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Gazelles (High-Growth) Companies: a Bibliometric Science Map of the Field

Raysa Geaquinto Rocha[1] · **João J. Ferreira**[1]

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Abstract

Research on gazelles (high-growth) companies has been increasing exponentially in the last decade. It is especially evident from 2013 onwards. This article offers an overview of academic literature development published from 2000 to 2021 regarding Gazelles firms in 84 peer-reviewed articles from the Web of Science. We applied a novel methodological approach to compare results from different bibliometric analyses using VOSviewer software, analysing three indicators, journals, articles, and author by citations, co-citations, and bibliographic coupling. We also analysed the co-occurrence of keywords Plus. The results provided four thematic clusters: entrepreneurship, performance, innovation, and dynamics. We presented the most relevant contributions and a future research agenda for each cluster to address the field gaps.

Keywords High-growth firms · Gazelles · Rapid growth firms · Strategy · Bibliometric analysis

Introduction

Ever since Penrose (1959) first proposed growth theory, research has sought to explain how and why companies are able to grow and expand. Henceforth, research has developed across different fields, for example, in the decades since Barney (1991) and Porter (1981) made advances in the strategic management field regarding the theory of resources and sustainable competitive advantages in explaining what and how those advantages occur. Productivity, innovation, and competitiveness are

✉ João J. Ferreira
jjmf@ubi.pt

Raysa Geaquinto Rocha
raysa.geaquinto@gmail.com

[1] Department of Management and Economics, University of Beira Interior (UBI), NECE - Research Unit in Business Sciences, Pólo IV, Estrada Do Sineiro, 6200-209 Covilha, Portugal

intrinsically linked (Carayannis & Grigoroudis, 2014), and strategic choices drive different performance levels (Barney, 1991; Porter, 1981). For example, knowledge management capabilities are crucial to innovative performance (Martinez-Conesa et al., 2017; Zahra & George, 2002), therefore shape the emergence of a select group of companies, then entitled gazelles, that report swift growth and stand out from the rest, influencing economic growth while also generating employment (Du et al., 2015).

Gazelles constitute a unique context for understanding organisational growth; its management challenges are different from the remainder of the private sector, and policies designed to stimulate the business environment and reduce the regulatory barriers are critical to their emergence (Giner et al., 2017). The long-term value creation perspectives for shareholders and stakeholders convey such organisations' relevance to research and practice. Nevertheless, the challenge arises from the samples and the organisational structures (Coad et al., 2014a, b; Delmar et al., 2003; Demir et al., 2017).

Difficulties also arise in identifying this group (Demir et al., 2017; Mogos et al., 2021; Shane, 2009), even if we may define the relationship between employment creation, higher turnover levels, profitability, and assets with this swift pace of growth (Coad et al., 2014a, b). Specific characteristics such as their orientations towards entrepreneurship and learning, the ownership structure, access to financing, the management and human capital structure, the portfolio of acquired knowledge and skills, the clients, markets, and export focus all rank as factors enabling the identification of gazelle companies that hold greater significance than aspects such as location, acquisitions, education, risk-taking, motivation by self-fulfilment, and the internal control structure (Dwyer et al., 2016).

The capital level revolves around its correlated questions (risk, efficiency, and liquidity) and the importance of short-term financial decisions to gazelle firms' working capital and profitability (Boțoc et al., 2017). Studies on the strategic management deployed by gazelle companies remain dispersed and fragmented given their respective characteristics, and the nature of their growth constitute complex and challenging to measure dimensions (Shane, 2009). Demir et al. (2017) categorise the main drivers of these non-standard levels of growth as human capital; strategy, human resources management, innovation, and capabilities. While the advances made in recent decades brought about the differentiation of gazelle companies from the majority of small and medium-sized companies, there remains a need for a model that facilitates the identification of newly emerging gazelles (Dwyer et al., 2016).

Due to those companies' impact and to ascertain which direction the future research on gazelle companies should take, we need to grasp the current state-of-the-art literature on such companies (Demir et al., 2017), which requires a systematised search of the existing research. Therefore, this study summarises the literature's mapping and characterising it through a bibliometric analysis, enabling identifying research shortcomings and preparing a future research agenda.

The article takes the following organisational structure. Following this introduction, sect. "Review Approach" explains the methodological approach and detailing all the steps taken to produce the results in sect. "Results". Section "Discussion of

thematic groups" provides a discussion of these results before moving onto the categorisation and classification of the literature. In sect. "Conclusions", we set out our final considerations and proposals for a future research agenda.

Review Approach

We applied recent trends in bibliometric studies (Caputo et al., 2021; Ferreira, 2018). Data collection was based on a systematic review protocol (Wright et al., 2007). We conducted the database search, collection, and analysis of the articles' results under a pre-established procedure for selecting the most relevant studies (Denyer & Tranfield, 2009; Tranfield et al., 2003). We handled the items identified following the principle of equality, their focus, accessibility, and transparency (Thorpe et al., 2005).

Criteria

To ensure the relevance and pertinence of the articles identified (Tranfield et al., 2003), we furthermore employed the following criteria for inclusion and exclusion as determined during the planning stage, thus before undertaking the automatic search (Jenkin et al., 2014): (a) including only those articles within the respective field of study (Management or Business or Economics); (b) including only articles written in English (Ankrah & AL-Tabbaa, 2015); (c) including only articles in Scientific Journals; (d) including only articles published between 1900 and 2021, the entire period that the database covers (Feng et al., 2015); (e) topics containing the terms "high-growth firm" or "gazelles" or "rapid growth firm"; (f) including only articles' with a scientific methodology (excluding editorials, opinion articles, and other) (Jones et al., 2011).

Following the criteria above, on March 06, 2021, we carried out the Web of Science's search; it provided 100 theoretical and empirical articles (Wright et al., 2007). We excluded 16 articles based on the previous criteria. Thus, we thoroughly analysed 84 articles. Figure 1 summarises these methodological steps.

Bibliometric Analysis

To study the scientific activities of the research concerning Gazelles companies, we develop a bibliometric analysis. After selecting the articles, we submitted them to VOSViewer version 1.6.16 software for developing and displaying a bibliometric map based on network data (Van Eck & Waltman, 2010; Zupic & Čater, 2015). It combines performance analysis and science mapping (Caputo et al., 2021; Ferreira, 2018). We used word frequency, citation, and publication counted to measure the performance analysis. We used science mapping to analyse how different scientific elements are related (Caputo et al., 2021; Ferreira, 2018).

We selected three indicators to compare, journals, articles, and authors. In these three indicators, we analyse citations, co-citations, and bibliographic

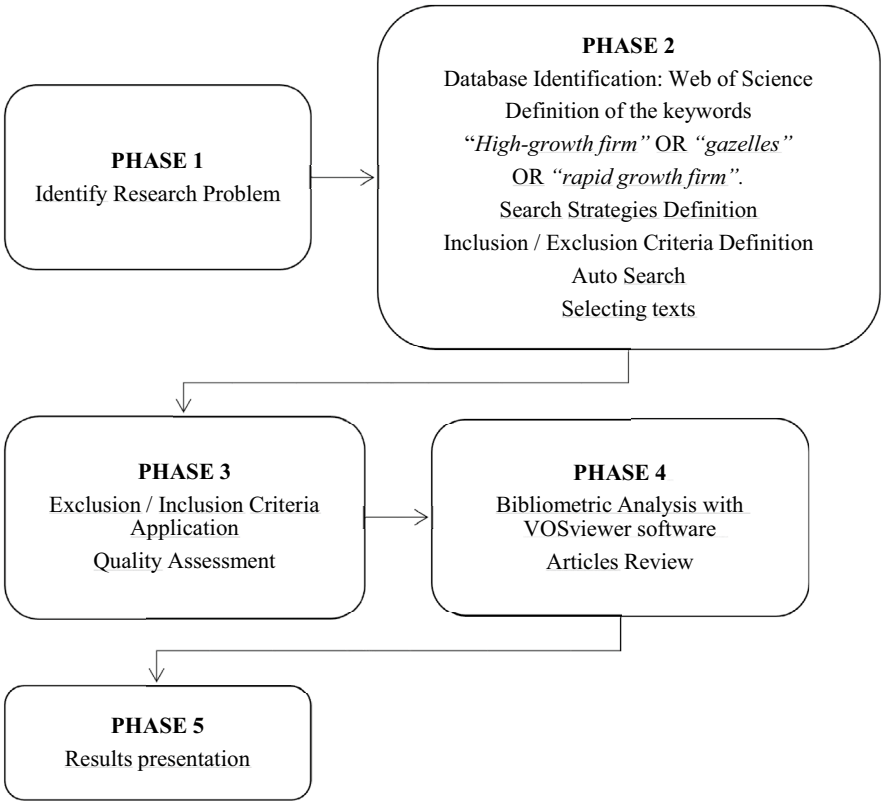

Fig. 1 Search protocol phases

coupling. The first analysis focuses on the selected publications after applying the criteria. The second evaluates the references cited in these publications. Finally, the third analysis evaluates the connections between articles in the database in terms of positioning in the network. In addition to these indicators, we also developed a co-occurrence analysis of the keywords, as they focus on the articles' content. Therefore, the comparative analysis overcomes the limitations and biases of choosing only one of the analyses, providing a comprehensive map of the subject area.

Results

We present the results regarding the units of analysis: articles, authors, journals, and keywords. We present the citations, co-citations, and bibliographic coupling results for all units, thus providing the necessary data to compare this research

Table 1 Article's comparison in terms of citation, co-citation, and bibliographic coupling

Citations		**Co-citation**		**Bibliographic coupling**	
Document	Cit	Cited reference	Cit	Document	Total link strength
Delmar (2003)	610	Acs (2008)	29	Stam (2019)	31
Henrekson (2010)	341	Birch (1979)	24	Aldrich and Ruef (2018)	8
Zacharakis (2001)	227	Coad and Rao (2008)	20	Brown (2017)	57
Mason (2013)	204	Coad et al. (2014b)	24	Krasniqi (2016)	38
Acs (2008)	194	Delmar (2003)	37	Morris (2015)	23
Zacharakis (2000)	172	Henrekson (2010)	45	Daunfeldt (2015a)	44
Coad et al. (2014a)	126	Grimm et al. (2012)	23	Daunfeldt (2015b)	20
Nightingale (2014)	123	Mason (2013)	23	Segarra (2014)	34
Hölzl (2009)	115	Parker (2010)	24	Hagen (2014)	14
Moreno (2007)	113	Storey (1994)	26	Lee (2014)	18
Parker (2010)	109			Bamiatzi (2014)	23
Daunfeldt (2015a)	65			Bos (2014)	30
Feindta (2002)	61			Coad et al. (2014a)	50
Segarra (2014)	58			Nightingale (2014)	34
Grimm (2012)	56			Colombelli (2014)	18
Lee (2014)	54			Koski (2013)	10
Lopez-garcia (2012)	53			Mason (2013)	28
Beekman (2004)	50			Tomczyk (2013)	4
Krasniqi (2016)	48			Lopez-Garcia (2012)	17
Morris (2015)	46			Grimm (2012)	1
Colombelli (2014)	45			Lindic (2012)	12
Hagen (2014)	44			Parker (2010)	27
Stam (2005)	37			Henrekson (2010)	45
Brown (2017)	36			Hölzl (2009)	16
Bamiatzi (2014)	35			Acs (2008)	14
Stam	29			Moreno (2007)	31
Aldrich and Ruef (2018)	29			Stam (2005)	7
Koski (2013)	25			Beekman (2004)	11
Daunfeldt (2015b)	23			Delmar (2003)	20
Tomczyk (2013)	22			Feindta (2002)	2
Lindic (2012)	22			Zacharakis (2001)	26
Bos (2014)	21			Zacharakis (2000)	23

Cit citations

field's development.

Analysis of the Articles

Concerning the evolution of the field, Table 1 and Fig. 3 show its growth in the number of articles since 2010. The average number of citations per article was 65.96 (Standard Deviation of 102.3), the median was 29, with a mode of 13. Figure 2 displays the Web of Science annual trend in citations and publications.

Figure 2 allows identifying that most publications have taken place since 2013. This result demonstrates this theme's newness as a focus of scientific study and conveys the relative scarcity of publications on this theme (Boțoc et al., 2017; Demir et al., 2017). Therefore, over the last decade, the literature has demonstrated a rising interest in gazelle companies (Coad et al., 2014a, b; Demir et al., 2017).

Table 1 provides the top 32 articles within the results ranked in terms of the citations, confirming the field's growth. Regarding the references cited by the articles (co-citation analysis), we set a minimum of 20 references; of 4058 cited references, only 10 meet the threshold. It provided a picture of the main references, for example, the theoretical pillars of the articles analysed. The top three references are:

- Henrekson, M., & Johansson, D. (2010). Gazelles as job creators: A survey and interpretation of the evidence. *Small Business Economics*, *35*(2), 227–244.
- Delmar, F., Davidsson, P., & Gartner, W. B. (2003). Arriving at the high-growth firm. *Journal of Business Venturing*, *18*(2), 189–216.
- Acs, Z. J., & Mueller, P. (2008). Employment effects of business dynamics: Mice gazelles and elephants. *Small Business Economics*, *30*(1), 85–100.

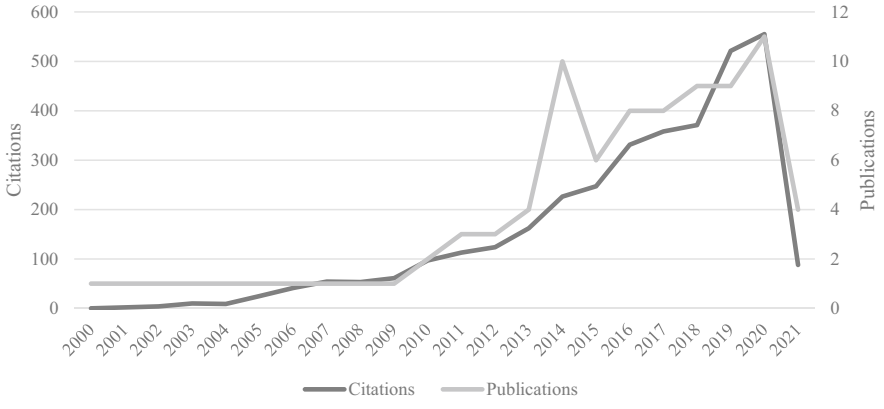

Fig. 2 Number of articles and citations per year in the Web of Science database (1900–2021)

We fixed a minimum threshold of 5 citations for articles. Concerning the theoretical pillars of the field, we considered the articles with a minimum of 20 citations and the highest link strength:

- Brown, R., Mawson, S., & Mason, C. (2017). Myth-busting and entrepreneurship policy: The case of high growth firms. *Entrepreneurship and Regional Development*, *29*(5–6), 414–443.
- Coad, A., Daunfeldt, S. O., Johansson, D., & Wennberg, K. (2014). Whom do high-growth firms hire? *Industrial and Corporate Change*, *23*(1), 293–327.
- Henrekson, M., & Johansson, D. (2010). Gazelles as job creators: A survey and interpretation of the evidence. *Small Business Economics*, *35*(2), 227–244.

Table 2 Author's comparison in terms of citation, co-citation, and bibliographic coupling

Citation			**Co-citation**		**Bibliographic coupling**	
Author	Papers	Cit	Author	Cit	Author	Total link strength
Anton, S G	3	25	Acs, Z J	85	Anton, S G	47.98
Benesova, D	2	8	Anyadike-danes, M	29	Benesova, D	93.12
Brown, R	4	268	Audretsch, D B	41	Brown, R	368.95
Coad, A	4	276	Autio, E	24	Coad, A	259.94
Daunfeldt, S O	6	223	Barringer, B R	23	Daunfeldt, S O	242.01
Halvarsson, D	3	92	Birch, D I	87	Halvarsson, D	151.8
Hart, M	2	18	Bottazzi, G	36	Hart, M	121.58
Hölzl, W	3	241	Brown, R	36	Hölzl, W	103.4
Johansson, D	3	490	Coad, A	158	Johansson, D	139.96
Kubickova, V	2	8	Daunfeldt, S O	66	Kubickova, V	93.12
Lee, N	2	64	Davidsson, P	64	Lee, N	65.47
Mason, C	3	258	Delmar, F	61	Mason, C	328.32
Mawson, S	2	36	Garnsey, E	22	Mawson, S	203.6
Megaravalli, A V	2	7	Henrekson, M	69	Megaravalli, A V	67
Michalkova, A	2	8	Hölzl, W	53	Michalkova, A	93.12
Nightingale, P	2	249	Lopez-garcia, P	20	Nightingale, P	195.69
Sampagnaro, G	2	7	Mason, C	42	Sampagnaro, G	67
Stam, E	3	87	Parker, S C	29	Stam, G	51.44
Tamagni, F	2	34	Schreyer, P	20	Tamagni, F	46.2
Teruel, M	2	59	Shane, S	27	Teruel, M	56.03
Zacharakis, A	2	399	Smallbone, D	24	Zacharakis, A	1
			Stam, E	48		
			Storey, D J	52		

Cit citations

Analysis of the Authors

This research area is in its infancy. Therefore, the 84 publications included 170 authors. Of the top three authors with the most citations (1. Johansson, D with 490 citations; 2. Zacharakis, A with 399 citations, and 3. Coad, A with 276 citations), only the third is one of with the most publications (=4). In terms of co-citation, of 2707 cited authors, only 25 with more than 20 citations Coad (=158), Birch (87), and Acs (=85). This result (Table 2) indicated only a few key authors in this research area. The bibliographic coupling demonstrated the author closer to the centre of the network, Brown (=368.95), Mason (=328.32), and Coad (=259.94). This relatively new research area is centred in the publication of few key authors.

Analysis of the Journals

The comparison between journals provides an image of those who have contributed the most to researching Gazelles companies' research. By analysing the citations, we observe the relevance; the co-citation indicates the area's bases and the bibliographic coupling the networks' importance. Our results consist of 44 journals (Table 3). Small Business Economics and Industrial and Corporate Change are the journals with the most publications, while the other journals are beginning to publish this topic. Seven of them account for half of the publications.

The journals with more citations are Small Business Economics (1449), Journal of Business Venturing (1009), and Industrial and Corporate Change (339). In terms of co-citation, 1897 journals were cited, 39 with more than 20 citations. The articles cited have used research from Small Business Economics (563), Journal of Business Venturing (230), and Industrial and Corporate Change (182). In terms of link strength in the network, the bibliographic coupling with a minimum threshold of 2 articles per journal resulted in 13 journals out of 44. The top three journals are Small Business Economics (331.98), Industrial and corporate change (190.52), and International Small Business Journal-Researching Entrepreneurship (131.24).

In sum, the citation analyses offered the most significant journals, articles, and authors in the field. A high number of citations do not mean a high impact connection in the network. The bibliographic coupling provided the articles, journals, and author with the most impact in the research area. The most extensive set of related articles contains 57 publications, more than half of the articles analysed. Evaluating the indicators' results allows the mitigation of biases, enhancing the research's validity (Caputo et al., 2021) and minimizing the possibility of omitting a piece of important information about the field.

Analysis of the Keywords

The analysis of keywords is helpful to identifying clusters (Table 4). We used the co-occurrence of the Keywords Plus from Web of Science (Caputo et al., 2021),

Table 3 Journal's comparison in terms of citation, co-citation, and bibliographic coupling

Citation			**Co-citation**		**Bibliographic coupling**	
Source	Articles	Cit	Source	Cit	Source	Total link strength
Academia-revista latinoamericana de administracion	1	3	Academy of Management Journal	64	Applied Economics Letters	19.37
Academy of Management Perspectives	1	29	Academy of Management Review	64	Cuadernos de economia	102.15
Applied Economics Letters	2	13	Administrative Science Quarterly	36	Entrepreneurship and Regional Development	120.36
Asian Journal of Technology Innovation	1	5	American Economic Review	55	Eurasian Business Review	57.77
Baltic Journal of Economic Studies	1	0	Applied Economics	26	Industrial and Corporate Change	190.52
Business Strategy And The Environment	1	1	Econometrica	35	International Entrepreneurship and Management Journal	68.16
Cambridge Journal of Regions Economy and Society	1	18	Economic Journal	29	International Review of Entrepreneurship	62
Central European Management Journal	1	0	Entrepreneurship and the Growth of Firms	20	International Small Business Journal-Researching entrepreneurship	131.24
Cuadernos de economia	3	2	Entrepreneurship & Regional Development	41	Journal of Business Economics and Management	22.93
Entrepreneurship and Regional Development	2	149	Entrepreneurship Theory and Practice	95	Journal of Business Venturing	30
Entrepreneurship and Sustainability Issues	1	8	Foundations and Trends in Entrepreneurship	23	Journal of Intellectual Capital	41.44
Eurasian Business Review	2	0	Harvard Business Review	37	Journal of Small Business Management	49.25
Industrial and Corporate Change	8	339	Industrial and Corporate Change	182	Small Business Economics	331.98
Intangible Capital	1	0	Industry and Innovation	22		
International Entrepreneurship and Management Journal	2	23	International Small Business Journal	68		

Table 3 (continued)

Citation			**Co-citation**		**Bibliographic coupling**	
Source	Articles	Cit	Source	Cit	Source	Total link strength
International Journal of Emerging Markets	1	1	Job Generation Process	25		
International Review of Entrepreneurship	2	4	Journal of Business Venturing	230		
International small Business Journal-Researching Entrepreneurship	4	60	Journal of Economic Literature	30		
Jahrbucher fur nationalokonomie und statistik	1	2	Journal of Evolutionary Economics	27		
Journal of Business Economics and Management	2	14	Journal of Finance	25		
Journal of Business Research	1	10	Journal of Financial Economics	25		
Journal of Business Venturing	3	1009	Journal of Industrial Economics	43		
Journal of Entrepreneurship and Public Policy	1	23	Journal of Industry Competition and Trade	30		
Journal of Family Business Management	1	7	Journal of Management	45		
Journal of Financial Economics	1	0	Journal of Management Studies	22		
Journal of Intellectual Capital	2	0	Journal of Political Economy	22		
Journal of Management & Organization	1	2	Journal of Small Business Management	69		
Journal of Service Theory and Practice	1	17	Journal of Small Business and Enterprise Development	24		
Journal of Small Business Management	4	74	Management science	23		
Management & Marketing-Challenges for the Knowledge Society	1	0	Organization Science	24		
Management International Review	1	44	Quarterly Journal of Economics and Economic science	23		

Table 3 (continued)

Citation			**Co-citation**		**Bibliographic coupling**	
Source	Articles	Cit	Source	Cit	Source	Total link strength
North American Journal of Economics and Finance	1	0	Regional Studies	35		
Portuguese Economic Journal	1	0	Research Policy	115		
Problemy Zarzadzania-Management Issues	1	0	Review of Economics and Statistics	39		
RAUSP Management Journal	1	2	Small Business Economics	563		
Regional Studies	1	0	Strategic Management Journal	114		
Research Policy	1	22	Technovation	20		
Small Business Economics	17	1449	Understanding the Small Business Sector	27		
South African Journal of Business Management	1	0	World Development	21		
Technovation	1	18				
Tijdschrift voor economische en sociale geografie	1	37				
Transformations in Business & Economics	1	3				
World Bank Economic Review	1	8				
World Development	1	56				

Cit citations

Table 4 Keyword Plus co-occurrence analysis by VOSviewer software version 1.6.16

Keyword	Occurrences	Total link strength	Keyword	Occurrences	Total link strength
Cluster 1—entrepreneurship			**Cluster 2—**performance		
Age	8	8	Determinants	11	11
behavior	5	5	High-growth firms	21	20
Employment	5	5	Knowledge	11	10
Entrepreneurship	20	18	Management	7	7
Entry	7	7	Performance	22	21
Growth	7	5	SMEs	5	5
Research and development	7	7	Strategy	6	6
Cluster 3—innovation			**Cluster 4—**dynamics		
Business	5	5	Dynamics	14	14
Firms	9	7	Industry	7	6
Gibrats-Law	7	7	Persistence	5	5
Innovation	27	25	Size	14	14
Model	5	5	Survival	9	9
Policy	9	9			
Productivity	5	5			

with fractional counting method, a minimum of 5 occurrences of a keyword, of 241 keywords, 26 meet the threshold. VOSviewer provided 4 clusters with 201 links and 123 of total link strength. The most occurring keywords are innovation (27), performance (22), and high-growth firms (21). We used a thesaurus file to unite the synonyms and abbreviations (high-growth firms, gazelles, HGF, and HGFS) (Van Eck & Waltman, 2010).

The complete co-occurrence analysis also provides three other outcomes, network visualisation (Fig. 3), density visualisation (Fig. 4), and overlay visualisation (Fig. 5). Figure 3 displays the clusters by colour (cluster 1—red; cluster 2—green; cluster 3—blue; cluster 4—yellow), highlighting the link strength by each keyword's size, bigger the size means more considerable the link strength. We named the clusters by their keyword with the stronger link strength (Table 4). Figures 3 and 4 and Table 4 indicate that several keywords are connected beyond their cluster because they have more links than the number of keywords in their cluster.

The density visualisation (Fig. 4), like the network visualisation (Fig. 3), displays the keywords' connections. The hotter the colour (red) and the bigger the keyword, the stronger its presence and link strength, and the opposite, the colder the colour (blue) and the small the keyword, the weak its presence and link strength.

The overlay visualisation (Fig. 5) is useful for analysing the keyword temporal distribution and how the interest changed during the years. The darker blue (entrepreneurship) indicates the beginning of the research (oldest years) while red (knowledge) is the newest research (most recent years).

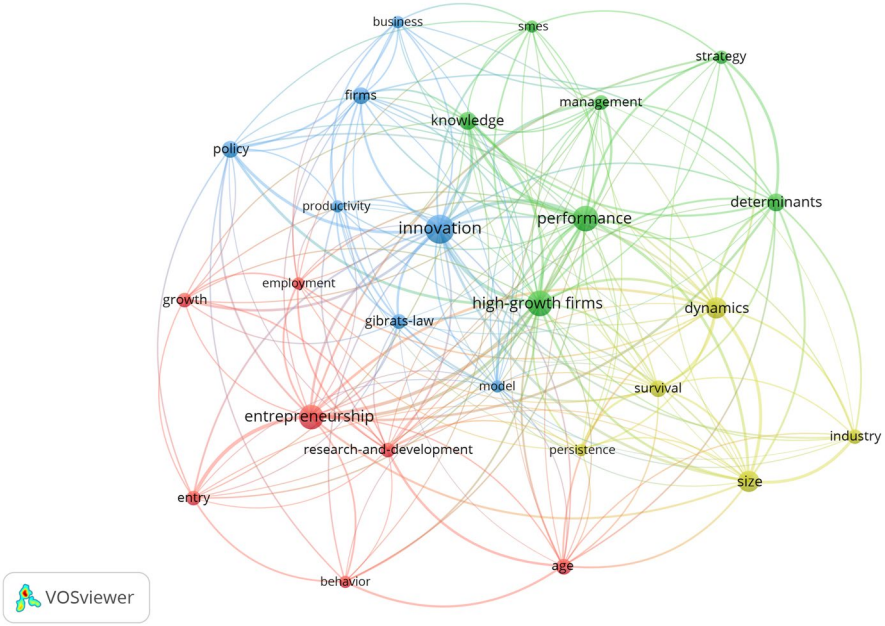

Fig. 3 Network visualisation by VOSviewer software version 1.6.16

Discussion of Thematic Groups (Clusters)

Gazelle companies are a complex research topic. Prior evidence has shown an absence of conceptualisation agreement in the literature (Aldrich & Ruef, 2018; Daunfeldt et al., 2015) and empirical evidence of the OECD concept unfit (Daunfeldt et al., 2015). However, in the last decade, the research was driven in other directions despite the concept (Mogos et al., 2021). Hence, despite the conceptualisation issue, Gazelles companies are a significant research field (Coad et al., 2017; Henrekson & Johansson, 2008). Based on our results, we identified four thematic groups (clusters): (i) entrepreneurship, (ii) performance, (iii) innovation, (iv) dynamics.

Group 1 (Cluster red)—Entrepreneurship

There was progress in defining and characterising gazelles even while this still represents a shortcoming in the literature. There has yet to emerge any definitive findings due to identifying the rapid growth depending upon the criteria utilised (Delmar et al., 2003). To establish a Gazelles profile, one must look at the entrepreneur, context, characteristics of the company, resources, and strategies (Leiva Bonilla & Alegre Vidal, 2012). Thus, the measurements of growth, the definitions, and the duration periods differ following the research project given the prevailing heterogeneity and non-linearity

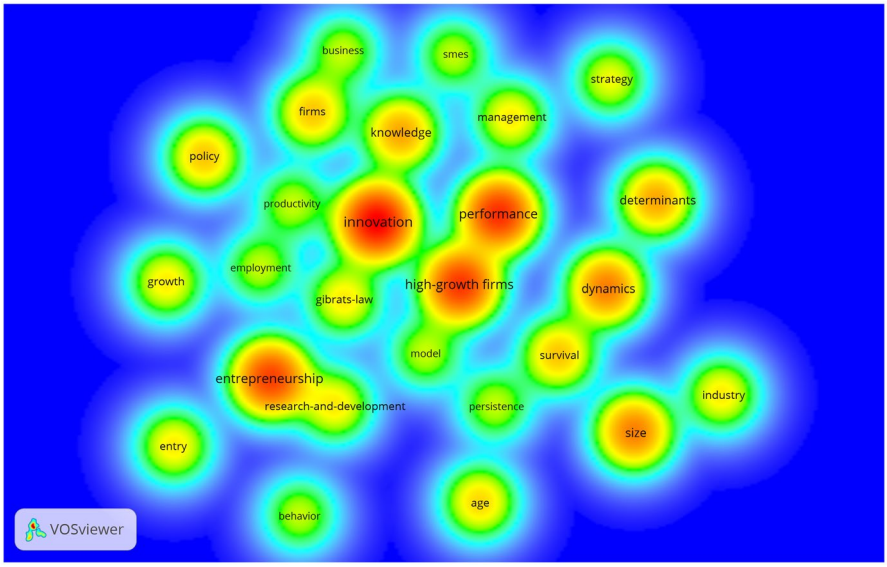

Fig. 4 Density visualization by VOSviewer software version 1.6.16

in this group of companies (Brown et al., 2017; Delmar et al., 2003; Lopez-Garcia et al., 2012; Mason et al., 2013).

There are many myths about the gazelle company type that Brown et al. (2017) attempt to unpick in terms of how much are predominantly young, small, and high technology companies, emerging out of university incubators, that both grow organically and according to their planning and that they operate in similar fashions irrespective of their respective different locations.

Morris et al. (2015) present holistic and robust research on entrepreneurship's effects on entrepreneurial societies' economies while considering public stimulus policies' effects. The entrepreneurial ecosystem's quality is strongly related to the predominance of gazelles in a region (Stam & van de Ven, 2019), and entrepreneurship policies focus on supporting gazelles firms (Martínez-Fierro et al., 2019). Benesova et al. (2018) maintain that human resources and performance influence the innovation ongoing in gazelles and that rapid growth stems from fostering innovation and effective human resource creativity.

The studies on the life cycles of gazelle companies approach the relevance of exploring means of extending these companies' lives as they experience premature bankruptcies on a large scale (Satterthwaite et al., 2017). The comparison between the gazelle companies surviving over time and those prematurely going out of business does not demonstrate any difference in their productivity levels or leverage even across differentiated economic and financial scales and dimensions (Bianchini et al., 2017). Similar results were found in Chinese gazelles companies that can persistently maintain their rapid growth (Moschella et al., 2019).

The life cycle of global gazelles and the differences among the global gazelle companies and their peers received research attention from Hagen et al. (2014), who

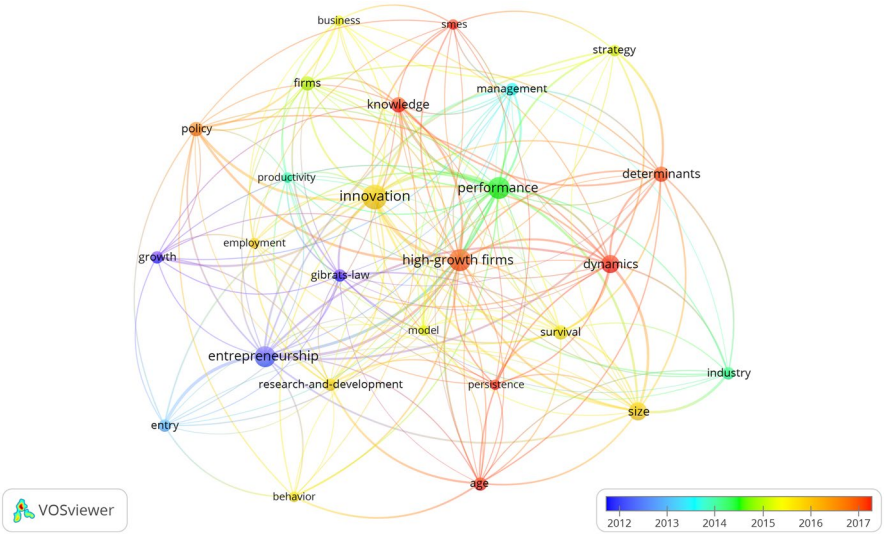

Fig. 5 Overlay visualisation by VOSviewer software version 1.6.16

maintain that there are only a few companies able to attain rapid rates of growth, and they are themselves involved in waves of innovation and the reconfiguration of their capabilities and/or boosting those already existing. Each wave of innovation happens due to the combination of shared trigger factors, such as entrepreneurial openness, planning, and prior preparation for growth and entering into complex markets that open up a range of new opportunities (Hagen et al., 2014). The waves of innovation emerging out of research and development that drive high-growth rates may also occur in already mature firms and enterprises (Kang et al., 2018). To beginners, accelerators can boost high potential entrepreneurs (González-Uribe & Reyes, 2021), and business angels positively affect sales growth (Croce et al., 2020). Nightingale et al. (2014) defend that their entrance generates positive influences for the market. Still, there are outstanding questions about these contributions (Morris et al., 2015).

As happens with entrepreneurship, there is a need to study innovation's role in these companies' rapid growth as the investments applied to research and development positively shape its likelihood of achieving rapid growth (Segarra et al., 2014). However, gazelle companies' behaviours concerning research and development are neither linear nor similar and change following the respective host country's technological characteristics (Hölzl, 2009). A formal research and development department may be positively contributing to established high-growth firms. Nevertheless, a formal human resource may negatively affect emergent high-growth firms' performance (López et al., 2019).

Sims et al. (2006) conclude that young gazelles (less than 15 years) have young owners (CEOs under 50 years) and have proper financial performance levels. In contrast, the study results by Mthimkhulu et al. (2016) find these companies have track records of less than 6 years within the South African context. In the case of Costa

Rica, however, they are large companies that do not display any geographic concentration (Gonzalez et al., 2017) and thereby corroborating the studies identifying the heterogeneity prevailing in this group (Brown et al., 2017; Delmar et al., 2003; Lopez-Garcia et al., 2012; Mason et al., 2013).

The period of rapid growth is not inclusively the same for all companies, and when they decline the speed of their growth, their rates of return on early growth levels are far lower. Regarding job creation, we would note that companies achieving high rates for a certain period have experienced staff members' departure in the preceding period (Daunfeldt et al., 2015). Furthermore, the creation of additional employment (Acs et al., 2008; Lopez-Garcia et al., 2012) and the tendency to be young companies receive support from the studies by Mthimkhulu et al. (2016) and Henrekson et al. (2010), even while there is a need for other studies on other locations. However, company age does not support all research findings as a determinant factor for rapid growth (Lopez-Garcia et al., 2012). Regarding gazelles' location, the technological districts and major urban areas significantly interlink with gazelle companies' existence (Giner et al., 2017).

Group 2 (Cluster Green)—Performance

The strategies and potential for such firms' success underwent a study by Zacharakis et al. (2000), who applied different actuarial models for testing to develop a generic model to assist in decision-making. Zacharakis et al. (2001) study the excess of confidence in decision-making over potential gazelles' investments. Their results indicate that such excessive confidence among investors may stem either from experience, the quantity, or the type of information available or the specific confidence in the investment's success. Additionally, the higher the level of information, the lower the complete analysis level in the decision-making, driving a lack of accuracy. They conclude that excesses of confidence need avoiding facilitating the better taking of decisions. The confidence of the owner in success, in turn, whenever high, may reduce the likelihood of making initial public offerings due to future profit expectations (Parker et al., 2010).

Knowing how to survive recessions and managerial responses to crises represent another factor attracting interest and the stresses caused by the recession, which may arise in keeping with the type of management response decided. Hence, managers require a flexible approach to recessions as rigidity in their responses, and the lack of familiarity with their failings may result in that termed "autistic management", thus, managers avoid taking attitudes towards challenges with the potential of bringing about their failure (Muurlink et al., 2012).

Andonova et al. (2013) defend that four strategic competencies are crucial to the survival of gazelles, precisely their capacity to prioritise product and market development, internally reorganise and delegate, to manage innovation, and provide support for productive creativity and the capacity to manage financial and economic resources. The SME performance interlinks with the prevailing business environment, capabilities, and strategic factors. Cluster analysis enables the identification of three types of SMEs: backwards, followers, and gazelles. These gazelles are

medium-sized companies, skill intensively producing relatively unprocessed products for sale (Hansen et al., 2018).

The perspective that gazelle companies display characteristics associated with success does not reflect the Swedish reality where such companies only attain low levels of profitability and weak financial health, which may explain the motive for only a few proving able to maintain their high-growth rates over subsequent periods (Daunfeldt et al., 2016). Entrepreneurs' values emerge as factors influencing gazelle companies' success even while the study by Tomczyk et al. (2013) concludes that there is no mediating relationship between values and performance. In terms of customer perceived value, Scottish Gazelles consider it an important enabler of performance and growth; the same is not perceived by non-high-growth firms in Scotland (Mawson, 2018).

There is a profound relationship between growth and entrepreneurship speed, given that gazelle companies particularly stand out in this aspect. The studies nevertheless range from exploring the factors for the success of baby SME gazelle firms in the e-commerce sector, especially in terms of commitment, convenience, control, content, interaction, brand image, and price sensitivity (Feindta et al., 2002), the different barriers faced within rural and urban contexts as regards the surrounding entrepreneurial environment (Cowell et al., 2018) through to those pointing towards an excessive focus on gazelles, unicorns, and other rare company types emerging out of exceptional business circumstances (Aldrich & Ruef, 2018).

Group 3 (Cluster Blue)—Innovation

Adverse environment per se does not hinder firm growth. Conversely, it can be an opportunity to use strategies to overcome the market's uncertainty (Bamiatzi & Kirchmaier, 2014). Concerning public policies, the employment generation's particular subsidies do not significantly correlate with increasing gazelles' growth rate (Koski et al., 2013). Governments encounter difficulties in identifying gazelle companies due to their heterogeneity, and hence policies designed to foster and nurture them, taking into consideration their specific needs, experience significant shortcomings (Mason et al., 2013).

Innovative capabilities can assist firms in high-growth (Eklund, 2020), but they also can support a strong decline or failure (Goedhuys & Sleuwaegen, 2016). In the European context, technological innovations are crucial drivers to the rising of a Gazelle company in core countries. However, in new European Union countries, the exports seem to be the key force in supporting a firm capacity to become a Gazelle (Megaravalli & Sampagnaro, 2018). In the Latin American context, specifically in Ecuador, innovation is not a driver of a sales-high-growth company (Ayala et al., 2018).

Parker et al. (2010) apply Gibrat's law to explain why gazelles cannot maintain their frenetic growth rates. They present two core strategies enabling gazelles to maintain their scales: their marketing departments and key products (avoiding developing new products and applying consumer complaints as a means of quality control). The strategic management of gazelles highlights that recourse to earlier

strategies that brought about success in previous periods puts that success at risk and advocates against the deployment of a strategic mix as also potentially inappropriate.

Group 4 (Cluster Yellow)—Dynamics

Gazelles emerge from more dynamic business environments as they create jobs and boost competitiveness (Bonilla et al., 2012). As regards the perception of gazelle companies as essential to economic growth (Lee, 2014), Bos et al. (2014) results suggest the entrance of gazelles drives growth in the industry even while the opposite; hence, the growth of the industry, as positively impacting on the growth of gazelle companies, do not receive any support from the evidence presented.

Krasnicka et al. (2016) opt for size, location core activity, and capital as possible influences on increasing value and generating employment even while not encountering any correlation among Polish gazelle companies. In turn, Lee (2014) identifies the following barriers to attaining swift growth, recruitment, lack of skills; obtaining financing, cash flow, management abilities, and capacities; and finding appropriate installations. In turn, the market strategy constitutes a moderating factor in the relationship between gazelles' growth and performance, which suggests that there is no universally valid strategy for achieving the desired level of performance (Senderovitz et al., 2016).

Moreno et al. (2007), within a comparative perspective on companies belonging to the same industry, explore the distinctions between gazelle companies and others by combining the economic and strategic visions, thus the external and internal focuses of companies. It conveys how such resources are determinant to their growth and how these may be sourced from outside of the company, with networks constituting a means of accessing essential resources. Knowledge is one of these critical resources, and the ability to gain access to new knowledge provides an important dynamic capacity for the swift growth of these firms. They conclude that such firms are smaller in size, have more idle but available resources and, in some cases, lower levels of financial resources available.

Sirec et al. (2014) deploy growth in sales as the dependent variable for company size, performance, educational level, and indebtedness. They report a negative result between company size and performance while there is a significant and positive impact on the education level, while the level of indebtedness generated no significance within the context of Slovenia. Once again, this study's findings reaffirm this group's heterogeneity (Brown et al., 2017; Lopez-Garcia et al., 2012; Mason & Brown, 2013). The business model's scalability is the firm's base accelerated growth cycle and wealth creation (Monteiro, 2019). The persistency should be considered because the lack of it in the growth process is a stylised fact about high-growth companies (Rodrigues et al., 2021).

One should consider the industrial structure's differences affecting the potential high-growth firms (Friesenbichler & Hölzl, 2020). Regarding gazelles in the service sector, they appear to emerge with higher frequency in this sector than in others (Satterthwaite et al., 2017), as well as observations as to their more significant levels of innovation than their peer companies, especially in terms of KIBS (Kubickova

Table 5 Suggestions for future research by thematic groups (clusters)

Thematic groups	Future lines of research
Group 1—entrepreneurship	Relationship between rotation/churn in gazelle companies and job creation (Lee, 2014) Determine the components of an entrepreneurial ecosystem that influences gazelles (Martínez-Fierro et al., 2019) Comparisons between the profiles of the owners (including the differences between family-owned and non-family-owned gazelle companies) Coopetition among gazelle companies
Group 2—performance	Conditions for sustainable, long-term accelerated growth (Daunfeldt et al., 2016) Relationship between performance and the sustainability of rapid growth in SME companies Emotional intelligence of gazelle company managers and employees in comparison with other companies Cooperation and open innovation strategies Motivations of managers for changes in strategies that lead to rapid growth Relationship between the performance and internationalisation of gazelle companies
Group 3—innovation	The scope for gazelles to serve as instruments for undertaking public (Bos et al., 2014) and social services (Morris et al., 2015) Process of creative destruction for innovation in gazelle companies (Colombelli et al., 2014) Differentiating the best public policies for gazelle companies following the prevailing national economic conditions
Group 4—dynamics	Differentiating between institutions' influences over gazelle companies and the critical conditions for nurturing such companies (Krasniqi et al., 2016) Trends in companies' cooperation, registering accelerated growth over time and comparing rapid growth companies and their peers (Beekman et al., 2004). Influences of the phases of the life cycles of different industries Gazelle bankruptcies and their effects

et al., 2018). Regarding small, family-owned businesses, in good economic and financial shape, with moderate levels of innovation and an optimal survival potential for the period of financial crisis and recession, it makes up the profile of gazelle companies in Catalonia (Arimany-Serrat et al., 2016).

Research Agenda

Investigation on gazelle companies is still only recent and remains fragmented and dispersed (Demir et al., 2017; Shane, 2009). Hence, this research's contribution stems from putting forward suggestions for future research lines (Table 5) for each category identified based on the bibliographic analysis.

Conclusions

This study summarises the literature's mapping and characterising it through a bibliometric analysis, enabling identifying research shortcomings and preparing a future research agenda. The article combines performance analysis and science mapping, providing a panoramic view of the field. We conducted a bibliographic analysis with the VOSviewer software of the results provided by a systematic pre-established procedure using 84 articles from the *Web of Science* database.

This research is the first bibliographic analysis of the research concerning Gazelles companies. This article offers theoretical contributions that concern the knowledge structures of this promising field. This research's main contribution stems from its reflection and later systematisation of the literature with an analysis of its four thematic clusters: (i) entrepreneurship, (ii) performance, (iii) innovation, (iv) dynamics. Through this systematisation, we were also able to put forward a set of suggestions for future study in keeping with the shortcomings revealed within the different categorised areas.

Regardless of the contributions, we also need to detail certain limitations, especially recourse to a single database. Thus, future research should use different databases and recourse to other article systematisation methodologies. It is a research area in its infancy. Therefore, the need for exploratory and qualitative research to better understand such complex phenomena remains fundamental.

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Declarations

Conflict of Interest The authors declare no competing interests.

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