



Female entrepreneurial leadership factors

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Accepted: 16 March 2022 / Published online: 3 August 2022
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Abstract

This article presents the foundations, current structure and trend of academic research into leadership factors in female entrepreneurship to provide scholars in the field with an overview of the followed research directions and to explore whether the same traditional patterns are reproduced in gender studies on entrepreneurship and leadership. For this purpose, a bibliometric analysis of the Web of Science database from 2000 to 2020 was used. With a performance analysis of variables (e.g. authors, publications, journals and countries), and thanks to scientific mapping, the links among these variables were studied. The results show that the trend of publications increased from 2015, but with little influence and output. The most influential and productive countries are the USA and Spain. 35% of the journals are based in the USA and 25% in England. The most influential ones deal with entrepreneurship, business, management and leadership. Although the foundational base is influenced by the author Ahl, known for calling for new research directions related to women entrepreneurs from a social construction perspective, the most influential articles continue to investigate gender with a dominant male bias. The network analysis reveals cooperation between different countries and authors with the USA dominating. The ambiguity of entrepreneurial leadership field due to the overlap of entrepreneurship and leadership disciplines reveals through the co-citation of journals different specialisation areas: business and entrepreneurship, management and psychology, organisational behaviour. This work provides researchers with an overview that encourages them to overcome the dominant male normative lens from new epistemological perspectives.

Keywords Female Entrepreneurial Leadership · Bibliometric analysis · Gender · Entrepreneurial leadership factors

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Introduction

Research into female entrepreneurship (FE) has developed significantly in recent decades. Several arguments are used to justify the territory chosen to legitimise research in this field (Ahl, 2003). The vast majority of scholars do so from a traditional market perspective by citing its high impact on economic growth (Ahl, 2004; Calás et al., 2009), but others do so to search for equality (Ahl, 2003), through its impact as a social process of change (Calás et al., 2009). What is certain is that FE deserves to be studied in its own right (Bruin et al., 2006). However, some feminist researchers warn about the importance of the chosen epistemological positioning by challenging and questioning the very basis of followed practices by obtaining very different results depending on the research approach and lenses employed (Ahl, 2006; Calás et al., 2009).

Traditional research has often considered the entrepreneur to be “generic”, and only differentiated from non-entrepreneurs. Hence it is not considered necessary to research women specifically because they have similar characteristics (Bruin et al., 2006). Other assumptions have focused on gender as a variable (Carter & Shaw, 2006), with a large number of studies that primarily compare male and female entrepreneurs. Although these last studies have advanced the FE field by “improving understanding and highlighting the contribution of women-led businesses to the global economy” (Henry et al., 2015), they have generated a persistent, but hidden, gender bias in entrepreneurial discourse with a dominant male model, where stereotypes with masculine characteristics have prevailed (Ahl, 2004; Antunes et al., 2020). Consequently, women are positioned as lacking and incomplete men, and their businesses are considered to be less important (Ahl, 2006). Overall, contemporary scholars now recognise the unconscious tendency of some accepted research approaches to contribute to the highly biased perception of women entrepreneurs as inferior to their male peers (Ahl, 2006) by, thus, reinforcing and replicating the subordination of the feminine to the masculine (Marlow & Patton, 2005). Despite calls to employ feminist theory as an analytical framework to demonstrate this inferiority bias, “there is little evidence that this has emerged”. So research remains descriptive rather than explanator (Ahl & Marlow, 2012).

Research into women’s leadership has followed the same patterns. The leadership literature studies different leadership styles and approaches in an attempt to identify distinct skills that contribute to leadership effectiveness, but still reflects the same “gendered paradigm” (Galloway et al., 2015). The “symbolic universe of masculinity” (Patterson et al., 2012) has so substantially shaped leadership development that leadership can hardly be separated from men (Eagly & Carli, 2003). Understandings of organisations, leaders and individual roles are based on gendered expectations (Patterson et al., 2012) in which we find masculinity and men as normative referents (Calás & Smircich 1996), women develop as leaders in a masculine context (Elliott & Stead, 2008) and it is a challenge to assert their authenticity (Galloway et al., 2015). Once again, these assumptions situated in Western industrial contexts that reproduce these ‘masculine ideals’ condition the research focus that impacts leadership practice (Elliott & Stead, 2008).

Some researchers have sought to move the focus of women's research forward by taking it out of "its dead end" and proposing new directions (Ahl & Marlow, 2012). They recommend feminist theorising that "challenges the highly gendered nature of entrepreneurship studies" (Ahl, 2006; Harrison et al., 2015; Henry, Foss, Fayolle, et al., 2015), and also leadership by promoting a shift from a male experience-based approach to a more interpretive poststructuralist methodology with women's experiences (Calás et al., 2009). It is important to make progress in gender studies to understand how gender is constructed by moving from having "a descriptive approach with no theoretical orientation to an approach with highly informed conceptual frameworks" (Henry et al., 2015).

And despite all the progress in entrepreneurial research and gendered leadership, the "new paradigm" of entrepreneurial leadership (EL) (Fernald et al., 2005) has not benefited from these wider debates and developments. The literature in this field "has not been accompanied by appropriate theoretical frameworks, theory building and conceptual analysis, including gender analysis" (Harrison et al., 2015). EL discourse tends to move towards subordination by "rendering essentially invisible the gendered and sexual dimensions of much contemporary leadership practice" (Henry, Foss, Fayolle, et al., 2015;).

The EL field is a relatively recently recognised research area with its own identity, and one that has emerged from studying the convergence of the entrepreneurship and leadership fields. This 'new paradigm' benefits from the mutual cross-fertilisation between the two areas, and its contribution is recognised as a factor in the success or failure of small- and medium-sized enterprises (Harrison et al., 2018; Leitch & Harrison, 2018; Leitch et al., 2013; Renko et al., 2015; Simba & Thai 2019) and large companies (Kuratko, 2007). For entrepreneurial activities to be successful, the leader needs certain competencies or attributes, defined as specific leadership capabilities (Cogliser & Brigham, 2004; Fernald et al., 2005; Gupta et al., 2004). Although this field continues to evolve, its definition is not clear (Leitch & Harrison, 2018). Nonetheless, the definition proposed by Gupta et al., (2004) as a "leadership that creates visionary scenarios that are used to assemble and mobilize a 'supporting cast' of participants who become committed by the vision to the discovery and exploitation of strategic value creation" (Gupta et al., 2004) is generally accepted. A common thread to most definitions is that it is clearly grounded in the entrepreneurial literature by focusing on the traits, characteristics and behaviours of entrepreneurial leaders and leadership (Harrison et al., 2015). To advance with its definition and concept, it is important to identify and better understand which factors, attributes, skills, abilities, capabilities, characteristics or behaviours are considered the most valuable for entrepreneurs to overcome the challenges of managing an organisation. From a conceptual overlap approach between leadership and entrepreneurship (Roomi & Harrison, 2011), factors such as vision, influence, leadership of innovative and creative people, and planning (Cogliser & Brigham, 2004) stand out. From the perspective of personality traits and attributes or holistic vision, we find factors like achievement orientation, flexibility, passion, perseverance, overconfidence, stress resistance, assertiveness, competitiveness, opportunity detection, risk aversion, among others (Fernald et al., 2005; Harrison & Burnard, 2016; Nicholson, 1998; Renko et al., 2015; Vecchio, 2003).

However, information on how these attributes have been able to help entrepreneurs to overcome challenges, whether they can be learned or exercised, and whether a gender prism has been identified, is insufficient to date (Harrison et al., 2018; Kempster & Cope, 2010). Adequate tools to measure leaders' entrepreneurial characteristics and behaviours are lacking (Renko et al., 2015) and no consensus has been reached (Harrison & Burnard, 2016). As several researchers state, the field is still searching for its identity (Leitch & Harrison, 2018; Leitch et al., 2013; Renko et al., 2015).

Exploring gender in the EL context allows us to look at the discipline from new and different perspectives by better recognising women's EL experiences (Carter & Marlow y Bennett, 2012). To do this, we must move away from the entrenched approach that views EL as gender-blind, gender-neutral and gender-defensive (Patterson et al., 2012).

It is important to understand the starting point and approach taken by researchers of the emerging niche of factors in female EL (FEL) by avoiding reproducing the same gender bias errors that traditional entrepreneurship and leadership research reproduced. The purpose of this research is to understand the landscape of the foundational and structural basis of FEL factors and their trend. To do so, we apply the bibliometric method to the literature in this field to understand the trend of publications in productivity and influence terms. The following questions are answered: which articles are the most cited and constitute the intellectual base, which authors study this subject, which researcher groups have been formed and from which research approaches, what type of journals publish and from which countries, and in which major knowledge areas is this field being catalogued. Possible lenses and prisms through which this research is conducted are sought. The bibliometric methodology is applied with two approaches: a scientific performance analysis and graphically mapping the field (Cobo et al. 2011, Gaviria-Marín 2021). The former aims to assess the impact of the production and citations made to the scientific output of a specific study field for certain variables, such as authors, universities, articles, countries and journals. The latter includes the graphical mapping of science to show the structural and dynamic aspects of scientific research. They are often studied as a combination to validate and enrich the results of both. Therefore, the complementarity of both approaches allows a global picture to be built of a specific research field and its evolution by identifying areas of current interest to be employed within theoretical and empirical frameworks. Bibliometric studies are often used in a wide range of social science research fields, such as management (Podsakoff et al., 2008), entrepreneurship (Luor et al., 2014) and innovation (Cancino et al., 2017).

The structure of this article is as follows. Firstly, the bibliometric methods applied and the search methodology to obtain the database are discussed. The next section presents the results: a survey of publications, authors, countries, journals and research areas and keywords together with a detailed graphical analysis of the bibliographic data networks using VOSviewer software. To conclude, the main conclusions of the study and its limitations are addressed, identifying possible future research.

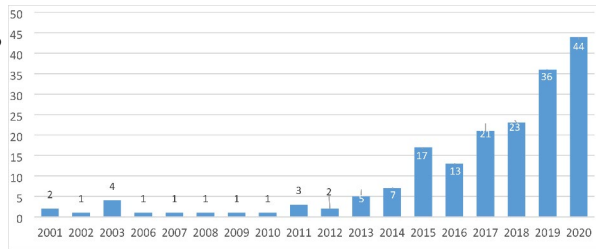
Bibliometric Method

In this study, a bibliometric analysis is used to assess where the most active influential research focus on this topic lies. Bibliometric methods are recognised as scientific specialties, form an integral part of the research evaluation and quantification methodology, especially in scientific and applied fields (Ellegaard & Wallin, 2015), and are increasingly employed to study various aspects of science (Hood & Wilson, 2001) like the business and management field (Gaviria-Marín, 2021). To obtain an overview of the studied field, different procedures can be applied, such as a scientific performance analysis or the graphical mapping of science (Gaviria-Marín, 2021; Merigó et al., 2015).

To carry out a bibliometric performance analysis, indicators are used to measure academic production or its influence (Cancino et al., 2017; Merigó & Yang, 2017) based on a content or citation analysis by data collection and management (Wallin, 2005; Martínez et al., 2014). The results are about the total number of papers published during a given time period (TP), the impact of these publications (TC), the average number of citations per article (TC/TP), the most relevant authors, the most representative journals (Thongpapanl, 2012), an author's h-index (Hirsch, 2005; Alonso et al., 2009), the journal's impact factor (IF) (Garfield, 1972) and data on the geographical distribution of publications like country of origin (Bonilla et al., 2015). One of the main bibliometric indices to evaluate researchers' scientific performance (Alonso et al., 2009) is the h-index, which was introduced (Hirsch, 2005) to consider the quantity and impact of their publications. It is also used to measure different actors' scientific performance (Alonso et al., 2009), such as journals (Braun et al., 2006), countries (Guan & Gao, 2008), institutes or universities (Schubert, 2007). The second approach provides a network analysis with graphical maps based on bibliographic data. The VOSviewer software (version 1.6.15 (0)) (Van Eck & Waltman, 2010) was used to create and visualise them. VOSviewer is a free software that allows information to be graphically represented and analysed, such as citation analyses, co-citations of journals, bibliographic coupling by authors and countries, and co-occurrence of author keywords (Boyack & Klavans, 2010; Merigó et al., 2018; Zupic & Čater, 2015). It also visualises the connections between these variables (Merigó et al., 2016). These techniques, when combined with a network analysis, allow the bibliometric structure and intellectual structure of the research field to be presented (Donthu et al., 2021).

The structure to obtain the bibliographic base follows Callahan's recommendations (Callahan, 2010): Our first step was to query the core collection of the Web of Science (WoS) database. WoS is a digital bibliographic platform considered to be one of the main providers of collections with more than 15,000 publications and 50,000,000 articles or studies that are relevant for the evaluation of the world's scientific production (Baier-Fuentes et al., 2019; Merigó et al., 2015). Although alternative databases exist, the material included in WoS is expected to be of the highest quality standards (Merigó et al., 2015). The employed indices are: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED and IC.

Fig. 1 Distribution of documents published per year for research into FEL factors (2000–2020). Source: the authors based on data from the WoS



Secondly, we defined appropriate search terms using search equations Topic: (“leader*” and “entrepre*”), combined with factors or skills by including all the relative terms: AND Topic: (“abilit*” or “capabilit*” or “attribut*” or “skill*” or “factor*” or “competenc*” or “behavior*” or “trait*” or “feature*”). The following filter was added to obtain gender-focused results: AND Topic: (“female” or “gender” or “wom*” or “femin*”).

Thirdly, the time frame was defined. The selected period was 2000–2020¹, which is long enough to understand how the literature in this field has evolved. The results were refined by choosing only articles and reviews and, to not exclude countries of authorship, articles published in all languages were included. As 15 publications had no publication date, a decision was made to always include the early access date as a preference in counts to reach 18 publications²

Results

The main results of the bibliometric analysis of the production and the graphic map applied to the records linked with LEF research are presented below. The search process obtained 183 publications distributed into 176 articles and seven reviews.

Publications: distribution per year and citation structure

The number of publications per year that address the topic of leadership factors in entrepreneurship with a gender approach has grown in the last 6 years of our study period (see Fig. 1). In 2000, no publications were recorded, and the object of this research was hardly of interest from 2001 to 2012. It was from 2013 when the field began to have timidly draw the scientific community’s attention. Publications increased and became more sustained during the 2015–2020 period, with almost 85% of all the published articles, and an average of almost 26 articles per year, and an average of 40 in the last 2 years alone.

However, understanding these leadership factors in female entrepreneurship (FE) is still an emerging field as 81% of the papers indexed in the WoS database had less than 10 citations according to Table 1. This highlights the little influence the papers in

¹The WoS database extraction date was 23 January, 2021.

²Early access articles are fully peer-reviewed, citable and published, but have not yet been assigned any volume/number/page number (source: WoS).

Table 1 General citation structure

	Citations	Total papers	%
	≥200 citations	1	0.5%
	≥100 citations<200	2	1.1%
	≥50 citations<100	3	1.6%
	≥20 citations<50	10	5.5%
	≥10 citations<20	18	9.8%
	≥1 citation<10	101	55.2%
	=0 citation	48	26.2%
	Total Papers	183	100%

Source: The authors based on the WoS

this specific research field have had. The general citation structure allowed us to analyse the amount of documents related to a citation threshold to be analysed (Cancino et al., 2017). Thus 26% of the indexed papers had no citations at all, 91% were cited less than 20 times, and only one document had at least 200 citations.

The annual citation structure of the published documents (see Table 2) showed that the year with the most citations was 2001 with 313, followed by 2015 with 239. The most cited articles usually appeared in the most remote years because an article needs a 3–7-year period to obtain the most citations (Wang, 2013). This basis revealed, however, that 90% of the articles were published in the most recent years during the period 2013–2020 with more than 60% of all the citations.

By way of conclusion, the interest shown in leadership factors topic in FE has grown, but researchers' interest has only been modest since 2015. This finding highlights the novelty of the field, but papers have a low citation rate compared to the general entrepreneurship field.

These results fall in line with researchers' findings in this field, who conclude that, although EL has been studied for several decades, it still has no clear identity because no tools have been developed to assess these factors (behaviours, skills or characteristics) in the field (Leitch et al., 2013; Renko et al., 2015).

The most influential articles in female EL research

This section analyses the most influential and popular articles in the database. The indicators used for this purpose were citations received (TC) (Baier-Fuentes et al., 2019; Donthu et al., 2021) and the citations that the article received on average the year it was published (TC/Y). This relative ratio allows the influence of the article to be compared regardless of the year when it was published (Gil-Gomez et al., 2021).

Table 3 shows the 20 most cited articles. Authors like Gundry and Welsh, Vecchio and Buttner have published the three most influential articles for receiving the most citations between 2001 and 2003. The most cited article (212) is that by Gundry and Welsh (2003). The article with the highest ratio of citations received per publication year (TC/Y) was that of Balachandra, Briggs, Eddleston and Brush which, despite being published in 2019, has obtained 15 citations per year. It was followed by the article by Neumeier and Santos (2019) with 12.

The most influential article investigated high-growth strategies in a group of women entrepreneurs in the industrial sector “beyond examining the relationship

Table 2 Annual citation structure for research into female entrepreneurial leadership factors research

Year	TP	TC	≥200	≥100	≥50	≥20	≥10	≥1
2000	0	0						
2001	2	313	1	2	2	2	2	2
2002	1	119		1	1	1	1	1
2003	4	83			1	1	2	4
2004	0	0						
2005	0	0						
2006	1	5						1
2007	1	16					1	1
2008	1	2						1
2009	1	6						1
2010	1	5						1
2011	3	14						2
2012	2	28					2	2
2013	5	123			1	2	5	5
2014	7	90			1	1	2	7
2015	17	239				5	8	17
2016	13	53					1	8
2017	21	105				1	3	19
2018	23	136				2	4	18
2019	36	132				1	3	27
2020	44	24						18
Total	183	1493	1	3	6	16	34	135
%	100%		0.5%	1.6%	3.3%	8.7%	18.6%	73.8%

Abbreviations: TP: Total Papers; TC: Total number of citations; Number of papers with ≥ of 200, 100, 50, 20, 10 and 1 citation/s.

Source: The authors based on the WoS with Excel

between gender and (personal) entrepreneurial characteristics” (Gundry & Welsch, 2001) with a descriptive approach, but without a theoretical framework.

Vecchio studied sex/gender differences in social behaviour and leader effectiveness, and concludes that claims of gender comparative advantage, based on stereotypical reasoning, are exaggerated. So for him a “fine-grained” analytical approach is essential as is “including the temporal dimensions and the leader’s perceived tolerance of demographic differences” (Vecchio, 2002). The same author in 2003 situated entrepreneurship as a type of leadership, but without recognising the EL field in its own right (Vecchio, 2003).

Buttner delved into differences in leadership between men and women from a feminist social perspective with an exploratory content analysis. Her results showed that the relational theory is a useful framework for identifying and explaining the interactive style of women entrepreneurs in their own firm (Buttner, 2001).

Balachandra et al., (2019) broke away from traditional patterns and employed the gender role congruence theory to demonstrate that women entrepreneurs do not experience prejudice from venture capitalists because they are women, but when they exhibit strongly stereotypical feminine behaviours. Masculinity does not provide any advantage in venture capital pitches, but femininity provides a disadvantage (Balachandra et al., 2019).

Table 3 The 20 most cited documents between 2000 and 2020 in WoS Core

No.	TC	Title	Authors	Year	TC/Y
1	212	The ambitions entrepreneur: High growth strategies of women-owned enterprises	Gundry, LK; Welsch, HP	2001	11
2	119	Leadership and gender advantage	Vecchio, RP	2002	6
3	101	Examining female entrepreneurs' management style: An application of a relational frame	Buttner, EH	2001	5.1
4	61	Generating political will for safe motherhood in Indonesia	Shiffman, J	2003	3.4
5	58	A cross cultural study of gender-role orientation and entrepreneurial self-efficacy	Mueller, Stephen L.; Datoon, Mary Conway	2013	7.1
6	53	Gender disparity in the C-suite: Do male and female CEOs differ in how they reached the top?	Fitzsimmons, Terrance W.; Callan, Victor J.; Paulsen, Neil	2014	7.6
7	47	The Influence of Social and Human Capital in Developing Young Women as Entrepreneurial Business Leaders	McGowan, Paucic; Cooper, Sarah; Durkin, Mark; O'Kane, Caroline	2015	8
8	38	Sustainable business models, venture typologies, and entrepreneurial ecosystems: A social network perspective	Neumeier, Xavier; Santos, Susana C.	2018	12
9	29	Don't Pitch Like a Girl!: How Gender Stereotypes Influence Investor Decisions	Balachandra, Lakshmi; Briggs, Tony; Eddleston, Kim; Brush, Candida	2019	15
10	29	Political Empowerment, Rule of Law, and Women's Entry into Entrepreneurship	Goltz, Sonia; Buche, Mari W.; Pathak, Saurav	2015	4.8
11	28	The dearth of daughter successors in family businesses: Gendered norms, blindness to possibility, and invisibility	Overbeke, Kathyann Kessler; Bilimoria, Diana; Perelli, Sheri	2013	4
12	27	Developing women leaders through entrepreneurship education and training	Bullough, Amanda; de Luque, Mary Sully; Abdelzaher, Dina; Heim, Wynona	2015	4.5
13	26	Academics' entrepreneurship propensities and gender differences	Goel, Rajeev K.; Goktepe-Hulten, Devrim; Ram, Rati	2015	4.3
14	25	How prepared are academic administrators? Leadership and job satisfaction within US research universities	Morris, Tracy L.; Laipple, Joseph S.	2015	4
15	20	Narcissistic rhetoric and crowdfunding performance: A social role theory perspective	Anglin, Aaron H.; Wolfe, Marcus T.; Short, Jeremy C.; McKenny, Aaron F.; Pidduck, Robert J.	2018	7
16	20	Individual dynamic managerial capabilities: Influence over environmental and social commitment under a gender perspective	Buil-Fabrega, Marian; del Mar Alonso-Almeida, Maria; Bagur-Femenias, Llorenç	2017	5
17	19	What drives future business leaders? How work values and gender shape young adults' entrepreneurial and leadership aspirations	Lechner, Clemens M.; Sorthéix, Florencia M.; Obschonka, Martin; Salmela-Aro, Katariina	2018	6
18	17	The Role of Competencies in Shaping the Leadership Style of Female Entrepreneurs: The Case of North West of England, Yorkshire, and North Wales	Bamiatzi, Vassiliki; Jones, Sally; Mitchelmore, Siwan; Nikolopoulos, Konstantinos	2015	3

Table 3 (continued)

No.	TC	Title	Authors	Year	TC/Y
19	16	Leadership styles and corporate social responsibility management: Analysis from a gender perspective	del Mar Alonso-Almeida, Maria; Perramon, Jordi; Bagur-Femenias, Llorenc	2017	4
20	16	Entrepreneurial leadership competencies among Malaysian university student entrepreneurial leaders	Bagheri, Afsaneh; Pihie, Zaidatol Akmaliah Lope; Krauss, Steven Eric	2013	2

Abbreviations: TC: Total number of citations; TC/Y: The total of citations in the number of years that the document has been published.

Source: Obtained from the VOS viewer software

We observe that the most influential articles in FEL still reproduce the same pattern of contemporary research into gender and entrepreneurship with a descriptive approach, but without a theoretical framework. This reproduces discriminatory gender relations. To leave aside “this impasse”, an alternative and conceptually informed feminist critique with a poststructuralist approach is needed (Henry et al., 2015).

Do these most influential articles have similar contents?

One of the cartographic techniques that allows us to find is bibliographic linking. It examines whether two publications that share common references also have similar contents (Kessler, 1963). It divides publications into thematic groups based on the shared references which allow certain recent and niche publications to gain visibility by providing insight into the latest advances (Donthu et al., 2021).

According to Fig. 2, with a minimum of 10 citations per article, this results in 32 articles, organised into eight clusters of bibliographically coupled documents. The most influential cluster with the most citations is the yellow cluster formed by Gundry, Vecchio, Buttner and others, who all published between 2001 and 2007 with a feminist social or women’s management approach by a traditional methodology that perpetrates women’s subordination. The largest cluster is the red one with seven articles sharing a bibliography. The article by Mueller et al. (2013) is bibliographically coupled to the articles by Bagheri (2013), McGowan et al. (2015), Bamiatzi (2015), Morris (2015), Goltz (2015), and most recently to Lechner (2018). All these articles address entrepreneurship and leadership from a social construction and contextual gender research approach. Bagheri et al. (2013) and Goltz (2015) cite the EL field in its own right. The most recent cluster is that formed by Balachandra (2019), Bullough (2015), Anglin (2018) and Hmieleski (2019), showing how stereotypes are socially constructed and impact FE. The green cluster led by Fitzsimmons (2014) shares a group that highlights some articles on CEOs and family entrepreneurship.

The most productive and cited publication sources in research

The studied articles are published in more than 140 journals. Table 4 shows the 20 most productive journals (TP) with some bibliometric indicators, such as the total number of citations received by articles (TC) and their distribution in thresholds, the h-index (H), the average number of citations per article (TC/TP), the IF and the percentage of articles on the total base per journal (% TP).

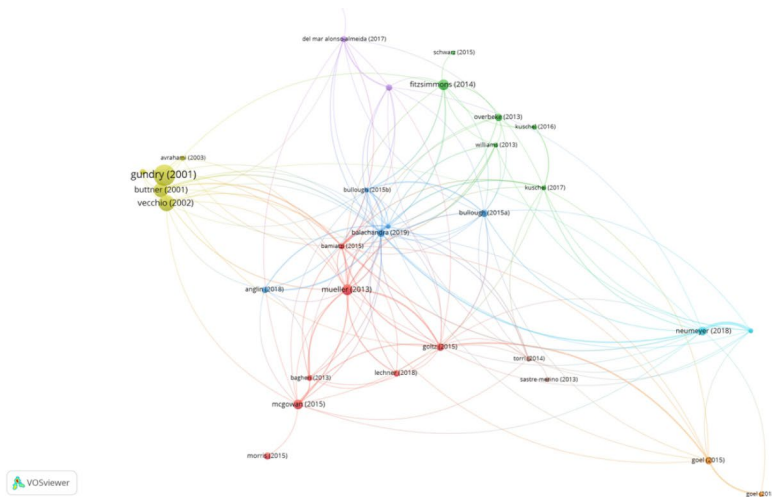


Fig. 2 Bibliographic Coupling of Documents. Source: VOSviewer

Following the classification by Baier et al. (2019), we distributed the journals in our database into the following main categories: entrepreneurship journals (International Entrepreneurship and Management Journal, Entrepreneurship and Regional Development, International Journal of Entrepreneurship Behavior & Research, Journal of Social Entrepreneurship among others); business and enterprise journals (Journal of Business Venturing, Journal of Business Research, Small Business Economics, Journal of Business Ethics), management journals (Management Decision, Journal of Management Studies, Journal of Management), human resources journals (Advances in Developing Human Resources), ethics journals (Journal of Business Ethics), environmental journals (JCP), psychology journals (Frontiers In Psychology), gender journals (International Journal of Gender and Entrepreneurship, Gender In Management), technology journals (JTT), science and humanities journals (Pertanika Journal of Social Science and Humanities), and journals that fell into several categories like Management and Business at the same time (Journal of Small Business Management)

Performance differs depending on the employed indicator. The most productive journals are the Journal of Small Business Management (JSBM) and the International Journal of Gender and Entrepreneurship (JGE). In turn, the journal with the most cited articles is the Journal of Business Venturing (JBV), followed by Leadership Quarterly (LQ), which are the journals with the highest IF. These journals, together with Small Business Economics (SBE) and Journal of Cleaner Production (JCP), have a recognised reputation with an IF2020 over 6 for their high scientific productivity level, and also for publishing papers with a citation threshold of over 100. However, the Journal of Business Ethics (JBE) has the best citation-to-article ratio ahead of JBV and LQ. The citation structure revealed that only three journals have published one article or more with at least 100 citations or more, LQ with two, and JBV and JBE with one. It is worth noting that a journal like SBE, which ranks 4th in the IF of the presented base, has no cited articles. This is because the three articles it has published were early accessed in November and December 2020 (see Table 5),

Table 4 Citation structure of the journals that publish the most

Journal	TP	TC	H	TC/TP	IF 2020	IF 5 years	% TP	≥200	≥100	≥50	≥10	≥1
Journal of Small Business Management	8	118	6	15	4.544	6.799	4.4%	0	0	0	2	3
International Journal of Gender and Entrepreneurship	6	16	3	3	NA	NA	3.3%	0	0	0	0	0
Journal of Cleaner Production	4	60	2	15	9.297	9.444	2.2%	0	0	0	2	2
Advances in Developing Human Resources	4	1	1	0	NA	NA	2.2%	0	0	0	0	0
Journal of Technology Transfer	4	53	3	13	5.783	6.552	2.2%	0	0	0	1	3
Management Decision	4	26	2	7	4.957	4.816	2.2%	0	0	0	0	1
Small Business Economics	3	0	0	0	8.164	8.139	1.6%	0	0	0	0	0
Journal of Business Venturing	3	243	3	81	12.065	15.732	1.6%	1	1	1	2	3
International Entrepreneurship and Management Journal	3	65	2	22	5.94	6.458	1.6%	0	0	1	1	1
Journal of Developmental Entrepreneurship	3	0	0	0	NA	NA	1.6%	0	0	0	0	0
Journal of East European Management Studies	2	6	1	3	0.821	1.016	1.1%	0	0	0	0	0
Gender In Management	2	3	1	2	2.293	2.425	1.1%	0	0	0	0	0
Pertanika Journal of Social Science and Humanities	2	0	0	0	NA	NA	1.1%	0	0	0	0	0
Journal of Entrepreneurship in Emerging Economies	2	3	1	2	NA	NA	1.1%	0	0	0	0	0
Academia-Revista Latinoamericana de Administracion	2	18	2	9	1.108	1.255	1.1%	0	0	0	0	1
Frontiers In Psychology	2	1	1	1	NA	NA	1.1%	0	0	0	0	0
Career Development International	2	10	2	5	3.792	4.03	1.1%	0	0	0	0	0
Cirico-España Revista De Economia Publica Social Y Cooperativa	2	3	1	2	NA	NA	1.1%	0	0	0	0	0
Leadership Quarterly	2	172	2	86	10.517	11.319	1.1%	0	1	2	2	2
Journal of Business Ethics	1	101	1	101	6.43	7.83	0.55%	0	1	1	1	1

Abbreviations in Table 2; H: h-index investigation base; IF: Index Factor; NA: not available

Source: The authors based on WoS with BibExcel

which left no time for it to be cited. The journals that stand out as the most influential and productive are some of the most important ones in the entrepreneurship, management and organisational theory fields.

By analysing the evolution of journal publications with time, Table 5 shows how journals are residual and random over time and do not follow a pattern of continuity. However, we see how the pioneering journals that publish are JBV, JBE and LQ, but they do not continue to publish on the topic with a gender focus. The journals that have emerged in the last 2 years are *Advances in Developing Human Resources*, which has published four research papers in the last year of our study period, and *SBM* with four papers in the last 2 years

Finally, 35% of the journals with published research are based in the USA and 25% in the UK. The remaining 20% come from Western European countries. As Ahl (2004) points out, discursive practices are followed to produce research articles. Writing and publication practices, disciplinary norms and institutional support play an important role in shaping research texts because they guide and limit conversation (Huff, 1999). In this case, the literature base is published in journals dominated by an American institutional order that reproduce particular practices, and is also framed within business and entrepreneurship journals

Research area

Table 6 shows the categories per research area. Here 60% of the articles in our research belong to the Economics and Business category with 110 publications, and 1,130 citations in all. Psychology, Social Sciences and Education and Engineering are research areas that also stand out in this base, among others.

The FEL subject area has several areas in which researchers publish (although the economics and business category predominates), which is also reflected in the many journals chosen with different themes, as seen in the section on publication sources. This is because EL is interchangeably associated with two fields that are normally taken as separate areas: leadership (associated with people management and psychology) and entrepreneurship (associated with the management and business areas). However a few decades ago, several scholars started drawing parallels between the two Lippitt, 1987; Vecchio, 2003; Gupta et al., 2004; Cogliser & Brigham, 2004; C. Harrison & Burnard, 2019) by taking different positions and perceiving EL as either an entrepreneurship subdomain or a leadership type. Recently, there has been a shift towards a holistic approach that conceives EL as a field that benefits from the mutual cross-fertilisation of both fields (Leitch & Harrison, 2018; Karpinskaia & Shirokova, 2019), but debate about the fragmented approach to the discipline base still persists today (Harrison et al., 2015).

Most prolific and influential authors and cooperation

This section aims to identify not only the highest performing and most influential authors, but also the distribution by the citation thresholds of publications among the more than 500 researchers in the FEL field of the database. Number of publications is used to obtain the most productive authors. To know the most influential authors,

Table 5 Evolution of publications per journal over time (2000–2020)

Journal	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	Total
Journal of Small Business Management (USA)													3					4	1	8	
International Journal of Gender and Entrepreneurship (England)																1	3	2		6	
Journal of Cleaner Production (USA)																1	1	1	1	4	
Advances in Developing Human Resources (USA)																				4	
Journal of Technology Transfer (USA)															1	1	2		4		
Management Decision (England)						1														2	4
Small Business Economics (Netherlands)																				3	3
Journal of Business Venturing (USA)																	1	1	1	3	
International Entrepreneurship and Management Journal (USA)												1						2		3	
Journal of Developmental Entrepreneurship (Singapore)																1	1	1	1	3	
Journal of East European Management Studies (Germany)								1												1	2
Gender In Management (England)																	2			2	
Pertanika Journal of Social Science and Humanities (Malaysia)																	1	1		2	
Journal of Entrepreneurship in Emerging Economies (England)																			1	1	2
Academia-Revista Latinoamericana de Administracion (Colombia)														1	1					2	
Frontiers In Psychology (Switzerland)																				2	2
Career Development International (England)																1	1			2	
Cirtec-España Revista de Economía Publica Social y Cooperativa (Spain)																1	1			2	
Leadership Quarterly (USA)																				2	
Journal of Business Ethics (Netherlands)																				1	1

Abbreviations in Table 2.

Source: The authors based on WoS

Table 6 Main research and citation structure areas

Research Area	TP	%	TC	H	TC/TP	≥200	≥100	≥50	≥20	≥10	≥1
Business & Economics	110	60.1%	1130	16	10	1	3	5	12	23	82
Psychology	13	7.1%	224	5	17		1	2	3	3	11
Social Sciences - Other Topics	13	7.1%	148	5	11		1	1	1	2	10
Education & Educational Research	10	5.5%	62	3	6				1	3	9
Engineering	10	5.5%	123	5	12				3	5	8
Science & Technology - Other Topics	8	4.4%	73	4	9				2	2	6
Environmental Sciences & Ecology	6	3.3%	69	3	12				2	2	5
Agriculture	5	2.7%	25	3	5					1	5
Development Studies	5	2.7%	30	3	6					1	4

Abbreviations are shown in Table 2.

Source: The authors based on WoS with BibExcel

certain measures are employed, such as citations obtained, citations per publication or the h-index are used (Donthu et al., 2021).

Table 7 shows the 15 authors who have published the most articles in research, along with their respective institutions and countries of origin. It also includes the distribution per citation thresholds of their publications. Table 5 presents the most influential authors in terms of citations received or citations per publication. The results reveal that the most productive authors do not coincide with the most influential authors.

According to Table 4, the most productive authors are Goel and Goktepe-hulten with three published articles. Of the top 15 authors, only Neumeyer and Santos have received more than 50 citations for all their articles. Authors' h-index is used to measure authors' scientific performance or the employed database, but does not provide relevant information.

However according to Table 8, the most influential authors are Gundry and Welsch because they are the most cited ones with 212 citations. They are followed by Vecchio, Buttner and Shiffman (with 119 citations). One possible explanation for this difference is that the most prolific authors (Goel and Goktepe-hulten) have obtained a few citations when publishing in the most recent years (2015, 2018 and late in 2019). In contrast, the most influential ones have published between 2001 and 2003. The time factor should be taken into account when constructing an author's influence because it takes a certain number of years before an article obtains a volume of citations (Wang, 2013). Another reason lies in researchers' publication journals. Goel and Goktepe-hulten have published all their articles in Journal of Technology Transfer (JTT) in the management area, but have clearly focused on innovation and technology transfer, and not on a common publication area in the EL field (see the green cluster in Fig. 3). This is also true for the two articles by Neumeyer and Santos in relation to the journals chosen for their publications, namely JTT and Journal of Cleaner Production (JCP). Neither of these journals belongs to the most influential

Table 7 The 15 authors who have published the most on the FEL factors topic

No.	Author	University	Country	TP	TC	H	H*	TC/TP	≥100	≥50	≥10	≥1
1	Goel RK	Illinois State University	USA	3	40	2	21	13.3	2	2	2	2
2	Goktepe-hulten D	Lund University	SWEDEN	3	40	2	7	13.3	2	2	2	2
3	Santos SC	Rowan University	USA	2	50	2	9	25.5	2	2	2	2
4	Neumeyer X	University of North Carolina	USA	2	50	2	8	25.5	2	2	2	2
5	Bullough A	University of Delaware	USA	2	39	2	11	19.5	2	2	2	2
6	Deluque MS	Thunderbird Sch Global, Arizona Management	USA	2	39	2	13	19.5	2	2	2	2
7	Alonso Almeida MD	Autonomous University of Madrid	SPAIN	2	36	2	23	18	2	2	2	2
8	Bagurfemias L	Pompeu Fabra University	SPAIN	2	36	2	11	18	2	2	2	2
9	Lepeley MT	Global Inst Qual Educ Execut Programs	USA	2	27	2	3	13.5	2	2	2	2
10	Kuschel K	Universidad del Desarrollo	CHILE	2	27	2	2	13.5	2	2	2	2
11	Obschonka M	Queensland University of Technology	AUSTRALIA	2	21	2	23	11	1	1	1	1
12	Bagheri A	University of Tehran	IRAN	2	16	1	9	8	1	1	1	1
13	Pihie ZAL	Universiti Putra Malaysia	MALAYSIA	2	16	1	8	8	1	1	1	1
14	Van Praag M	Copenhagen Business School	DENMARK	2	11	2	18	6.5	2	2	2	2
15	Bernardino S	Polytechnic Institute of Porto	PORTUGAL	2	6	1	3	3	2	2	2	2

Abbreviations: TP: Total Papers; TC: Total number of citations; H: Author h-index database; H*: Author h-index (WoS).

Source: The authors based on WoS with BibExcel

Fig. 3 Co-authorship per authors with overlay visualisation (source: VOSviewer)



journals in the entrepreneurship and leadership field, which are *Journal of Business Venturing (JBV)*, *Leadership Quarterly (LQ)*, among others (Ahl, 2004)

Thanks to these authors' affiliation data, we find that the most productive authors come mainly from US. institutions, but with collaboration between several institutions from the same country or from other countries like Sweden and Australia. All this suggests cooperation.

To find out which authors collaborate consistently and have a stronger impact, and to gain insight into new emerging author cooperation trends (Zupic & Čater, 2015), we used the overlay visualisation of co-authorships per author (see Fig.3). To visualise research trends, co-authors were overlaid with their average year of publication using colours to represent their temporal variation. The terms depicted in dark blue were published around 2015/2016 on average, green represents those with a mean year of publication at around 2018.5 and the year of publication of the keywords in yellow is around 2020. The graphical map in Fig.3 shows the 28 authors with a minimum threshold of two articles and zero citations. The oldest research group is Bullough and De Luque from the USA, which published around 2015, followed by Bagheri and Pihie who published around 2015.5 and are respectively from Iran and Malaysia. Lepeley and Kuschel (USA and Chile) published in mid-2016 on average. Bagur-Femenias and Alonso-Almeida (Spain) published two articles around 2017, with 33 on average. Goel and Goktepe-hulten follow with three articles around 2017 (USA and Sweden). The articles of Neumeyer and Santos (USA) have an average publication date of 2018. What is interesting about this graph is the emerging cooperation shown in yellow, such as Cho's South Korean group, Nili's US group, among others. The data in Fig.3 , therefore, reveal interesting cooperation between authors from institutions of different geographical origins, such as the USA, Chile and Sweden, with at least two articles and origins other than the USA, which is the most productive country, and Spain or other emerging groups like that from South Korea.

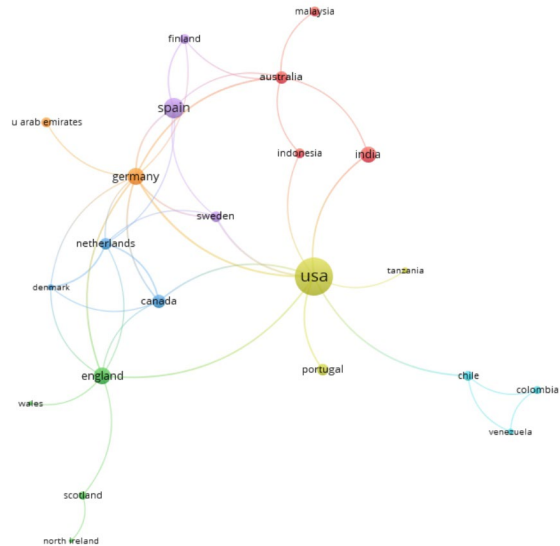
Table 8 The most cited authors in the research field

No.	Author	University	Country	TC	TP	H	TC/TP	≥200	≥100	≥50	≥10	≥1
1	Gundry LK	DePaul University Chicago	USA	212	1	1	212	1	1	1	1	1
2	Welsch HP	DePaul University Chicago	USA	212	1	1	212	1	1	1	1	1
3	Vecchio RP	University of Notre Dame	USA	119	1	1	119	1	1	1	1	1
4	Buttner EH	University of North Carolina	USA	101	1	1	101	1	1	1	1	1
5	Shuffman J	Johns Hopkins University	USA	61	1	1	61	1	1	1	1	1
6	Dato-on MC	Rollins College	USA	58	1	1	58	1	1	1	1	1
7	Mueller SL	Griffith University	AUSTRALIA	58	1	1	58	1	1	1	1	1
8	Paulsen N	University of Queensland	AUSTRALIA	53	1	1	53	1	1	1	1	1
9	Callan VJ	University of Queensland	AUSTRALIA	53	1	1	53	1	1	1	1	1
10	Fitzsimmons TW	University of Queensland	AUSTRALIA	53	1	1	53	1	1	1	1	1
11	Neumeayer X	University of North Carolina	USA	50	2	2	25	2	2	2	2	2
12	Santos SC	Rowan University	USA	50	2	2	25	2	2	2	2	2
13	Cooper S	University of Edinburgh	SCOTLAND	47	1	1	47	1	1	1	1	1
14	Mcgowan P	Ulster University	NORTHERN IRELAND	47	1	1	47	1	1	1	1	1
15	Durkin M	Ulster University	NORTHERN IRELAND	47	1	1	47	1	1	1	1	1
16	O'kane C	NA	NORTHERN IRELAND	47	1	1	47	1	1	1	1	1
17	Goktepehulten D	Lund University	SWEDEN	40	3	2	13	2	2	2	2	2
18	Goel RK	Illinois State University	USA	40	3	2	13	2	2	2	2	2
19	Deluque MS	Thunderbird Sch Global	USA	39	2	2	20	1	1	1	1	1
20	Bullough A	University of Delaware	USA	39	2	2	20	1	1	1	1	1

Abbreviations in Table 7.

Source: The authors based on the WoS with BibExcel

Fig. 4 Co-authorship per country
(source: VOSviewer)



Geographical distribution of the most productive and cited countries and collaboration per country

After analysing the geographical distribution of the papers, Table 9 shows publishers' top 15 countries of origin from the most numerous to the fewest articles and citations. The USA is the country with the most publications on the topic of women's EL factors with 61 publications, followed by Spain with 18, and Germany and England with 12. Once again, the citation structure differs from article production because, although the USA and Spain also received the most citations, Australia came third, followed by Canada.

To further analyse countries and their possible relationships, country co-authorship is proposed. This technique shows the most productive countries, and the degree of scientific communication and collaboration between them, by identifying those papers with more than one author (Merigó et al., 2018).

The graphical map in Fig. 4 shows seven clusters with 22 countries with a threshold of one paper per country and 10 citations. It is worth noting that the largest nodes include the most influential countries in article production terms, in this case with the USA and Spain and, to a lesser extent, Germany, England and India. Relationship lines represent cooperation between countries and colours delimit clusters. It can be concluded that the USA cooperates with Portugal and Tanzania, while Spain, the second largest producer, cooperates with Finland and Sweden. Germany cooperates with United Arab Emirates and England, and has the same geographical cluster with Northern Ireland, Scotland and Wales. Once again, the USA is the most influential and dominant country in co-authorship terms.

Table 9 15 Countries that publish the most on the entrepreneurial leadership factors topic

No.	Country	TP	TC	H	TC/TP	≥200	≥100	≥50	≥10	≥1
1	USA	61	975	14	16	1	3	5	21	36
2	SPAIN	18	110	6	6.1				4	6
3	GERMANY	12	56	5	4.7				2	7
4	ENGLAND	12	49	4	4.1				1	2
5	INDIA	11	16	2	1.5					5
6	CANADA	8	58	3	7.3				2	3
7	AUSTRALIA	7	89	3	12.7			1	2	3
8	PORTUGAL	6	54	3	9.0				1	2
9	THE NETHERLANDS	6	25	3	4.2					1
10	BRAZIL	5	4	1	0.8					3
11	SWEDEN	5	42	2	8.4				2	4
12	PEOPLES R CHINA	5	3	1	0.6					3
13	CHILE	4	38	4	9.5				1	3
14	FINLAND	4	33	3	8.3				2	2
15	U ARAB EMIRATES	4	10	2	2.5				1	1

Abbreviations in Table 2. H: h-index research database.

Source: The authors based on WoS with BibExcel

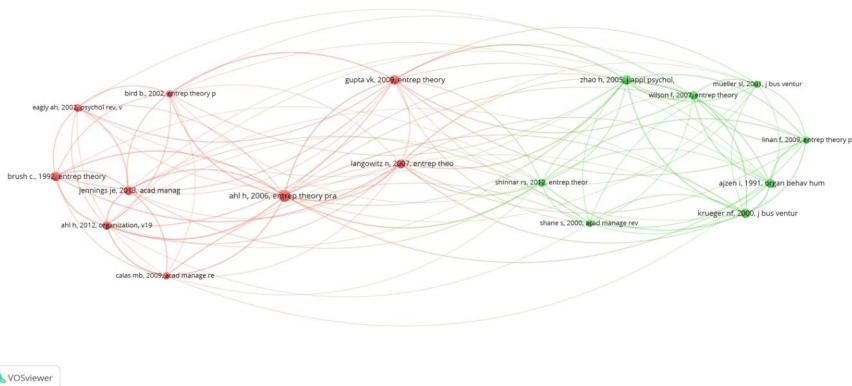


Fig. 5 .Co-citation of references (source: VOSviewer)

Foundational theme and intellectual structure of the literature

We attempted to investigate the foundational intellectual structure on which LEF researchers have been based through the co-citation of publications, which occurs when two papers are cited in a third paper (Merigó et al., 2018). In this way, we can discover thematic clusters, seminal publications, and foundations of knowledge (Donthu et al., 2021) because frequently co-cited publications are thematically similar (Hjørland, 2013).

Figure 5 reflects the 17 papers with a minimum of 10 citations per reference. We observe two distinct thematic clusters. The red cluster is formed by articles on femi-

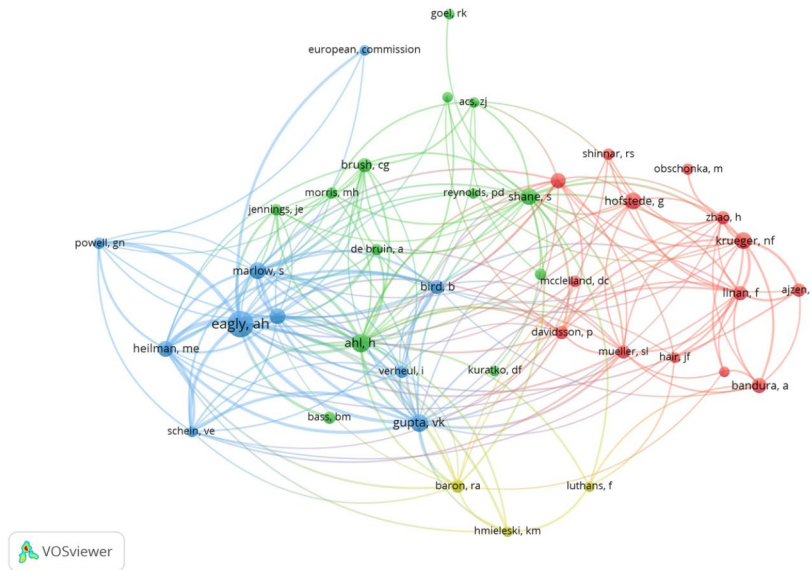


Fig. 6 .Co-citation of authors. (source: VOSviewer)

nist approaches, led by Ahl's article where she encourages searching for new directions in research into women entrepreneurs. Ahl is a renowned Swedish researcher on FE who occupies a gender social constructionist position that encourages the choice of a poststructuralist epistemological research framework. The other cluster consists of authors researching factors in EL, mostly without a gender focus and others, like Shinnar, with a gender focus to reproduce the dominant male model.

An author co-citation analysis results when an author cites in his/her publication a paper by one author, together with a paper by another author and, therefore, aims to show the structure and connections of the authors most frequently cited together (Gaviria-Marin et al., 2019), and to understand the structure of the scientific community in a particular field. In Fig. 6 with a minimum of 15 citations from one author, 40 met the threshold. We observe a bibliometric map on which citation connections are established between authors and form four thematic clusters. In the green node, Ahl appears again as the most co-cited. Ahl is co-cited with: De Bruin and Brush, who have articles together that suggest the scarcity of FE research; Kuratko, Shane and Harrison, who investigate the skills, intentions, competencies and capabilities that form part of EL with no gender prism. The blue node comprises mainly the female authors who explore gender in organisations and gender stereotypes. Eagly is an author who has researched gender leadership style and gender, and is co-cited with: Marlow, who investigates entrepreneurship from a feminist perspective; Bird and Gupta, who investigate the creation of organisations from a gender perspective; Heilman, who studies the impact of stereotypes for women in companies. Interestingly, the European Commission appears as a co-cited author. In the red node, we find Krueger, who is co-cited with Hofstede, Bandura, among others, who publish on leadership factors

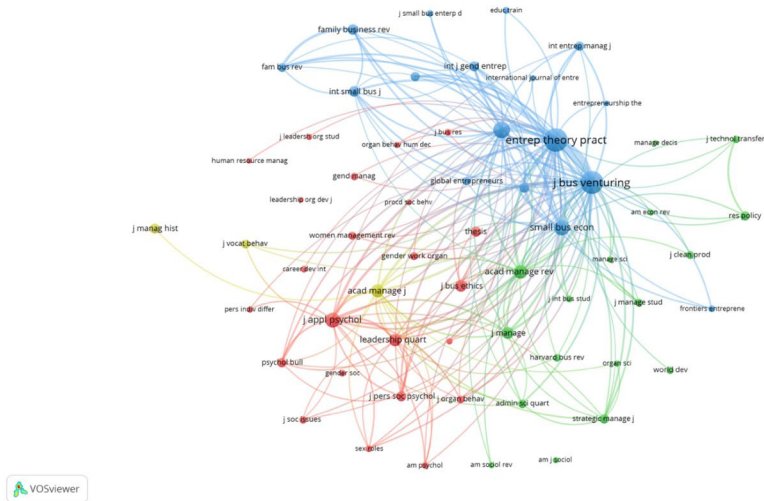


Fig. 7 Co-citation of Journals (source: VOSviewer)

in entrepreneurship, such as entrepreneurial intentions, self-efficacy or the influence of culture, but do not address the gender approach.

Figure 7 analyses co-citations between journals to find out which journals disseminate the concept and whether they have a common thematic organisation or specialisations (Blanco-Mesa et al., 2017). The larger the node size, the more citations journals have received, and the smaller the distance between nodes, the higher the co-citation frequency, and *vice versa* (Liao et al., 2018). Sixty sources were obtained with a minimum threshold of 25 citations. The observed large scientific domains are as follows: the blue one with journals that form part of the same thematic organisation on business, economics and entrepreneurship (Entrepreneurship theory and practice (ETP), JBV, JSBM and SBE). The red group of journals stands out for belonging to areas like psychology, the study of human resources and leadership. It even includes women's studies, with the Journal of Applied Psychology (JAP) as a reference in terms of citations and links or LQ. The green cluster is related to the management area with Academy Management Review and Journal Management as the largest nodes for being the most cited. In this cluster we also find the JCP journal. Finally, the yellow cluster is the smallest one and contains journals like Journal of Vocational Behavior that deal with human behaviour and applied psychology, or even philosophy.

In conclusion, this graphical map analysis corroborates some of the common areas in which the cited journals are connected. It is interesting to see how the journal ETP stands out as one of the most co-cited journals because of its large node and its multitude of connections, but it only publishes one article on FEL factors. Journals such as Journal of Cleaner Production (JCP), Journal of Technology Transfer (JTT) and Advances in Developing Human Resources (ADHR) are among the most productive journals and are hardly co-cited.

Table 10 Commonest author keywords

No.	keyword	occurrences	TLS
1	entrepreneurship	30	34
2	gender	27	30
3	leadership	18	21
4	entrepreneurial intentions	12	8
5	women	11	12
6	women entrepreneurs	9	3
7	family business	7	10
8	culture	7	10
9	social entrepreneurship	7	7
10	innovation	7	6
11	female entrepreneurship	5	5
12	self-efficacy	5	4
13	succession	4	8
14	sustainability	4	5
15	career development	4	4
16	women entrepreneurship	4	3
17	competencies	3	3
18	education	3	6
19	development	3	3
20	management	3	2

Abbreviations: TLS: Total Link Strength

Source: Obtained from the VOS viewer software

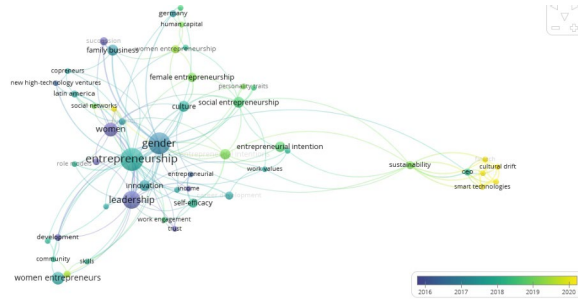
Trends across keyword research: co-occurrences of author keywords

A content analysis has the potential to discover emergent fields because it establishes relationships and builds a conceptual structure of the domain (Ellegaard & Wallin, 2015). Therefore, the main keywords in the document base were analysed with the co-occurrence of author keywords. When words co-occur frequently in documents, it means that the concepts behind those words are closely related (Zupic & Čater, 2015). This semantic field helps us to understand the cognitive structure because the result is a network of topics whose relationships represent the conceptual space of a field (Börner et al., 2003).

The present study identified the most frequent author keywords and those that most frequently appear in the same documents (Merigó et al., 2018). Table 10 shows the commonest author keywords with their respective co-occurrences and total link strength. Apart from logical main words like entrepreneurship, gender, leadership, among others, other words stand out: culture, family business, social entrepreneurship, innovation, self-efficacy, succession, sustainability, career development, competencies, education, development and management.

Figure 8 shows the main keywords and takes a threshold of three occurrences of one keyword and the 100 most representative connections. Twenty-five keywords stand out, which means that for all the 25 keywords, the total strength of co-occurrence links with other keywords is calculated by selecting the keywords with the highest total link strength. To show research trends, author keywords were overlay visualised with their average year of publication using colours to represent their temporal variation. The terms depicted in dark blue were published around 2016 on

Fig. 8 Co-occurrence of authors keywords with overlay visualization. (source: VOSviewer)



average, those in green have an average year of publication around 2018.5, and the average year of publication of the keywords in yellow is around 2020.

The average year of publication of the terms leadership, management, women, development and trust is around 2016. The words gender, innovation or family business appear about 2017. Around 2018, the terms entrepreneurship, role model, equality, community, self-efficacy, skills or social entrepreneurship emerge. Halfway through 2019, the words entrepreneurial intentions, women entrepreneurs, female entrepreneurship, human capital, personal traits, skills, sustainable and social network are published on average. It is worth noting that roughly in 2018 and 2019 some entrepreneurial leadership factors appear: competences, skills, personality traits, self-efficacy, entrepreneurial intentions and social network. Approximately in 2020 on average, terms linked with fintech, platforms, smart technologies and young people start to emerge. This analysis reinforces that the field is young because we do not even observe the “entrepreneurial leadership” field term.

Discussion and Conclusions

Lessons learnt

A comprehensive bibliometric study of FEL factors is presented to provide an overview and understanding of the state of literature’s development in the field. It was carried out by means of two techniques used together, a bibliometric performance analysis and graphical mapping, by studying variables like articles, principal investigators, scientific journals, countries, research areas and keywords with their interrelations.

We conclude that:

- Scientific production was not significant until 2015, and is a young and under-developed research field in terms of the number of publications and citations (almost 85% of the articles were published between 2015 and 2020, and 81% of the papers indexed in the WoS database have fewer than 10 citations). All this reveals the novelty of the field with a gender focus.
- The most influential seminal article was by Ahl. She is a renowned Swedish researcher on FE from a social constructionist gender position that encourages the choice of a poststructuralist epistemological research framework. She is

- co-cited with De Bruin and Brush, who have articles together that state the paucity of FE research. Eagly is an author who has researched leadership style and gender, and is co-cited with: Marlow, who researches entrepreneurship from a feminist perspective; Bird and Gupta, who investigate organisation building from a gender perspective; Heilman, who studies the impact of stereotypes for women in business.
- (c) Despite the influence of feminist perspectives on the base, the most cited articles by Gundry and Welsh (2001), Vecchio (2002) and Buttner (2001) and are coupled bibliographically, still reproduce the same pattern of contemporary research into gender and entrepreneurship with a descriptive approach, but include no theoretical framework (Henry et al., 2015). However, the article by Balanchandra et al. (2015), with a higher ratio of citations per year of publication, changes the research perspective. Following the structure proposed by Ahl (Ahl, 2003), these articles take different epistemological positions: that of Gundry et al. with that of Vecchio, and that of Buttner, do so with a traditional objectivist epistemological approach, with the former from an individualistic approach and the latter from a comparative approach. Balachandra does so from extended constructionist epistemology.
- (d) The most productive journals are JSMB and IJGE. However, the most cited are JBV, followed by LQ. Interestingly, the pioneering journals were the US benchmark journals in entrepreneurship and leadership JBV, JBE and LQ, with the strongest influence given their many citations, but they stopped publishing in the field. JSBM ranks first in productivity terms in the last 5 years, together with the gender journal IJGE. Finally, 35% of the journals with published research are based in the USA and 25% in England. The remaining 20% come from Western countries. This reveals the possible existence of discursive practices that can guide and limit conversation (Ahl, 2004; Huff, 1999) both by the journal's country of origin (Anglo-Saxon countries USA and England in our case) and by these journals' category (mainly management, entrepreneurship and business). In journal co-citation terms, three clear specialisation areas appear: business and entrepreneurship; management and psychology; organisational behaviour. The cluster with the most co-citations and connections forms part of the same thematic organisation on business and economics with journals ETP, JBV, JSBM and SBE. The other journal to stand out is JAP. It appears in another cluster: the area of psychology and organisational behaviour.
- (e) The predominant research areas are economics and business (60%) and, to a lesser extent, psychology and social sciences. EL is associated indistinctly with two fields that have usually been considered separate areas: leadership (associated with people management and psychology) and entrepreneurship (associated with the areas of management and business).
- (f) The most productive authors are Goel (USA) and Goktephulten (Sweden) with three articles, but the most cited are Gundry, Welsh and Vecchio (all the USA) with only one. This is probably due to their publication date (the more recent, the fewer citations received) and also to the chosen journals (for Goel and Goktephulten, journals from very specific niches like technology where the EL field is not normally researched). Bibliographic linking by authors reveals close

connections with similar, or even joint, research lines. This reveals interesting co-operations between authors from institutions in different geographical locations in the USA, jointly with Chile and Sweden, or in countries like Spain, or with other emerging groups like South Korea.

- (g) Once again, the USA comes over as the most productive, influential and dominant country in citations, output and co-authorship terms. The USA dominates the publishing landscape in the studied field, followed by Spain, Germany and England. The citation structure differs insofar as the USA and Spain also receive the most citations, and Australia ranks third, followed by Canada. The USA collaborates with Portugal and Tanzania, and Spain with Finland and Sweden. England stands out in the same geographical group with Northern Ireland, Scotland and Wales.
- (h) Trends in FEL factors, obtained by author keywords, focus on examining the relation linking entrepreneurship, leadership and gender, but reveal some trends like innovation and education, social entrepreneurship and sustainability or culture, family business or succession, etc.

With this bibliometric analysis, we can corroborate that the field of women's EL factors is still in its early days in research terms with barely any influence and production. American discourse occupies the dominant position in the discursive community in the FE field (Ahl, 2004), the leadership field and, as we have just shown, also in the field of FEL factors. Although the FE literature has significantly developed (Henry et al., 2015), there is still a long way to go in the discipline of FEL and its factors. Despite its seminal studies having scholars who encourage contributions to the field from broader poststructuralist perspectives, there is still a tendency to reproduce traditional gender-biased research approaches.

Main limitations

Of the main limitations, we firstly highlight that which derives from the nature of the bibliometric analysis, which is descriptive and exploratory. It provides the general orientation of the studied field in accordance with the different analysed variables.

Secondly, the obtained results are limited to the WoS Core Collection database which, despite being considered one of the most influential ones for classifying research, it may have some limitations like excluding journals or papers that are not indexed because they have recently appeared and which, for example, may be equally influential in this field. It is, therefore, acknowledged that had another database been chosen, the results and conclusions could have differed from those obtained.

Finally, our results represent the overall picture that was available until 2020, which may cause these results to substantially change in the future, and also due to low scientific output. Bibliometric data are dynamic depending on the period, output and impact received by different dimensions. Thus any results may vary in the years to come.

Future research lines

Future research directions include the need to look more closely at this field, and to continue research into the male dominant normative lens of both journals and scholars, to build a clear conceptual and empirical framework from a female social constructionist gender lens.

Another possible research line would be to analyse women entrepreneurs' own leadership factors, and to understand how they are manifested and constructed in different cultural and social contexts to approach the field with higher diversity and to enrich the construct. If the leadership factors of women entrepreneurs who are capable of driving success in entrepreneurship can be identified and assessed (Renko et al., 2015), then there will be excellent opportunities for this research to develop. By exploring all these issues, the intention is to improve available knowledge, and to outline appropriate actions or recommendations, to foster more pluralistic start-ups.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s11365-022-00798-2>.

Author contributions All authors have contributed equally to this work. All authors have read and agreed to the published version of the manuscript.

Funding Universitat Politècnica de València.

Open Access funding provided thanks to the CRUE-CSIC agreement with Springer Nature.

Declarations

Conflict of interest The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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