versus outsider works within the field, we calculated the ratio between 'SSCI citations per year' and the '*J*-index' for each core work. A ratio above 2.00 was regarded as indicating an 'outsider', i.e. a work cited by entrepreneurship researchers but which is even more heavily cited by researchers from other fields of research (indicated by a much higher number of 'SSCI citations per year') in relation to the work's importance in entrepreneurship research (as reflected by its *J*-index). The publication years of the outsider and insider works are presented in Table 5.

Table 5 indicates that 14 outsider works in entrepreneurship research were published prior to the 1980s, whereas few insider works were published during this period, an outsider/insider ratio of 1.75. However, the 1980s saw an increase in the number of insider works that have been influential in entrepreneurship research but did not receive much attention outside of the field (reflected in a high *J*-index but not a high number of SSCI citations per year; during the period in question the outsider/insider ratio was 0.38). The 1980s can be regarded as a pioneering phase with many works that opened up the field and received a great deal of attention in various handbooks.

In the 1990s we find a mix of outsider and insider works. The number of insider works published during the decade increased compared to the 1980s, but there was also a significant increase in the number of outsider works (ratio 0.75). The field grew due to the migration of scholars from other research fields. Looking

Table 4
Core literature ratio – age distribution.

	Frequency: core literature	Frequency: cited titles (with at least two citations)	Ratio: core literature to cited titles (with at least two citations)
<1980	22	264	8.3%
1980–1989	36	514	7.0%
1990–1999	56	641	8.7%
2000–2002[a]	21	111	18.9%
	135	1530	

[a] 69 titles published after 2002 have been removed as they are included in too few 'handbooks'.

at the characteristics of the outsider works, we find an inflow of works anchored in disciplines such as economics (e.g. Storey, 1994; Blanchflower and Oswald, 1998; Audretsch, 1995; Acs and Audretsch, 1990; Baumol, 1990), financial economics (e.g. Gompers and Lerner, 1999; Berger and Udell, 1998; Sahlman, 1990), economic geography (e.g. Saxenian, 1994; Audretsch and Feldman, 1996; Jaffe et al., 1993; Glaeser et al., 1992; Krugman, 1991) and strategic management (e.g. Cohen and Levinthal, 1990; Barney, 1991; Teece et al., 1997; Porter, 1990) – works with a broader audience and to some extent anchored in disciplines with a slightly different publication pattern to that of entrepreneurship research.

Finally, in the first three years of the 2000s, the ratio of outsider/insider works was only 0.11, indicating an increased number of insider works (the only outsider works published between 2000 and 2002 were Sorenson and Stuart, 2001; Carroll and Hannan, 2000). However, the results may be influenced by the fact that it often takes some time to receive a high number of SSCI citations, and several of the works published in the early 2000s might not yet have had the possibility to receive a large number.

4.4. Top-ranked works in entrepreneurship research

In order to further elaborate on the core works in entrepreneurship research, we will focus on the 20 top-ranked works in entrepreneurship research presented in Table 6.

We have divided the top-ranked works into thematic groups based on content:

- Contribution to the theoretical foundation works, focusing on
  - The function of entrepreneurship in the creation of new markets
  - The characteristics of the entrepreneur as an individual
  - The evolution of entrepreneurship and the entrepreneurial process
- Domain-defining works
- Empirical studies of entrepreneurship and small businesses

4.4.1. Theoretical foundation works

Out of the 20 top-ranked works, as many as thirteen can be regarded as theoretical foundations of entrepreneurship anchored in economics and in 'the function of entrepreneurship in the creation of new markets' (Schumpeter, 1934, 1942; Kirzner, 1973, 1997; Knight, 1921; Casson, 1982; Shane, 2000) as well as in the behavioural sciences and 'the characteristics of the entrepreneur as an individual' (McClelland, 1961). There are also theoretical foundations related to the understanding of 'the evolution of entrepreneurship and the entrepreneurial process' (Stinchcombe, 1965; Penrose, 1959; Nelson and Winter, 1982; Aldrich, 1999; Aldrich and Zimmer, 1986).

4.4.1.1. The function of entrepreneurship in the creation of new markets. From the list of core works in entrepreneurship with a theoretical focus, a couple are rooted in economics that elaborate on the function of entrepreneurship in the creation of new markets. In this respect, different schools of economic thought as a foundation of entrepreneurship research can be identified, such as the Schumpeterian, Kirznerian, Knightian and 'integrative' schools (Landström and Benner, 2010).

4.4.1.1.1. The Schumpeterian school. Joseph Schumpeter is the best known economist with an interest in entrepreneurship. Throughout his career he tried to formulate an economic theory built on change and 'newness' and was the first to treat innovation as an endogenous process – with the entrepreneur as an innovator and prime mover in the economic system, who leads the market away from existing equilibrium positions and shifts it to a higher one (Van Praag, 2005). It is obvious that Joseph Schumpeter's works (1934 and 1942) can be regarded as some of the most influential entrepreneurship contributions. Schumpeter's book *The Theory of Economic Development* (1934), in which he lays the foundation of his argumentation, is top ranked in our analysis with a *J*-index of 33.51. Schumpeter's second contribution to the top-20 list is *Capitalism, Socialism and Democracy* (1942), which is ranked 5th in our analysis (*J*-index 13.51). In this book he focused on the institutional structure of society and argued that increased rationality in society weakens entrepreneurship and leads to the stagnation of capitalism. Due to economies of scale, large corporations have an innovative advantage over small firms and the economic landscape is consequently dominated by giant corporations.

4.4.1.1.2. The Kirznerian school. Without doubt, Schumpeter's view of the function of the entrepreneurial process has been predominant in entrepreneurship research for many years. However, the Austrian economic tradition has received much attention during the past decade, not least after the domain-defining article by Shane and Venkataraman in 2000 (see below). Today, the most prominent exponent of the Austrian tradition is Israel Kirzner, and several of his works are included in the top-ranked entrepreneurship literature, such as his book *Competition and Entrepreneurship* (1973), which is ranked 8th in our analysis (*J*-index 11.89). According to Kirzner, it is fundamental for an entrepreneur to

Table 5
Publication year of outsider and insider works in entrepreneurship research.

Publication year of core works					
	<1980	1980–1989	1990–1999	2000–2002	Total number
Outsider	14	10	24	2	50
Insider	8	26	32	19	85
Ratio: outsider/insider	1.75	0.38	0.75	0.11	0.59

Table 6
Top 20 core works.

Rank	Year	Author(s)	Title	Type	*J*-Index	SSCI citation	SSCI/year
1	1934	Schumpeter, J.	*Theory of Economic Development*, Cambridge, MA: Harvard University Press	Book	33.51	2967	57.06
2	2000	Shane, S. and Venkataraman, S.	'The promise of entrepreneurship as a field of research', *Academy of Management Review*	Article	22.97	342	42.75
3	2000	Shane, S.	'Prior knowledge and the discovery of entrepreneurial opportunities', *Organization Science*	Article	16.22	180	22.50
4	1921	Knight, F.	*Risk, Uncertainty and Profit*, Chicago, IL: University of Chicago Press	Book	15.68	1765	33.94
5	1942	Schumpeter, J.	*Capitalism, Socialism and Democracy*, New York: Harper and Brothers	Book	13.51	4846	93.19
6	1988	Gartner, W.	'Who is an entrepreneur? Is the wrong question', *American Journal of Small Business*	Article	12.85	217	10.85
7	2000	Bhidé, A.	*The Origin and Evolution of New Businesses*, New York: Oxford University Press	Book	12.16	106	13.25
8	1973	Kirzner, I.	*Competition and Entrepreneurship*, Chicago, IL: University of Chicago	Book	11.89	592	16.91
9	1961	McClelland, D.	*The Achieving Society*, Princeton, NJ: Van Nostrand	Book	11.89	2694	57.32
10	1994	Storey, D.	*Understanding the Small Business Sector*, London: Routledge	Book	11.63	474	33.86
11	1997	Kirzner, I.	'Entrepreneurial discovery and the competitive market process: an Austrian approach', *Journal of Economic Literature*	Article	11.46	172	15.64
12	1982	Casson, M.	*The Entrepreneur: An Economic Theory*, Oxford: Martin Robertson	Book	11.38	184	7.08
13	1986	Aldrich, H. and Zimmer, C.	'Entrepreneurship through social networks', in: D. Sexton and R. Smilor (Eds.), *The Art and Science of Entrepreneurship*, New York: Ballinger, pp. 3–23	Book chapter	10.90	204	9.27
14	1994	Saxenian, A.	*Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Cambridge, MA: Harvard University Press	Book	10.85	1236	88.29
15	1997	Venkataraman, S.	'The Distinctive Domain of Entrepreneurship Research', in: J. Katz and R. Brockhaus (Eds.), *Advances in Entrepreneurship, Firm Emergence and Growth*, Greenwich, CT: JAI Press, pp. 119–138	Book chapter	10.42	177	16.09
16	1965	Stinchcombe, A.	'Social structure and organizations', in: J.G. March (Ed.), *Handbook of Organizations*, Chicago, ILL: Rand-McNally, pp. 142–193	Book chapter	9.73	1289	29.98
17	1959	Penrose, E.	*Theory of the Growth of the Firm*, Oxford: Oxford University Press	Book	9.73	2169	44.27
18	1982	Nelson, R. and Winter, S.	*An Evolutionary Theory of Economic Change*, Cambridge: Harvard University Press	Book	9.58	4303	165.50
19	2000	Hamilton, B.	'Does entrepreneurship pay? An empirical analysis of the returns to self-employment', *Journal of Political Economy*	Article	9.46	78	9.75
20	1999	Aldrich, H.	*Organizations Evolving*, London: Sage	Book	9.38	457	50.78

be alert in identifying and dealing with profit-making opportunities ('entrepreneurial alertness'). He/she searches for imbalances in the market system. In such situations, there is an asymmetry of information in the market, which means that resources are not effectively coordinated. By seeking out these imbalances and constantly trying to coordinate resources in a more effective way, the entrepreneur leads the process towards a new equilibrium.

In addition, two other works related to the Kirznerian way of thinking are included among the top-ranked works in entrepreneurship research. One is Kirzner's article "Entrepreneurial discovery and the competitive market process: An Austrian approach", published in the *Journal of Economic Literature* in 1997 (rank 11, *J*-index 11.46), in which he conducts a survey of Austrian economics and clarifies some of his own arguments regarding mainstream microeconomics in general and the entrepreneurial discovery process in particular. Second, in relation to the Austrian tradition of economic thought, we also include the article by Scott Shane on 'Prior knowledge and discovery of entrepreneurial opportunities' in *Organization Science* (2000), which is ranked 3rd in our analysis (*J*-index 16.22). In the article, Shane conducted an empirical test of some assumptions in Austrian economics and demonstrated that any given technological change in society will generate a range of entrepreneurial opportunities that are not obvious to all potential entrepreneurs and that any given entrepreneur will discover only those opportunities related to his or her prior knowledge.

4.4.1.1.3. The Knightian school. A third function of entrepreneurship is the entrepreneur as 'risk-taker', a theme first addressed by Frank Knight in his thesis *Risk, Uncertainty and Profit* (1916/1921). The work is very highly ranked in 4th position with a *J*-index of 15.68. In his book, Knight made a distinction between insurable risk and non-insurable uncertainty, arguing that opportunities arise out of uncertainty related to change and that an entrepreneur receives a return for making decisions under conditions of 'true' uncertainty – if change is predictable, there is no opportunity for profit. Knight's work has been highly influential in entrepreneurship research, primarily in the context of different occupational choice models (e.g. Lucas, 1978; Kihlstrom and Laffont, 1979) and more recently regarding decisions made in entrepreneurial ventures (e.g. Sarasvathy, 2001).

4.4.1.1.4. The integrative approach. For many years there was little room for entrepreneurship in mainstream economics, or as William Baumol (1968, p. 68) argued 'The theoretical firm is entrepreneur-less – the Prince of Denmark has been expunged from the discussion of Hamlet.' During recent decades, several attempts have been made to include entrepreneurship in economic modelling and analysis. One such attempt that has been particularly

influential is that by Mark Casson in his book *The Entrepreneur: An Economic Theory* (1982), which in our analysis is ranked 12th with a *J*-index of 11.38. In this, Casson synthesizes the relationship between the entrepreneurial market-making process and neoclassical economics. In line with the arguments of the Austrian economic tradition, he recognizes that individuals differ not only in their tastes but also in their access to information. As a result, the entrepreneur will make superior judgemental decisions about the coordination of scarce resources that differ from those of other people, implying that entrepreneurship should be seen as a process of intermediation or 'market-making'.

4.4.1.2. The characteristics of the entrepreneur as an individual. In the late 1950s and early 1960s, a series of large-scale studies were conducted in an effort to understand the personal traits and characteristics of the entrepreneur: these were mainly carried out by behavioural scientists from disciplines such as psychology and sociology. One of the most influential works in this respect is David McClelland's study *The Achieving Society* (1961) (ranked 9th, *J*-index 11.89). McClelland posed the question: 'Why do certain societies develop more dynamically than others?' and demonstrated the link between the need for achievement in society and economic development. In this respect, entrepreneurs become an important driving force in the development of a society – the need for achievement is transformed into economic growth through the medium of the entrepreneur. McClelland's contribution meant that the personal qualities of the entrepreneur occupied a prominent position in entrepreneurship research during the 1970s and 1980s. However, over time, such research was subject to criticism and eventually came to be regarded as something of a 'dead end'.

4.4.1.3. The evolution of entrepreneurship and the entrepreneurial process. The creation of evolutionary models accelerated during the 1970s, mainly as a result of the open-system revolution in organization theory. Within a short period, scholars in different disciplines presented evolutionary theories, inspired in some cases by the seminal work of Campbell (1965), who attempted to explain phenomena ranging from the micro to the macro levels of an organization. For example, on the theory of the firm, Nelson and Winter (1982) were pioneers in the application of evolutionary models of economic change – although perhaps less inspired by Campbell and more by the Carnegie School of routine-based models of organizational action. These authors were also heavily inspired by Schumpeter, who was a prominent exponent of the idea that economic change could be conceptualized as an evolutionary process (Fagerberg, 2002).

In our analysis, Richard Nelson and Sidney Winter's book *Evolutionary Theory of Economic Change* (1982) is ranked 18th with a *J*-index of 9.58. The book summarizes a series of papers by Nelson and Winter in the 1970s, in which they tried to develop formal models of economic evolution as well as to answer the basic question of how firms and industries change over time. In line with Schumpeter, they focused their interest on technological change in the economy, arguing that technological competition is the driving force of economic growth. In their attempts to build a model of evolutionary changes in organizations, Nelson and Winter relied on the Carnegie School of 'bounded' and 'procedural' rationality in organizations (e.g. Simon, 1959, 1965; Cyert and March, 1963).

What Nelson and Winter did at a micro economic level, Howard Aldrich (1979) did at an organizational behaviour level. He argued that organizations flourish or fail because they are more or less suited to the particular environment in which they operate. His book on *Organizations Evolving* (1999) (ranked 20th, *J*-index 9.38) provides a conceptual framework based on an evolutionary approach to new firm formation. Here, Aldrich attempts to explain why and how new ventures develop using four generic processes – variation, selection, retention and struggle – which are necessary for and allow the evolution of new ventures. Among the highest ranked works within the field of entrepreneurship is another contribution by Howard Aldrich, the chapter co-authored with Zimmer on 'Entrepreneurship through social networks' in a handbook edited by Sexton and Smilor in 1986 (ranked 13th, *J*-index 10.90). In this conceptual chapter, Aldrich and Zimmer take an evolutionary perspective in order to introduce a view of entrepreneurship as embedded in networks of relationships and show the necessity for entrepreneurs to seek and employ social ties in order to attract resources and compete in markets.

In line with the evolutionary argumentation, we can also add Arthur Stinchcombe's seminal book chapter on 'Social structure and organization' (1965) (ranked 16th, *J*-index 9.73), in which he introduced the concept of the 'liability of newness'. Stinchcombe argued that there are significant differences in survival probabilities between established and young firms and that a new venture will experience the liability of newness, as (1) individuals in a young venture face challenges learning new roles; (2) there is a lack of defined routines and standardized procedures; (3) there is a lack of trust among new-venture employees; and (4) there is a lack of critical and stable external ties.

Most research to date has focused on external issues related to the liability of newness, rather than internal aspects that may influence the evolution of new ventures (Nagy and Lohrke, 2010). However, one 'internal' approach is the resource-based view (RBV), in which a firm's competitiveness is enhanced by the extent to which it can develop and maintain control over its resources or capabilities. One pioneering contribution within this framework is Edith Penrose's work on *The Theory of the Growth of the Firm* in 1959 (ranked 17th, *J*-index 9.73). In her book, Penrose intended to create a theory of firm growth, but most attention has been paid to her perhaps unintentional contribution to the resource-based view. Central to Penrose's argument is the view of the firm as an administrative unit with control over a number of potentially valuable resources, and she emphasizes the importance of managerial (administrative and entrepreneurial) capabilities in the growth of the firm.

4.4.2. Domain-defining works

In new fields, there is often an ongoing discussion concerning the domain of research, and this has certainly been the case among entrepreneurship scholars. At different points in time, we can find highly influential contributions on this subject. In the late 1980s, interest in the characteristics of the entrepreneur as an individual gathered momentum. In this respect, the works of William Gartner became important, not least his article "Who is the entrepreneur? is the wrong question" in 1988, which is ranked 6th (*J*-index 12.85) in our analysis. In this article, Gartner questioned the prevailing focus in entrepreneurship research on the characteristics of the entrepreneur, instead viewing entrepreneurship as a set of activities involved in the creation of new organizations. This article (together with a couple of later articles in a similar vein, namely Gartner, 1990, 1993) can be seen as the start of a shift from a focus on the entrepreneur to an increased interest in behavioural and process-related aspects.

About a decade later, a new domain-defining discussion emerged based on Scott Shane and Sankaran Venkataraman's influential article on 'The promise of entrepreneurship as a field of research' published as a 'research note' in *Academy of Management Review* in 2000 – an article that is highly ranked in our analysis (ranked 2nd, *J*-index 22.97). In the article, which draws on the work by Venkataraman (1997) (ranked 15th, *J*-index 10.42), the two authors discussed the domain of entrepreneurship research and triggered several developments within the field: (1) the article created a renewed interest in the Austrian school

of economics, as Shane and Venkataraman anchored their argumentation in the works of Kirzner (1973, 1997); (2) the article became a driving force that focused research interest on 'business opportunity recognition'; and, last but not least; (3) the article triggered intense debate regarding the definition of the domain of entrepreneurship research, a debate that has continued up to the present.

4.4.3. Empirical studies of entrepreneurship and small businesses

In evolving fields of research it is always important to gain a systematic and rigorous understanding of the phenomenon under study. Much research in entrepreneurship during the 1980s and 1990s focused on empirical investigations of different aspects of entrepreneurship and small businesses. Among the top 20 core works in entrepreneurship we find three contributions that try to illuminate the decision to become self-employed (Hamilton, 2000), to understand the survival and growth of the entrepreneurial venture (Bhidé, 2000) and to provide a synthesized understanding of the small business sector (Storey, 1994). Furthermore, we know that 'context' is important for entrepreneurship and within the top-ranked works we find one empirical study in the regional context of Silicon Valley and Route 128 in the US (Saxenian, 1994).

Barton Hamilton discussed the decision to become an entrepreneur in his article 'Does entrepreneurship pay? An empirical analysis of the returns to self-employment' in the *Journal of Political Economy* (2000). In our analysis the article is ranked 19th with a *J*-index of 9.46. In order to understand the motives for becoming self-employed, the article examines differences in the earning distributions of self-employed individuals and paid employees. Based on a large panel database in the US, Hamilton concluded that the non-pecuniary benefits of self-employment are substantial. Most entrepreneurs enter and persist in business despite the fact that they have both lower initial earnings and lower earnings growth than paid employees.

Among the top-ranked works in entrepreneurship we also find a contribution that tries to understand the survival and growth of entrepreneurial ventures. In the book *The Origin and Evolution of New Businesses* by Amar Bhidé (2000), which is ranked 7th with a *J*-index of 12.16, the author conducted an empirical analysis of the nature of the opportunities pursued by entrepreneurs, the problems they face in the creation and evolution of the entrepreneurial venture and their contributions. The book focuses on the original conditions of new ventures, and an interesting conclusion is that many successful new ventures on the *Inc.* 500-list started without any innovative idea or significant external finance.

David Storey's book *Understanding the Small Business Sector* published in 1994 (ranked 10th, *J*-index 11.63) can be regarded as the most comprehensive synthesis of our knowledge of the small business sector. The book has its origins in a major research programme on small businesses in the UK, financed by the Economic and Social Research Council (ESRC). Storey was appointed Programme Co-ordinator of the research programme, which was conducted between 1989 and 1992. The book is more or less a summary of the knowledge acquired within the research programme on issues such as the birth, growth and death of small firms, and the rate of employment within the sector as well as the regional distribution of small businesses, and it provides carefully considered conclusions from a policy perspective.

Silicon Valley has long been regarded as a highly successful entrepreneurial region, and politicians around the world have tried to copy its characteristics. In her book *Regional Advantage: Culture and Competition in Silicon Valley and Route 128* (1994), ranked 14th with a *J*-index of 10.85, AnnaLee Saxenian contrasts the cultures of Silicon Valley and Route 128 outside Boston. The detailed chronological case stories of the two leading high-tech regions in the US are related to the role of innovation-based competition, but also to the importance of cultural-institutional aspects of technology-based clusters. The conclusion is that the success of Silicon Valley is structural rather than specific and that it is necessary to create a culture and modes of action that support the overall development of a region.

4.4.4. Some concluding remarks

The conclusion that can be drawn from this review of the top-ranked works in entrepreneurship research is that the theoretical development of the field seems to have been rather slow. While some of the most influential empirical works were produced during the 1990s and early 2000s (Storey, 1994; Saxenian, 1994; Hamilton, 2000; Bhidé, 2000), in a theoretical sense the field is based on fairly old framework imported from mainstream disciplines, such as Schumpeter (1934, 1942), Kirzner (1973), Knight (1916) and Casson (1982) who are anchored in economics, and McClelland (1961) who originated in behavioural sciences. Several works are based on an evolutionary view of the firm (Stinchcombe, 1965; Penrose, 1959; Nelson and Winter, 1982; Aldrich, 1999).

However, as has been shown in our earlier analyses (see Sections 2.2 and 4.1), theoretical interest in entrepreneurship research has increased during the past decade, and there have been various attempts to introduce 'entrepreneurial concepts and theories', for example, as represented by the works of Aldrich (1999), Bhidé (2000) and Sarasvathy (2001), which now feature among the core works in entrepreneurship research.

5. Knowledge users in entrepreneurship research

In this section we change perspective and move from the knowledge producers and scholars who have produced the core contributions in entrepreneurship, to the users of this knowledge. We therefore employed the Web of Science 'Cited Reference Search' to locate all documents citing the 135 core works identified from the handbook chapter analysis. In total, we identified 54,469 documents in the Web of Science database citing the core entrepreneurship knowledge base, which we downloaded and analysed using Bibexcel software (Persson et al., 2009). Following the research question formulated in Section 1, we focused our analysis on the geographical location of the knowledge users as well as where they published their results and the subject areas of the journals in which they publish.

5.1. The geographic location of the users of core contributions

To investigate the impact of the core contributions on a geographical level, the address field of the articles by the knowledge users was analysed. Searches were performed for each of the top 20 core works using the Web of Science 'Cited reference search' option, and documents citing these top 20 texts were retrieved and analysed, using the Web of Science 'Analyze results' function. To investigate the extent to which the impact of the core contributions was local or global, the national origin of each of the top 20 core contributions was determined, after which we investigated whether the citing documents had author addresses in the US, Europe or elsewhere.

The identification of the origin of the core contributions involved some problems. Among the top 20 works are two contributions by Schumpeter (1934, 1942): one originally published in German when he resided in Austria and one published in English after he moved to the US. The main strategy for resolving this issue was to focus on the origin of the work rather than the author. Therefore, the 1934 Schumpeter work was classified as a European text while the later one was classified as American. Another problem was the 1959 contribution by Penrose, originally an American but predominantly considered a European scholar. Moreover, her contribution

Table 7
Geographic distribution of users citing the top 20 core contributions.

Core text origin	European users: average/median	US users: average/median	Other users: average/median
Total: (24,948 citations)	42%/42%	40%/39%	18%/18%
Europe: (4 texts, 6123 citations)	55%/50%	27%/32%	18%/18%
US: (16 texts, 18,825 citations)	39%/41%	43%/40%	18%/18%

to the top 20 core works was written while she was still resident in America but published after her move to the UK. In this case, we chose the geographic location with which Penrose is primarily associated (i.e. Europe). The analyses were performed on one core work at a time, and the percentage of the distribution of the users was calculated as the average of the individual distributions (Table 7).

Among the top 20 core contributions, four are of European origin whereas 16 originated in the US, making the total number of citations to American texts substantially higher. However, when looking at the average number of citations per work, the frequencies are quite similar, with roughly 1500 citations per work for European core works and 1200 for the American ones. The overall conclusion is that core works of American origin are equally used in the US and Europe with about 40% share of users respectively, while the other 20% have their affiliation in the rest of the world. Core contributions from Europe are to a larger extent used by European scholars, who constitute 50% of the users, while the share of American users is about 30%. Thus, the impact of American core contributions is more international than that of their European counterparts, who seem to have more of a local impact.

There are some caveats to be considered when interpreting these results. The number of European core contributions is significantly smaller than contributions from the US. Looking at the dataset as a whole, the distribution of users is almost identical to the share of users of the American contributions. There is also one extreme outlier in the European dataset, with one contribution (Storey, 1994) having 79% of European users but only 7% with an American affiliation. However, there is only one European contribution where the distribution of American and European users is fairly even and when using the median value to adjust for outliers, the distribution is still 50/32 in favour of European users of European core contributions.

5.2. Thematic focus of the users of core contributions

In this section we will conduct an analysis of the journals in which entrepreneurship knowledge base users are publishing research, and cluster them into fields based on the 'subject areas' of the journals.

5.2.1. Journals publishing knowledge base users' research

The 135 core works are cited in 54,469 documents in a total of 3903 journals. The distribution of articles between journals is skewed, with a few journals accounting for a majority of the articles, whereas the rest are distributed over a large number of journals. In Table 8 we list the 20 journals with the highest number of articles citing the core works, accounting for 18.49% of all citations to the core works. As shown in the table, the largest number of citations to the core works in entrepreneurship came from the *Strategic Management Journal*, *Research Policy*, *Academy of Management Journal*, *Small Business Economics*, *Academy of Management Review*, *Journal of Business Venturing* and *Journal of Management Studies*. The majority of journals can be regarded as mainstream disciplinary ones such as the *Academy of Management Journal*, *Academy of Management Review* and *Administrative Science Quarterly*. Looking at the subject areas of the top 20 journals, we can conclude that 'business' and 'management' heavily dominate as the top citing journals in entrepreneurship research. Out of the top 20 journals, with the exception of *Regional Studies*, *Journal of Economic Behavior and Organization*, *American Economic Review* and *Journal of Economic Issues*, all include the subject area(s) 'business' and/or 'management', which indicates that scholars working in management studies are important users of entrepreneurship knowledge. Among the top 20 journals there are only two that can be regarded as dedicated entrepreneurship journals: *Small Business Economics* and *Journal of Business Venturing*.

We argued above that entrepreneurship is a changeable field of research, and Table 9 illustrates that certain changes have occurred with regard to the relative importance of various journals over time. However, the relationship between the fields of strategic management and entrepreneurship is obvious, as the *Strategic Management Journal* is top-ranked during all three decades. *Research Policy*, a journal that covers broader issues with regard to technology and innovation and their effects on society, has climbed in rank. The same holds for journals such as the *Journal of Management Studies* and *Regional Studies* and, not least, the entrepreneurship specific journals *Small Business Economics* and *Journal of Business Venturing*. In the 1980s' ranking there were several journals in mainstream disciplines such as economics, sociology, political science, finance and business that have disappeared from or declined in the rankings from the 1990s onwards. On the other hand, several journals such as the *International Journal of Technology Management*, *Technovation*, *Journal of Business Ethics* and *Organization Science* have emerged in the top 20 rankings in the 2000s.

5.2.2. Subject areas of journals publishing research by the knowledge users

The analysis of the Web of Science 'subject areas' should be interpreted with some caution, especially in terms of seeing them as a reflection of research areas or as a way of looking at the migration of ideas between research areas. One aspect to bear in mind is that the subject areas were developed to categorise journals for information retrieval purposes, not as a way of categorizing or making distinctions between research fields. The categorization is rather static, both in terms of the categories per se and how they are used for describing the individual journals. This is a problem, not least when analysing emerging fields.

Of the total of 54,469 documents that cite the core works in entrepreneurship research (Table 10), as many as 19,072 were included in journals that can be classified as 'management', 'business' or 'business and finance', followed by 10,776 in journals classified as 'economics'. However, the size of the subject areas differs, for example, 'economics', 'environmental studies' and 'political science' are fairly large subject areas including a great number of articles in the Web of Science database, which means that after taking the size of the subject areas into consideration, the core entrepreneurship contributions are proportionally more often cited in 'management' and 'business' compared to areas such as 'economics'. Core entrepreneurship works are cited in a large variety of different subject areas, including some not immediately related to research fields adjacent to entrepreneurship, such as computer science, education, public administration and history.

Table 8
Top 20 journals citing entrepreneurship core contributions.

Rank	Journal	Frequency	Ratio of total works	Subjects
1	Strategic Management Journal	1278	2.35	Business; Management
2	Research Policy	711	1.31	Management; Planning & Development
3	Academy of Management Journal	626	1.15	Business; Management
4	Small Business Economics	572	1.05	Business; Economics; Management
5	Academy of Management Review	564	1.04	Business; Management
6	Journal of Business Venturing	554	1.02	Business
7	Journal of Management Studies	549	1.01	Business; Management
8	Administrative Science Quarterly	445	0.82	Business; Management
9	International Journal of Technology Management	442	0.81	Engineering; Multidisciplinary; Management; Operations Research & Management Science
10	Organization Studies	438	0.80	Management
11	Journal of International Business Studies	431	0.79	Business; Management
12	Organization Science	425	0.78	Management
13	Regional Studies	412	0.76	Environmental Studies; Geography
14	Journal of Business Research	402	0.74	Business
15	Journal of Economic Behavior and Organization	399	0.73	Economics
16	American Economic Review	393	0.72	Economics
17	Management Science	373	0.68	Management; Operations Research & Management Science
18	Journal of Business Ethics	367	0.67	Business; Ethics
19	Journal of Management	351	0.64	Business; Management
20	Journal of Economic Issues	337	0.62	Economics

Total 54,469 documents.

Table 9
Top journals over time (1980s, 1990s and 2000s).

Rank	1980s	Freq.	1990s	Freq.	2000s	Freq.
1	Strategic Management Journal	183	Strategic Management Journal	594	Strategic Management Journal	533
2	Administrative Science Quarterly	132	Academy of Management Journal	233	Research Policy	455
3	Academy of Management Review	114	Research Policy	221	Small Business Economics	368
4	American Economic Review	104	Small Business Economics	218	International Journal of Technology Management	328
5	Journal of Economic Behavior & Organisation	96	Journal of Business Venturing	218	Academy of Management Journal	296
6	Academy of Management Journal	85	Academy of Management Review	214	Journal of Management Studies	292
7	Journal of Economic Issues	81	Journal of Management Studies	205	Journal of Business Venturing	284
8	Journal of Finance	78	Journal of Institutional and Theoretical Economics	171	Technovation	270
9	Long Range Planning	78	Organization Science	169	Journal of Business Ethics	263
10	American Journal of Sociology	74	Journal of Economic Behavior & Organisation	151	Organization Science	256
11	History of Political Economy	73	Organization Studies	150	Journal of International Business Studies	252
12	Managerial and Decision Economics	68	Administrative Science Quarterly	149	Journal of Business Research	251
13	Management Science	65	Journal of International Business Studies	145	Regional Studies	250
14	Journal of Marketing	63	Long Range Planning	141	Academy of Management Review	250
15	American Sociological Review	62	Journal of Management	137	Industrial and Corporate Change	237
16	Journal of Financial Economics	61	Regional Studies	126	Organization Studies	230
17	Organization Studies	58	Journal of Business Research	125	Industrial Marketing Management	204
18	Journal of Post Keyenesian Economics	58	International Journal of Technology Management	122	Management Science	190
19	Journal of Management Studies	58	Management Science	114	European Planning Studies	189
20	Southern Economic Journal	55	History of Political Economy	106	International Journal of Human Resource Management	182

1980s: 1346 journals.
1990s: 1765 journals.
2000s: 2126 journals.

Table 10
Top 20 Web of Science 'subject areas' of journals citing the core knowledge.

Rank	Frequency	Subject areas
1	11,724	Business
2	10,776	Economics
3	4738	Management
4	2760	Sociology
5	2610	Business, Finance
6	1997	Law
7	1807	Environmental Studies
8	1341	Political Science
9	903	Psychology
10	807	Computer Science, Information Systems
11	769	Social Sciences, Interdisciplinary
12	746	Psychology, Applied
13	737	Engineering
14	730	Education & Educational Research
15	615	Public Administration
16	614	Engineering, Industrial
17	568	History
18	566	Computer Science
19	559	Planning & Development
20	556	Geography

This only draws on the first and thus main subject category in the case of journals that have more than one. Categories have been merged, such as different variation of computer science, except in cases where the sub-category (e.g. 'Computer Science, Information Systems') has large frequencies on their own. This should provide a more accurate representation of the subjects from which the journals citing the knowledge base come.

The distribution of documents between subject areas has been relatively stable over time (Table 11). Very few subject areas occur in only one period and, when comparing the rankings over time, most subject areas are within the same segment. For example, the subject areas in the top segment (the top six subject areas) appear to maintain their position over time. However, having said that, we find that 'business', 'management' and 'business and finance' have strengthened their positions, whereas several subject areas in the social sciences such as sociology, political science, psychology and history have tended to become less important. Interestingly, subject areas related to engineering, including 'engineering', 'engineering, industrial' and 'computer science' have strengthened their positions over time, and to some extent the same holds true for geography (including 'planning and development').

The classification of a journal into more than one subject area makes it possible to look at co-occurrences of subject areas to investigate the relations between them. To do this, we followed the same approach as in the previous co-citation and co-authorship analyses to produce a map of co-occurrence strengths between subject areas over time (see Fig. 3a–c).

As one would expect, the maps are centred around 'business', 'management' and 'economics'. These groupings became larger over time, i.e. the field seems to increasingly centre around 'business', 'management' and 'economics'. However, there were other changes over time. In the map of subject areas of journal articles published in the 1980s (Fig. 3a) we find three distinct clusters: one (yellow circles) with 'economics' and 'business' as the strong nodes and with 'management' somewhat separated from the core; another (green circles) that can be considered a behavioural science cluster with 'sociology' as the strongest node, but including 'psychology', 'anthropology' and 'education'; and finally, a small, distinct cluster (red circles) rather far removed from the centre including natural sciences and medicine.

During the 1990s (Fig. 3b) the field became more fragmented with many more subject areas, but 'business', 'management' and 'economics' (yellow circles) became even more dominant. It is interesting to note that, during this decade, the behavioural cluster became a joint cluster, bringing 'sociology', 'psychology', etc. closer to the 'economics' and 'management' clusters, while at the same time we can see that 'management' and 'business' have moved closer together whereas 'economics' has become more distant from 'management' and 'business'. In a parallel development, a small cluster (green circles) comprising 'geography' and 'environmental studies' was formed, having broken out of the 1980s cluster. There are also two very small clusters related to health care and medicine (red circles and blue circles).

The trend towards coalescence around 'management' and 'business' (yellow circles), together with 'economics' and the other social sciences continued in the 2000s. At the same time, the 'geography cluster' (green circles) has become stronger and closer to the centre (Fig. 3c). We can also see a growing health care cluster (red circles), now including 'psychology'.

Table 11
Top 20 Web of Science 'subject areas' of journals citing the core knowledge over time.

Rank	1980s		1990s		2000s	
	Freq	Subject categories	Freq	Subject categories	Freq	Subject categories
1	1906	Economics	3513	Economics	6484	Business
2	1458	Business	3501	Business	4004	Economics
3	584	Sociology	1347	Management	3030	Management
4	508	Law	834	Sociology	1291	Business, Finance
5	488	Business, Finance	671	Business, Finance	1145	Environmental Studies
6	283	Management	668	Law	819	Sociology
7	262	Political Science	496	Environmental Studies	651	Law
8	212	Psychology	437	Political Science	518	Engineering
9	159	History	244	Psychology, Applied	501	Engineering, Industrial
10	154	Education & Educational Research	241	Computer Science, Information Systems	500	Computer Science, Information Systems
11	145	Social Sciences, Interdisciplinary	232	Public Administration	443	Political Science
12	138	Environmental Studies	225	Planning & Development	402	Computer Science
13	132	Psychology, Social	220	Psychology	328	Psychology, Applied
14	130	Public Administration	216	Social Sciences, Interdisciplinary	288	Geography
15	122	Psychology, Applied	212	Education & Educational Research	243	Social Sciences, Interdisciplinary
16	91	Computer Science	208	International Relations	234	Public Administration
17	86	Anthropology	204	Geography	230	Industrial Relations & Labor
18	85	Industrial Relations & Labor	177	Industrial Relations & Labor	222	Planning & Development
19	83	Humanities, Multidisciplinary	173	Engineering	196	Information Science & Library Science
20	81	Planning & Development	166	History	190	Education & Educational Research

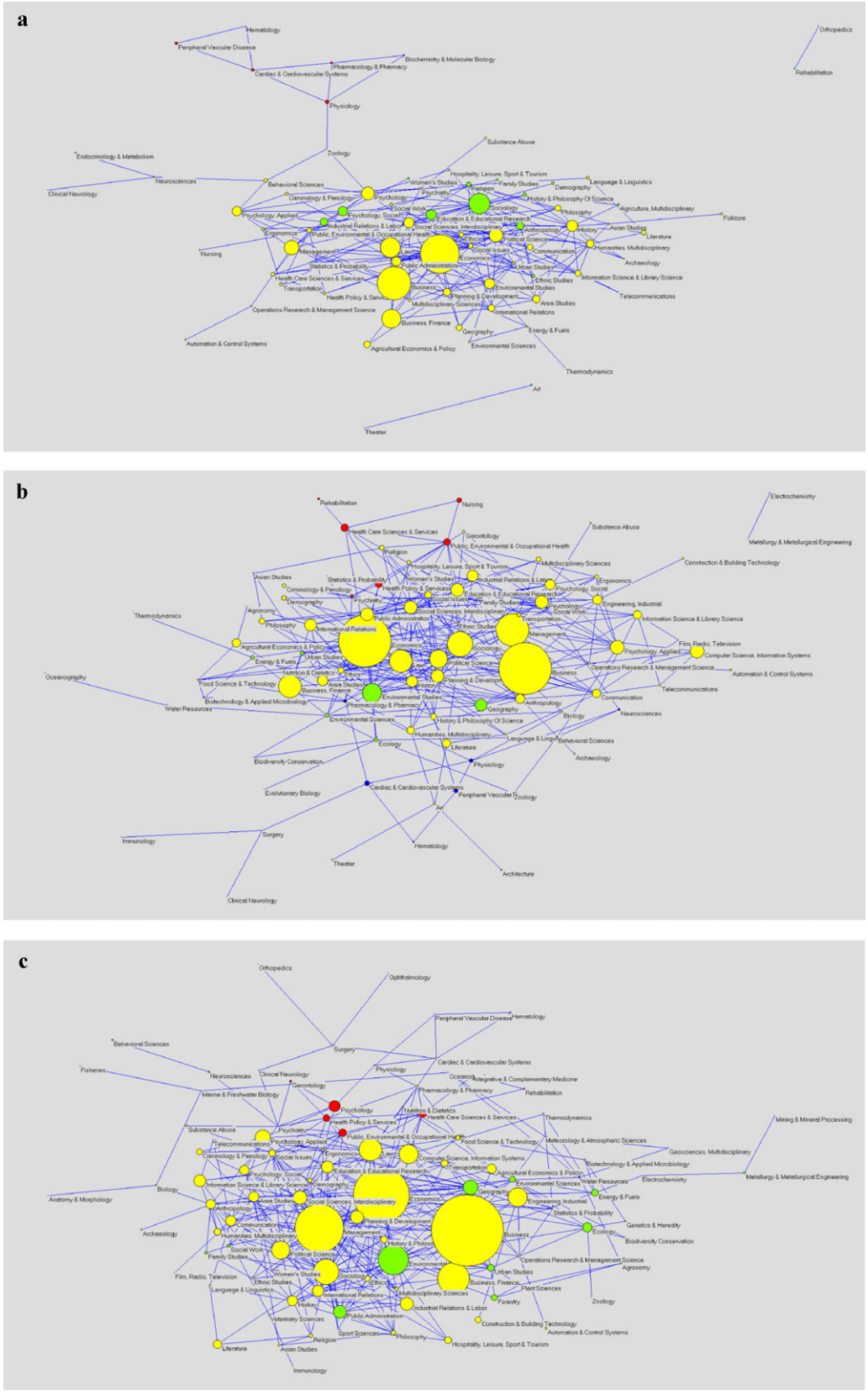

Fig. 3. (a) Co-occurrence of Web of Science 'subject areas' of journals citing the core knowledge producers during the 1980s. (b) Co-occurrence of Web of Science 'subject areas' of journals citing the core knowledge producers during the 1990s. (c) Co-occurrence of Web of Science 'subject areas' of journals citing the core knowledge producers during the 2000s. (For interpretation of the references to color in the text, the reader is referred to the web version of this article.)

5.2.3. Some concluding remarks

In this section we explored where the users of the core entrepreneurship research works presented their results, and the most significant conclusion to be drawn is the very strong anchoring of entrepreneurship research in the 'management' and 'economics' fields as evidenced not only by the journals in which the core works were published but also by the analysis of the 'subject areas' of publications citing the core works. This to some extent contradicts the conclusions drawn by Davidsson and Wiklund (2001) that entrepreneurship research is dominated by micro-level analysis, mainly using the firm or individual as the level of analysis. 'Management' and 'economics' seemed to strengthen their positions over time and are now at the centre of entrepreneurship research. Having said that, these signs of convergence between 'management' and 'economics' should not be exaggerated as they are clearly separate field of research: we are talking about rather low level linkages between the fields, and the change over time is also quite limited (in line with the 'bounded multi-disciplinarity' in entrepreneurship research as discussed by Landström and Persson, 2010). In addition, it is obvious that the core contributions in entrepreneurship research are cited in studies within many different fields – there are a large number of low frequency users of core entrepreneurship works within a range of research fields – creating a 'long tail', suggesting that a large number of knowledge users are to be found some distance from the core of entrepreneurship research.

6. Concluding reflections

6.1. What constitutes a core work in entrepreneurship research?

In this study we focused on the core contributions of entrepreneurship research, the most influential scholars within the field as well as on the most highly cited works. Against this background it is worth reflecting on the question: 'What constitutes a core work in entrepreneurship research?' Davis (1971) argued that scholars are regarded as 'great' not because their theory is necessarily true, but because it is interesting. Such theories challenge the taken-for-granted assumptions of their audience. A large number of the core works in entrepreneurship could be regarded as *interesting* in the sense that the theories challenge conventional wisdom in explaining entrepreneurship as a phenomenon. The most obvious work in this respect is Birch's report *The Job Generation Process* (1979), in which he argued that it is young and small ventures that create the most new jobs, not large and established companies. Other examples are Acs and Audretsch's observation, contrary to conventional wisdom at the time, that small firms play an important role in innovation and industrial changes, and the study by Bhidé, which challenged conventional wisdom of venture creation and growth. Among the core works we also find interesting arguments, an example of which is Gartner who, at the end of the 1980s, challenged the existing research tradition by arguing that 'Who is the entrepreneur? is the wrong question' and instead called for a more behaviour- and process-oriented approach. Thus, many core contributions can be regarded as 'interesting' in that they challenge our taken-for-granted assumptions.

In the early stages of knowledge development within a research field, it is important to gain robust empirical knowledge about the phenomenon – empirical knowledge that provides researchers with a deeper understanding and that constitutes a necessary first step in effective theory-building (Eisenhardt, 1989). Thus, some of the core works in entrepreneurship research contribute by providing *robust empirical knowledge*, i.e. well-developed syntheses of our knowledge or conducting high-quality empirical studies. Among entrepreneurship scholars there has been an ambition to empirically understand the phenomenon and, not unexpectedly, among the core works in entrepreneurship we find several high-quality empirical studies. One such example is Storey's book *Understanding the Small Business Sector* (1994), in which the author synthesized the empirical results of a large research programme on small businesses in the UK.

6.2. Entrepreneurship as an entrepreneurial achievement

We have regarded the establishment of entrepreneurship research as an entrepreneurial achievement in itself and focused our attention on individual scholars who have made significant cognitive contributions to the field, i.e. those scholars who have formulated interesting research questions and attracted other researchers to build on their works, thus shaping the field. Our analysis reveals that in new and evolving fields of research, as in many other emerging entrepreneurial activities, there is always a risk of becoming too 'opportunity oriented' (Wiklund, 1998). This means that researchers identify new research topics all the time, creating a highly fragmented field that is generally unrelated to previous knowledge, a field in which the resulting lack of historical awareness creates difficulties with regard to knowledge accumulation. However, as in successful entrepreneurial ventures in general that combine an opportunity focus and resource orientation (ibid.), it is not sufficient to identify new research opportunities unless they are securely anchored to earlier knowledge within the field – what we could call a 'knowledge-based' focus combining an interest in searching for new opportunities with a stronger knowledge base within the field. This will not only help to identify new research opportunities, but also ensure a stronger accumulation of knowledge of entrepreneurship research.

6.3. Future directions of entrepreneurship research

What are the implications of our study for the future development of entrepreneurship as a research field? In line with our argumentation above, a stronger 'knowledge-based' focus can initially be achieved by borrowing concepts and theories from other fields. Historically in entrepreneurship research, this has mainly involved the fields of economics and management studies. In borrowing theories and concepts from other fields of research, one needs to understand the foundations and assumptions on which these theories are based, as mistakes may otherwise be made in any explanation or understanding of entrepreneurship as a phenomenon (Lohrke and Landström, 2010). However, our study demonstrates that, over time, the number of influential 'insider' works has increased, and the clusters of research in entrepreneurship have come closer to each other. This indicates that the field is on the way to creating a knowledge-base of its own, with distinct research specialities and a set of core knowledge. Over recent years we have seen several attempts in this direction, for example, with the emergence of concepts such as 'effectuation' (Sarasvathy, 2001), evolutionary approaches (Aldrich, 1999) and 'bootstrapping' (Bhidé, 2000).

Despite the fact that entrepreneurship has borrowed theories from other fields and many scholars from other disciplines have migrated into entrepreneurship research, it has remained surprisingly disconnected from the neighbouring field of innovation studies. Despite common roots in Schumpeter and some interrelated topics such as innovation management (corporate entrepreneurship) and an interest in technology-based firms, 'entrepreneurship' and 'innovation' have evolved over time as two largely separate research fields. This holds true when seen in a cognitive sense, focusing on the knowledge development within the fields (e.g. Bhupatiraju et al., 2012; Persson, 2010) as well as in a social sense when viewing the research communities within each

field (e.g. Gartner et al., 2006). Lindholm-Dahlstrand and Stevenson (2007) also argued that innovation policy and entrepreneurship policy are rarely integrated in policy interventions by government.

Not all new ventures can be regarded as innovative and not all new knowledge generates viable (business) opportunities. However, there are several obvious connections between entrepreneurship and innovation: both are strongly linked to economic growth and industrial renewal; the concepts of 'entrepreneurship' and 'innovation' are partly intertwined (not least in everyday speech); and academic teaching often combines knowledge on entrepreneurship and innovation. In order to better understand economic growth in society, Braunerhjelm et al. (2009) proposed a stronger emphasis on entrepreneurship in the innovation process, arguing that entrepreneurial activity is the key factor in transferring knowledge to exploit commercial opportunities. This study would seem to confirm that there is considerable potential for stronger and more fruitful integration between the fields of entrepreneurship and innovation in future research.

Acknowledgements

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Appendix 1. Core contributions to entrepreneurship studies

Rank	Year	Author	Title	Type	Journal	*J*-Index	SSCI citation	SSCI/year
1	1934	Schumpeter, J.	The theory of economic development, Cambridge: Harvard University	Book		33.51	2967	57.06
2	2000	Shane, S. and Venkataraman, S.	The promise of entrepreneurship as a field of research	Journal	Academy of Management Review	22.97	342	42.75
3	2000	Shane, S.	Prior knowledge and the discovery of entrepreneurial opportunities	Journal	Organization Science	16.22	180	22.50
4	1921	Knight, F.	Risk, Uncertainty and Profit, Chicago: University of Chicago Press	Book		15.68	1765	33.94
5	1942	Schumpeter, J.	Capitalism, Socialism and Democracy: Can Capitalism Survive?, New York: Harper and Brothers	Book		13.51	4846	93.19
6	1988	Gartner, W.	"Who is an entrepreneur?" Is the wrong question	Journal	American Journal of Small Business	12.85	217	10.85
7	2000	Bhidé, A.	The Origin and Evolution of New Businesses, New York: Oxford University Press	Book		12.16	106	13.25
8	1973	Kirzner, I.	Competition and Entrepreneurship, Chicago: University of Chicago	Book		11.89	592	16.91
9	1961	McClelland, D.	The Achieving Society, Princeton, NJ: Van Nostrand	Book		11.89	2694	57.32
10	1994	Storey, D.	Understanding the Small Business Sector, London: Routledge	Book		11.63	474	33.86
11	1997	Kirzner, I.	Entrepreneurial discovery and the competitive market process: an Austrian approach	Journal	Journal of Economic Literature	11.46	172	15.64
12	1982	Casson, M.	The Entrepreneur: An Economic Theory, Oxford: Martin Robertson	Book		11.38	184	7.08
13	1986	Aldrich, H. and Zimmer, C.	Entrepreneurship through social networks, in: D. Sexton and R. Smilor (Eds.), The Art and Science of Entrepreneurship, New York: Ballinger	Book chapter		10.90	204	9.27
14	1994	Saxenian, A.	Regional Advantage: Culture and Competition in Silicon Valley and Route 128, Cambridge, MA: Harvard University Press	Book		10.85	1236	88.29
15	1997	Venkataraman, S.	The distinctive domain of entrepreneurship research, in: J. Katz and R. Brockhaus (Eds.), Advances in Entrepreneurship, Firm Emergence and Growth, Greenwich, CT: JAI Press	Book chapter		10.42	177	16.09

Rank	Year	Author	Title	Type	Journal	J-Index	SSCI citation	SSCI/year
16	1965	Stinchcombe, A.	Social structure and organizations, in: J.G. March (Ed.), Handbook of Organizations, Chicago: Rand-McNally	Book chapter		9.73	1289	29.98
17	1959	Penrose, E.	The Theory of the Growth of the Firm, Oxford: Oxford University Press	Book		9.73	2169	44.27
18	1982	Nelson, R. and Winter, S.	An Evolutionary Theory of Economic Change, Cambridge, MA: Harvard University Press	Book		9.58	4303	165.50
19	2000	Hamilton, B.	Does entrepreneurship pay? An empirical analysis of the returns to self-employment	Journal	Journal of Political Economy	9.46	78	9.75
20	1999	Aldrich, H.	Organizations Evolving, London: Sage	Book		9.38	457	50.78
21	1998	Blanchflower, D. and Oswald, A.	What makes an entrepreneur?	Journal	Journal of Labor Economics	9.38	194	19.40
22	1997	Busenitz, L. and Barney, J.	Differences between entrepreneurs and managers in large organizations: biases and heuristics in strategic decision-making	Journal	Journal of Business Venturing	9.38	163	14.82
23	1989	Evans, D. and Jovanovic, B.	An estimated model of entrepreneurial choice under liquidity constraints	Journal	Journal of Political Economy	8.97	321	16.89
24	1985	Drucker, P.	Innovation and Entrepreneurship: Practice and Principles, New York: Harper and Row	Book		8.38	518	22.52
25	1997	ENSR	The European Observatory for SMEs, Fifth Annual Report to the European Commission, EIM, Netherlands	Report		8.33	16	1.45
26	1990	Stevenson, H. and Jarillo, J.	A paradigm of entrepreneurship: entrepreneurial management	Journal	Strategic Management Journal	8.33	157	8.72
27	1988	Low, M. and MacMillan, I.	Entrepreneurship: past research and future challenges	Journal	Journal of Management	8.33	182	9.10
28	1996	Lumpkin, G.T. and Dess, G.G.	Clarifying the entrepreneurial orientation construct and linking it to performance	Journal	Academy of Management Review	8.26	273	22.75
29	1995	Audretsch, D.	Innovation and Industry Evolution, Cambridge: MIT Press	Book		8.26	280	21.54
30	2001	Alvarez, S.A. and Busenitz, L.	The entrepreneurship of resource-based theory	Journal	Journal of Management	8.11	62	8.86
31	2001	Reynolds, P., Camp, S.M., Bygrave, W., Autio, E. and Hay, M.	Global Entrepreneurship Monitor. 2001 Executive Report, Kauffman Foundation, Kansas, MO	Report		8.11	55	7.86
32	1985	Gartner, W.	A conceptual framework for describing the phenomenon of new venture creation	Journal	Academy of Management Review	7.78	192	8.35
33	1982	Jovanovic, B.	Selection and the evolution of industry	Journal	Econometrica	7.78	628	24.15
34	1991	Shaver, K. and Scott, L.	Person, process, choice: the psychology of new venture creation	Journal	Entrepreneurship Theory and Practice	7.69	95	5.59
35	1990	Cohen, W. and Levinthal, D.	Absorptive capacity: a new perspective on learning and innovation	Journal	Administrative Science Quarterly	7.69	2245	124.72
36	1989	Evans, D. and Leighton, L.	Some empirical aspects of entrepreneurship	Journal	American Economic Review	7.69	288	15.16
37	1986	Brockhaus, R. and Horwitz, P.	The psychology of the entrepreneur, in: D. Sexton and R. Smilor (Eds.), The Art and Science of Entrepreneurship, Cambridge: Ballinger	Book chapter		7.69	95	4.32
38	1980	Vesper, K.	New Venture Strategies, Englewood Cliffs, NJ: Prentice Hall	Book		7.57	177	6.32
39	1979	Birch, D.	The job generation process, MIT Program for Neighborhood and Regional Change, Cambridge, MA: MIT	Report		7.57	320	11.03

Rank	Year	Author	Title	Type	Journal	J-Index	SSCI citation	SSCI/year
40	1976	Jensen, M. and Meckling, W.H.	Theory of the firm: managerial behavior, agency costs and ownership structure	Journal	Journal of Financial Economics	7.57	5361	167.53
41	1999	Gompers, P. and Lerner, J.	The Venture Capital Cycle, Cambridge, MA: MIT Press	Book		7.29	196	21.78
42	1999	Lerner, J.	The government as venture capitalist: the long run impact of the SBIR program	Journal	Journal of Business	7.29	67	7.44
43	1998	Caves, R.E.	Industrial organization and new findings on the turnover and mobility of firms	Journal	Journal of Economic Literature	7.29	197	19.70
44	1987	Birch, D.	Job Creation in America: How Our Smallest Companies Put the Most People to Work, New York: Free Press	Book		7.05	252	12.00
45	1986	Carsrud, A.L., Olm, K.W. and Eddy, G.E.	Entrepreneurship: research in quest of a paradigm, in: D. Sexton and R. Smilor (Eds.), The art and science of entrepreneurship, Cambridge, MA: Ballinger	Book chapter		7.05	21	0.95
46	1986	Wortman, M.S.	A unified framework, research typologiesand research prospectuses for the interface between entrepreneurship and small business, in: D. Sexton and R. Smilor (Eds.), The Art and Science of Entrepreneurship, Cambridge, MA: Ballinger	Book chapter		7.05	16	0.73
47	1890	Marshall, A.	Principles of Economics, London: MacMillan	Book		7.03	4013	77.17
48	2002	Lazear, E. P.	Entrepreneurship, Working Paper No. 9109, Cambridge, MA: NBER	Report		6.76	19	3.17
49	2001	Gaglio, C. and Katz, J.	The psychological basis of opportunity identification: entrepreneurial alertness	Journal	Small Business Economics	6.76	43	6.14
50	2000	Reynolds, P., Hay, M., Bygrave, W., Camp, M. and Autio, E.	Global Entrepreneurship Monitor: 2000 Executive Report, Kansas City: Kauffman Center for Entrepreneurial Leadership	Report		6.76	48	6.00
51	2000	Sorenson, O. and Audia, P.G.	The social structure of entrepreneurial activity: geographic concentration of footwear production in the United States, 1940–1989	Journal	American Journal of Sociology	6.76	92	11.50
52	1995	Gompers, P.	Optimal investing, monitoring and the staging of venture capital	Journal	Journal of Finance	6.61	156	12.00
53	1984	Hannan, M. and Freeman, J.	Structural inertia and organizational change	Journal	American Sociological Review	6.59	1058	44.08
54	1980	Porter, M.	Competitive Strategy, New York: Free Press	Book		6.49	4533	161.89
55	1945	Hayek, F.	The use of knowledge in society	Journal	American Economic Review	6.49	1014	19.50
56	1991	Barney, J.	Firm resources and sustained competitive advantage	Journal	Journal of Management	6.41	2708	159.29
57	1994	Holtz-Eakin, D., Joulfaian, D. and Rosen, H.	Sticking it out: entrepreneurial survival and liquidity constraints	Journal	Journal of Political Economy	6.20	148	10.57
58	1985	Birley, S.	The role of networks in the entrepreneurial process	Journal	Journal of Business Venturing	5.99	155	6.74
59	1985	Stevenson, H., Roberts, M. and Grousbeck, H.	New Business Ventures and the Entrepreneur, Homewood, IL: Irwin	Book		5.99	78	3.39
60	1982	Kent, C.A., Sexton, D. and Vesper, K.	Encyclopedia of entrepreneurship, Englewood Cliffs, NJ: Prentice-Hall	Book		5.99	47	1.81
61	1992	Bygrave, W. and Timmons, J.	Venture Capital at the Crossroads, Boston, MA: Harvard Business School Press	Book		5.97	164	10.25

Rank	Year	Author	Title	Type	Journal	J-Index	SSCI citation	SSCI/year
62	1992	Larson, A.	Network dyads in entrepreneurial settings: a study of the governance of exchange relationships	Journal	Administrative Science Quarterly	5.97	330	20.63
63	1979	Kirzner, I.	Perception, Opportunity and Profit: Studies in the Theory of Entrepreneurship, Chicago: University of Chicago	Book		5.95	248	8.55
64	1977	Hannan, M. and Freeman, J.	The population ecology of organizations	Journal	American Journal of Sociology	5.95	1367	44.10
65	1977	Timmons, J.A., Smollen, L.E. and Dingee, A.	New Venture Creation, Homewood, IL: Irwin	Book		5.95	253	8.16
66	1968	Baumol, W.	Entrepreneurship in economic theory	Journal	American Economic Review	5.95	97	2.43
67	1996	Audretsch, D. and Feldman, M.	R&D spillovers and the geography of innovation and production	Journal	American Economic Review	5.79	454	37.83
68	1990	Acs, Z.J. and Audretsch, D.	Innovation and Small Firms, Cambridge: MIT Press	Book		5.77	288	16.00
69	1990	Baumol, W.	Entrepreneurship: productive, unproductive and destructive	Journal	Journal of Political Economy	5.77	224	12.44
70	1990	Gartner, W.	What are we talking about when we talk about entrepreneurship?	Journal	Journal of Business Venturing	5.77	61	3.39
71	1986	Churchill, N.C. and Lewis, V.L.	Entrepreneurship research: directions and methods, in: D. Sexton and R. Smilor (Eds.), The art and science of entrepreneurship, Cambridge, MA: Ballinger	Book chapter		5.77	12	0.55
72	1994	Aldrich, H. and Fiol, C.M.	Fools rush in? The institutional context of industry creation	Journal	Academy of Management Review	5.43	283	20.21
73	1994	Holtz-Eakin, D., Joulfaian, D. and Rosen, H.	Entrepreneurial decisions and liquidity constraints	Journal	Rand Journal of Economics	5.43	111	7.93
74	1993	Baumol, W.	Formal entrepreneurship theory in economics: existence and bounds	Journal	Journal of Business Venturing	5.43	31	2.07
75	2001	Blanchflower, D., Oswald, A. and Stutzer, A.	Latent entrepreneurship across nations	Journal	European Economic Review	5.41	40	5.71
76	2001	Klepper, S.	Employee startups in high-tech industries	Journal	Industrial and Corporate Change	5.41	44	6.29
77	2001	Sarasvathy, S.	Causation and effectuation: toward a theoretical shirt from economic inevitability to entrepreneurial contingency	Journal	Academy of Management Review	5.41	72	10.29
78	2001	Sorenson, O. and Stuart, T.	Syndication networks and the spatial distribution of venture capital investments	Journal	American Journal of Sociology	5.41	113	16.14
79	2000	Birley, S. and Stockley, S.	Entrepreneurial teams and venture growth, in: D. Sexton and H. Landström (Eds.), The Blackwell Handbook of Entrepreneurship, Oxford: Blackwell	Book chapter		5.41	18	2.25
80	2000	Blanchflower, D.	Self-employment in OECD countries	Journal	Labor Economics	5.41	44	5.50
81	2000	Carroll, G.R. and Hannan, M.	The Demography of Corporations and Industries, Princeton, NJ: Princeton University Press	Book		5.41	284	35.50
82	2000	Dunn, T.A. and Holtz-Eakin, D.	Financial capital, human capital and the transition to self-employment: evidence from intergenerational links	Journal	Journal of Labor Economics	5.41	55	6.88
83	2000	Jeng, L.A. and Wells, P.	The determinants of venture capital funding: evidence across countries	Journal	Journal of Corporate Finance	5.41	45	5.63
84	2000	Lin, Z., Picot, G. and Compton, J.	The entry and exit dynamics of self-employment in Canada	Journal	Small Business Economics	5.41	8	1.00
85	2000	Simon, M., Houghton, S. and Aquino, K.	Cognitive biases, risk perception and venture formation	Journal	Journal of Business Venturing	5.41	53	6.63

Rank	Year	Author	Title	Type	Journal	J-Index	SSCI citation	SSCI/year
86	1755	Cantillon, R.	H. Higgs (Ed.), 1931, Essai sur la nature de commerce en géneral (Essay on the nature of trade in general). London: Macmillan	Book		5.41	243	4.67
87	1985	Granovetter, M.	Economic action and social structure: the problem of embeddedness	Journal	American Journal of Sociology	5.39	3637	158.13
88	1985	Stevenson, H. and Gumpert, D.	The heart of entrepreneurship	Journal	Harvard Business Review	5.39	91	3.96
89	1985	Williamson, O.	The Economic Institutions of Capitalism, New York: Free Press	Book		5.39	5352	232.70
90	1992	Chandler, G.N. and Jansen, E.	The founder's self-assessed competence and venture performance	Journal	Journal of Business Venturing	5.22	38	2.38
91	1999	Stuart, T., Hoang, H. and Hybels, R.C.	Interorganizational endorsements and the performance of entrepreneurial ventures	Journal	Administrative Science Quarterly	5.21	221	24.56
92	1998	Amit, R., Brander, J. and Zott, C.	Why do Venture capital firms exist? Theory and Canadian evidence	Journal	Journal of Business Venturing	5.21	43	4.30
93	1998	Baron, R.	Cognitive mechanisms in entrepreneurship: why and when entrepreneurs think differently than other people	Journal	Journal of Business Venturing	5.21	93	9.30
94	1998	Berger, A. and Udell, G.	The economics of small business finance: the roles of private equity and debt markets in the financial growth cycle	Journal	Journal of Banking and Finance	5.21	121	12.10
95	1998	Bruderl, J. and Preisendorfer, P.	Network support and the success of newly founded businesses	Journal	Small Business Economics	5.21	66	6.60
96	1998	Hellmann, T.	The allocation of control rights in venture capital contracts	Journal	RAND Journal of Economics	5.21	64	6.40
97	1997	Reynolds, P. and White, S.B.	The Entrepreneurial Process: Economic Growth, Men, Women and Minorities, Westport, CN: Quorum	Book		5.21	54	4.91
98	1997	Teece, D., Pisano, G. and Sheen, A.	Dynamic capabilities and strategic management	Journal	Strategic Management Journal	5.21	1384	125.82
99	1991	Krugman, P.	Geography and Trade, Cambridge, MA: MIT Press	Book		5.13	1216	71.53
100	1990	Bates, T.	Entrepreneur human capital inputs and small business longevity	Journal	Review of Economics and Statistics	5.13	157	8.72
101	1990	Eisenhardt, K. and Schoonhoven, C.B.	Organizational growth: linking founding team, strategy, environment and growth among US semiconductor ventures, 1978–1988	Journal	Administrative Science Quarterly	5.13	314	17.44
102	1990	Evans, D. and Leighton, L.	Small business formation by unemployed and employed workers	Journal	Small Business Economics	5.13	47	2.61
103	1990	Sahlman, W.	The structure and governance of venture-capital organizations	Journal	Journal of Financial Economics	5.13	270	15.00
104	1988	Acs, Z.J. and Audretsch, D.	Innovation in large and small firms-an empirical-analysis	Journal	American Economic Review	5.13	247	12.35
105	1986	Roure, J.B. and Maidique, M A.	Linking prefunding factors and high-technology venture success	Journal	Journal of Business Venturing	5.13	61	2.77
106	1986	Sexton, D. and Smilor, R.	The art and science of entrepreneurship, Cambridge, MA: Ballinger	Book		5.13	12	0.55
107	1995	Gatewood, E., Shaver, K. and Gartner, W.	A longitudinal study of cognitive factors influencing start-up behaviors and success at venture creation	Journal	Journal of Business Venturing	4.96	45	3.46
108	1995	McGee, J., Dowling, M. and Megginson, W.	Cooperative strategy and new venture performance: the role of business strategy and management	Journal	Strategic Management Journal	4.96	36	2.77
109	1995	Palich, L. and Bagby, R.	Using cognitive theory to explain entrepreneurial risk-taking: challenging conventional wisdom	Journal	Journal of Business Venturing	4.96	61	4.69

Rank	Year	Author	Title	Type	Journal	J-Index	SSCI citation	SSCI/year
110	1980	Brockhaus, R.	Risk taking propensity of entrepreneurs	Journal	Academy of Management Journal	4.86	146	5.21
111	1979	Aldrich, H.	Organizations and Environments, Englewood Cliffs, NJ: Prentice-Hall	Book		4.86	1323	45.62
112	1979	Kihlstrom, R.E. and Laffont, J.J.	A general equilibrium entrepreneurial theory of firm formation based on risk aversion	Journal	Journal of Political Economy	4.86	195	6.72
113	1962	Arrow, K.	Economic welfare and the allocation of resources for inventions, in: R. Nelson (Ed.), The Rate and Direction of Inventive Activity, Princeton, NJ, Princeton University Press	Book chapter		4.86	1158	25.17
114	1985	MacMillan, I.C., Siegel, R.M. and Subba Narasimha, P.N.	Criteria used by venture capitalists to evaluate new ventures	Journal	Journal of Business Venturing	4.79	125	5.43
115	1983	Kanter, R.M.	The change masters, New York: Simon and Schuster	Book		4.79	1222	48.88
116	1994	Fried V.H. and Hisrich R.D.	Toward a model of venture capital investment decision making	Journal	Financial Management	4.65	40	2.86
117	1993	Aldrich, H. and Wiedenmayer, G.	From traits to rates: an ecological perspective on organizational foundings, in: J. Katz and R. Brockhaus (Eds.), Advances in Entrepreneurship, Firm Emergence and Growth, Greenwich, CT: JAI Press	Book chapter		4.65	47	3.13
118	1993	Jaffe, A., Trajtenberg, M. and Henderson, R.	Geographic localization of knowledge spillovers as evidenced by patent citations	Journal	Quarterly Journal of Economics	4.65	754	50.27
119	1991	Covin, J. and Slevin, D.	A conceptual model of entrepreneurship as firm behavior	Journal	Entrepreneurship Theory and Practice	4.49	132	7.76
120	1990	Aldrich, H.	Using an ecological perspective to study organizational founding rates	Journal	Entrepreneurship Theory and Practice	4.49	34	1.89
121	1990	Amit, R., Glosten, L. and Mueller, E.	Entrepreneurial ability, venture investments and risk sharing	Journal	Management Science	4.49	50	2.78
122	1990	Freear, J. and Wetzel, W.	Who bankrolls high-tech entrepreneurs?	Journal	Journal of Business Venturing	4.49	22	1.22
123	1990	Porter, M.	The competitive advantage of nations, New York: Free Press	Book		4.49	3130	173.89
124	1987	Sandberg, W.R. and Hofer, C.W.	Improving new venture performance: the role of strategy, industry structure and the entrepreneur	Journal	Journal of Business Venturing	4.49	116	5.52
125	1987	Wetzel, W.	The informal venture capital market: aspects of scale and market efficiency	Journal	Journal of Business Venturing	4.49	16	0.76
126	1992	Gartner, W., Bird, B. and Starr, J.	Acting as if: differentiating entrepreneurial from organizational behavior	Journal	Entrepreneurship Theory and Practice	4.48	56	3.50
127	1992	Glaeser, E., Kallal, H., Scheinkman, J. and Shleifer, A.	Growth in cities	Journal	Journal of Political Economy	4.48	480	30.00
128	1992	Sexton, D. and Kasarda, J.	The State of the Art of Entrepreneurship, Boston, MA: PWS Kent	Book		4.48	7	0.44
129	1978	Lucas, R. E.	On the size distribution of business firms	Journal	Bell Journal of Economics	4.32	310	10.33
130	1975	Williamson, O.	Markets and Hierarchies: Analysis and Antitrust Implications, New York: Free Press	Book		4.32	5577	169,00
131	1930	Weber, M.	The Protestant Ethic and The Spirit of Capitalism, New York: Scribners	Book		4.32	4593	88.33
132	1984	Hambrick, D. and Mason, P.	Upper echelons: the organization as a reflection of its top managers	Journal	Academy of Management Review	4.19	944	39.33
133	1983	Churchill, N.C. and Lewis, V.	The five stages of small business growth	Journal	Harvard Business Review	4.19	164	6.56

Rank	Year	Author	Title	Type	Journal	J-Index	SSCI citation	SSCI/year
134	1982	Bruno, A. and Tyebjee, T.	The environment for entrepreneurship, in: C. Kent, D. Sexton and K. Vesper (Eds.), Encyclopedia of Entrepreneurship, Englewood Cliffs, NJ: Prentice-Hall	Book chapter		4.19	35	1.35
135	1982	Shapero, A. and Sokol, L.	The social dimensions of entrepreneurship, in: C. Kent et al. (Eds.), Encyclopedia of Entrepreneurship. Englewood Cliffs, NJ: Prentice Hall	Book chapter		4.19	117	4.50

SSCI began in 1956.

Appendix 2. Summary of CVs of leading entrepreneurship researchers

	William Gartner	Howard Aldrich	Israel Kirzner	Scott Shane	Sankaran Venkataraman	William Baumol	David Audretsch	David Birch	Amar Bhidé	David Blanchflower	David Storey	Mark Casson	Josh Lerner	David Evans
Year of birth	1953	1943	1930	1964	1956	1922	1954	1937	1955	1952	1947	1945	1960	1954
Career trajectory														
PhD	1982	1969	1957	1992	1989	1949	1980	1966	1988	1985	1978	1969	1992	1983
Assistant professor	1981	1969	1957	1993	1989	–	1980	1966	1988	1986	–	1969	1991	–
Associate professor	–	1974	1961	1999	1995	–	–	1970	1993	1989	–	1977	1996	1983
Full professor	1994	1979	1968	2001	2001	1949	1996	–	2000	1993	1990	1981	1999	1985
First core work	1985	1979	1973	2000	1997	1968	1988	1979	2000	1998	1994	1982	1999	1989
Mobility														
No academic employments	5	3	1	6	3	2	6	2	4	7	3	1	1	2
Visiting professorships	1	9	na	3	0	na	7	0	1	0	4	3	na	1
Industry employments	0	0	na	0	0	na	0	20 years	0	0 consultant	0 policy	0	na	22 years
Scientific productivity														
Total publ.	84	163	122[a]	99	44	na	354	5	34	104	139	143	96	101
Books	2	8	12	11	3	na	12	1	7	3	9	19	9	5
Edited books	1	0	3	3	1	na	27	0	0	1	8	19	2	3
Book chapters	28	66	63	7	11	na	118	3	4	24	41	59	18	18
Single-authored articles	18	24	44	32	3	na	56	1	19	23	26	26	20	24
Multi-authored articles	35	65	44	46	26	na	141	0	4	53	55	20	47	51
Co-authorship ratio	0.51	0.37	na	0.70	0.12	na	0.40	1.00	4.75	0.43	0.47	1.30	0.43	0.47

[a] Kirzner's publication list since 1998 is not complete.

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