DOI: 10.28934/jwee20.34.pp181-201
JEL: I20

ORIGINAL SCIENTIFIC PAPER

Women, Entrepreneurship and Education: Descriptive Bibliometric Analysis Based on SCOPUS Database

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A B S T R A C T

Descriptive bibliometric analysis seeks to present the characteristics of published scientific papers that examine the phenomena of "women", "entrepreneurship" and "education". Using standard bibliographic and bibliometrics indicators, the specifics of publications from the point of publishing dynamics, belonging to different scientific areas, characteristics of a publication source, individual or joint authorship, geographical distribution, published content and citation metrics are presented. The research results rely on analytical tools provided by Scopus and BibExcel, while a Wordcloud text generator was used to create some of the graphical presentations. A total of 330 papers dated in the period

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from 1976 to 2020, were published in a total of 198 journals indexed in the SCOPUS database. Created as a result of individual research work or in collaboration with 811 different authors, the content of these works falls into one of 22 categories of research areas. The observed papers were cited by 4976 other documents indexed in the Scopus database. This study should be considered as a systematization of articles published in eminent scientific journals and should motivate other authors to conduct further researches in the field of bibliometrics.

KEY WORDS: *women, entrepreneurship, education, descriptive bibliometric analysis, gender, science production, Scopus database*

Introduction

Examining the nature and the dynamics of published papers is a widespread approach among authors who find their field of research in the spectrum of bibliography and bibliometrics. In order to follow the development trend of the observed research topic (Roth et al., 2020) or trends (Zhu et al. 2020), journal publication activity (Tang et al., 2018) or scientific discipline (Lampe et al., 2020) the authors have recognized benefits of bibliographic analysis for greater comprehension of activities performed in the scientific community. Complex bibliographic data and metadata provide a wide range of analytical possibilities, which represents one of potentials of digital transformed organizational capacity (Slavinski and Todorovic, 2019). The application of IT technologies has led to fundamental changes in the field of librarianship (Salazar 2019). Moreover, bibliographic databases such as Scopus and Web of Science have provided wider utilization of analytic tools in order to capacitate scholars to exhaust all the potentials of available bibliography data.

The opportunity to analyze and compare all the results of their bibliography searches was given to authors, enabling them to provide more compatible references for their research endeavors. As a matter of fact, examination of the education and the effectiveness of women-led entrepreneurial engagements have been noted throughout numerous publications covered by bibliography bases. According to contextual narrative the quality of education has been emphasized as the prediction of entrepreneurial success (Vukmirović, 2019; Rudhumbu et al., 2020), women empowerment fundamental (Banihani 2020) or a trigger of future entrepreneurial intentions (Armuña et al., 2020). The publications have also highlighted the importance of women's entrepreneurship both in the context

of economic revitalization (Khan 2020) and domestic economies strengthening (Radović-Marković et al., 2010).

Through multidisciplinary approaches towards the issues of "women", "entrepreneurship" and "education", research efforts have shown the increased interest of the academic community to interpret these phenomena from the point of the different scientific fields. The constant increase in the number of research papers recognizes the need to approach the analysis of such publications from the position of bibliographic analysis, as an effective method for interpreting the existing written corpus. Bibliographic analyzes of scientific papers dealing with women's participation issues have been registered within the fields of psychology (González-Álvarez and Cervera-Crespo 2019), management (Artto et al., 2009; Zhu et al. 2020) or higher education (Collins and Steffen-Fluhr 2019). Also, the authors examined the inequality of women's scientific productivity in Academia (Filandri and Pasqua 2019; Mayer and Rathmann 2018) and Scientific journals 'editorial boards (Wang et al., 2020).

Although the incensement of articles examining the phenomena of "women", "entrepreneurship" and "education" has been noted within the last 15 years (called WEE paper in the further text), there is no bibliographic paper that covers topics as the dynamics or nature of published work. Such bibliographic studies are common for many research fields (Palomo et al., 2017), while in recent years the publication of bibliographic papers from the position of gendered publication trends (Dalal et al., 2020) or gender inequality in scientific careers has become especially topical (Filandri and Pasqua 2019). In order to fill this gap, the study aims to present the results of bibliographic analysis for WEE papers and thus point out the novelties identified in publications created after 2003. This paper is organized as follows: First, criteria for database formation, bibliometrics approaches, and employed software were presented within the Sample and Methodology section. Second, bibliographic indicators related to the following research questions: Characteristics of scientific area, according to evolution and its dynamic; Characteristics of scientific productivity, according to authorship and publications' source; Characteristics of scientific productivity, according to sources and affiliations; Characteristics of scientific productivity, according to publications' content and Characteristics of further publications' life, were presented in the Results section. Third, summarized results interpreted from the point of novelties brought through the younger period of publication, as well as limitations and suggestions for creating similar studies

in the future were presented in Discussion and limitations. The last section contains some final conclusions of the performed analysis.

Sample and Methodology

Research sample was formed by extracting data from the Scopus bibliographic database. The exported data contained full bibliographic records, such as citation and bibliographical information, funding details, abstract and keywords etc. The primary criteria for bibliographic units research corresponded to the scientific papers published in the period from 1976 to 2020. The competitiveness of the Scopus bibliographic platform comparing to other specialized databases was the main research subject of various scientific papers (Harzing and Alakangas 2016), Wider time coverage of recorded units was emphasized as its biggest advantage (Mongeon and Paul-Hus 2016). Finding adequate bibliographic data was realized as follows: the search was limited to scientific papers that contained the term "women", "entrepreneurship" and "education" in their title, abstract or keywords. The results of the given criterion amounted to 330 scientific papers, which bibliographic data was retrieved on June 9, 2020. The largest number of documents was written in English (313), while scientific papers in Spanish (11), Lithuanian, Russian, Serbo-Croatian, French, German, Japanese, Polish and Ukrainian were also registered.

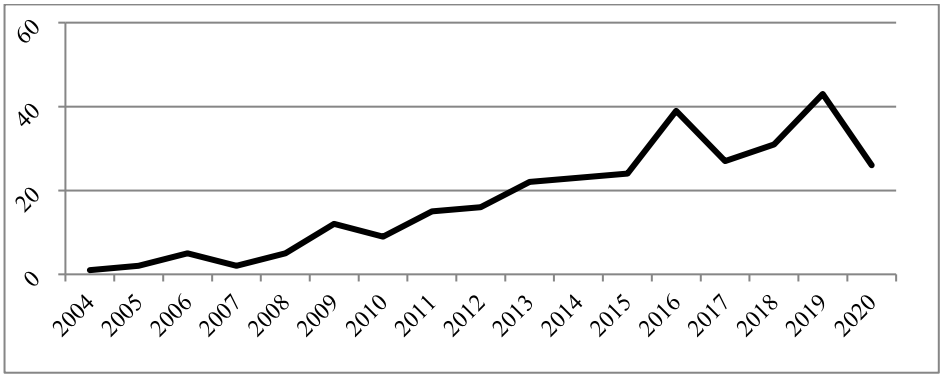
Employment of analytical tools provided by Scopus was sufficiently for acquiring most of the results demanded by research. Available tools were used for the explanation of the publication's dynamics in greater details, as well as in identifying the characteristics of publications in the context of scientific disciplines, the most dominant publication sources and most fruitful authors. For grouping publications into two production eras and for the purpose of their comparison, analytical tools were combined with "Advanced search" options and appropriate filters. Frequency analysis results, which aim was to present the characteristics of the published content, were obtained using BibExcel software, created by Olle Persson, while the accompanying graphical representations were exported from the Wordscloud online text generator.

Results

Characteristics of Scientific Area, According to Evolution and Its Dynamic

The oldest publication covered in Scopus database, which fulfills inclusion criteria by containing terms "women", "entrepreneurship" and "education" in title, abstract or keyword section, dates back to 1976. Called *The Byanshi: an ethnographic note on a trading group in far western Nepal*, this paper has been published in the journal *Contributions to Nepalese studies* and was categorized as a scientific research in the field of anthropology. Written by Manzardo, Dahal and Rai (1976), this article could be considered as research activities' isolated demonstration, as it was the only WEE paper in the first 12 years of production (the next one is published in 1988). With the aim of scientific production's examination, Graph 1 presents the growing trend in the number of WEE publications by year, from 2003 to 2020. In the following sections, observed period of time refers to "the younger period of production", in opposite to 27 years old "older period of production" (1973-2002). Publication number exported from bibliographic data indicates that "the younger period of production" was significantly more fruitful. From 1976 to 2002, only 29 published papers (average 1.11 papers per year) were identified, while 301 articles were published from 2003 onwards (average 17.7 papers per year). Accordingly, 91% of the total number of observed publications was published during "the younger period of production", while "the older period of production" resulted with only 9% of published works (although the older phase took into consideration a time frame which lasted almost a decade longer).

Graph 1: Number of published papers per year



Source: Authors' own

Observing data presented in Graph 1, the most fruitful production year was 2019, with 43 published papers. While the largest number of papers was published in 2019, this year is followed by 2016 with 39 and 2018 with 31 published papers. Throughout 2017, 27 articles were produced. At the time of writing, 25 publications were declared in 2020. No publications were recorded in 2003, which makes it the least prolific year of scientific production. Only 1 published article dates in 2004, while 2 scientific publications were recorded during 2005 and 2006.

Characteristics of Scientific Productivity, According to Authorship and Publications' Source

According to classification of the research areas provided by Scopus, the written corpus of 330 observed publications falls under researches within 22 different scientific disciplines. The largest number of publications was categorized as the subject area of Business, Management and Accounting (192 publications or 32.1% of the total production), followed by Social Sciences (158 papers or 26.4%) and Economics, Econometrics and Finance (114, 19.1%). The remaining 22.4% of publications were categorized as researches in the field of Arts and Humanities, Engineering, Medicine, etc. It should be noted that the publication content does not have to correspond exclusively to one subject area, and that it can be categorized as a combination of several research categories.

Comparing data from two production eras, it is notable that the research topics of papers containing terms of "women", "entrepreneurship" and

"education" in their title, abstract or keywords are different in order to the period of publication. The greatest number of papers published during the older period of production covers topics within the scientific area of Social Sciences (30.2%), Business, Management and Accounting (25.6%) and Arts and Humanities (23.3%). In the following years, increased number of papers in the field of Business, Management and Accounting was noted, as this area covers the most numerous group of scientific articles (32.6%). It is followed by Social Sciences with 26.1% and Economics, Econometrics and Finance with 20.4%. Although it was one of the most represented research categories for publications created before 2002, research works in the field of Arts and Humanities represented only 2.7% of the younger period of production.

In order to examine scientific journals as the sources of scientific production, WEE papers were published in 198 journals indexed in the Scopus database. Journals were classified into 10 groups, according to the criterion of grouping by the number of published papers. As expected, the most numerous group of journals consisted of journals with only one published paper and this group amounted in 77% of the observed journals. Journals with 2 scientific papers corresponded to 12.1%, while journals with over 2 papers were equal to 10.6% of the total number of journals sources. The largest number of papers published in the same journal is 29 articles (which amounts 8.8% of the total papers), and qualifies the *International Journal of Gender and Entrepreneurship* as the most represented journal of the WEE publication corpus (see Table 1). The most prolific journals, shown in order of publications' total number, were presented in Table 1. Sources of publications were linked to the belonging journal group, with citation metric values provided by Scopus. List of journals corresponds to journal groups from 1 to 7, while the last three (group 8, 9 and 10) were excluded from this review as journals with 1, 2 and 3 published papers in total. The citation metric included in Table 1 represents the ratio of the total number of citations for the observed source in 2019 and the total number of documents published in the journal for the period 2016 to 2018. Taken from the Scopus bibliographic database, this method provides data dependence, since among the observed sources there is no uniformity of publishing dynamics, nor publication quantity at the level of one year. Also, monitoring the citation score of the journal enables the identification of potential reputability and its positioning within the associated research discipline, as well as active participation in its co-creation.

Table 1: Scientific journals with corresponding journals' groups and Cite Score

Source name	Journal group	Cite Score
International Journal of Gender and Entrepreneurship	Group 1	2.07
International Journal of Entrepreneurship and Small Business	Group 2	1.22
Gender in Management	Group 3	1.8
International Entrepreneurship and Management Journal	Group 4	5.6
Journal of Developmental Entrepreneurship	Group 4	0.92
Journal of Small Business and Entrepreneurship	Group 5	1.58
Education and Training	Group 6	2.94
History of the Family	Group 6	0.73
International Journal of Entrepreneurial Behavior and Research	Group 6	4.75
Journal of Business Venturing	Group 6	11.13
Journal of Small Business and Enterprise Development	Group 6	3.03
Entrepreneurship and Sustainability Issues	Group 7	5.77
Journal of Enterprising Communities	Group 7	2.34
Journal of Entrepreneurship Education	Group 7	1.7
Journal of Entrepreneurship in Emerging Economies	Group 7	2.67

Source: Authors' own

Characteristics of Scientific Productivity, According to Publications' Sources and Affiliations

The bibliographic database covered published research activities of 858 authors (or 811 scholars without their repetition) of 330 articles dating in the chronological period of 44 years. Published papers were the results of individual author scientific engagement, as well as research collaborations which were more numerous - the author list of only a quarter of the publication has only one author. On the other hand, research collaboration can be described as follows: 28% of publications were created as a result of collaboration of 2 authors, 24% of papers were written by 3 authors, 14% were signed by 4 authors and 3% by 5 authors. The collaboration of 6 or more authors is characteristic of a total of 5% of publications. The most numerous authors' list equals 10 authors, which is the characteristic of only 1 article. The average number of authors per paper is 2.6. In order to examine the publishing intensity for the observed authors, the number of published papers per author was considered as a valid indicator of the scientific engagement.

Table 2 shows the list of 10 most prolific authors, who expressed research interest in issues related to women, entrepreneurship and education, as well as the source and year of published work. In an attempt to present characteristics of research activities in greater details, the values of the last column indicate author's tendency to cooperate on projects with other researchers (or on the contrary, to approach these activities individually). In order to numerically translate such tendencies, the presented values correspond to the coefficient of collaboration ($\mathbf{c_i}$) - the ratio of the number of papers written in co-authorship and the total number of papers for the observed author (Palomo et al. 2017). In this regard, the obtained values correspond to the interval 0-1, so as the value is closer to 1, the greater cooperation with other colleagues has been expressed by author.

Table 2: The top 10 authors of WEE publications

Author	**Papers**	**Source name and publication year**	$\mathbf{c_i}$
Johansen, Vegard	4	Journal of Education and Work (2017) Education and Training (2016) International Journal of Entrepreneurship and Small Business (2013) International Journal of Gender and Entrepreneurship (2013)	0.25
Belas, Jaroslav	3	Economic Research-Ekonomska Istrazivanja (2019) Entrepreneurship and Sustainability Issues (2018) Polish Journal of Management Studies (2018)	1
Cepel, Martin	3	Economic Research-Ekonomska Istrazivanja (2019) Entrepreneurship and Sustainability Issues (2018) Polish Journal of Management Studies (2018)	1
Gavurova, Beata	3	Economic Research-Ekonomska Istrazivanja (2019) Entrepreneurship and Sustainability Issues (2018) Polish Journal of Management Studies (2018)	1
Lucarelli, Caterina	3	International Journal of Gender and Entrepreneurship (2020) International Journal of Gender and Entrepreneurship (2016) International Journal of Entrepreneurship and Small Business (2015)	1

Author	Papers	Source name and publication year	c_i
Alvarez, Claudia	2	Computational and Mathematical Organization Theory (2015) Journal of Small Business and Enterprise Development (2011)	1
Aterido, Reyes	2	World Development (2013) Small Business Economics (2011)	1
Brush, Candida Greer	2	Journal of Business Venturing Insights (2017) Journal of Business Venturing (1997)	1
Chen, Helen L.	2	Journal of Engineering Education (2019) International Journal of Engineering Education (2016)	1
Cheng, Ranis	2	Journal of Entrepreneurship (2015) Gender in Management (2014)	1

Source: Authors' own

The most prolific researcher of WEE papers is Vegard Johansen, author of 4 scientific publications. In addition to the largest number of written papers, the author stands out as the only author of the top 10 most fruitful whose works are not only the result of collaborations - individual authorship characterize 3/4 of his total work. The other 22 publications presented in Table 2 are the results of inter-author collaborative endeavors, as evidenced by the equal values of the collaboration coefficients for the other 9 authors. The only publication that belongs to the older period of production was published in the *Journal of Business Venturing* in 1997. Only one paper from 2020 has been published in the *International Journal of Gender and Entrepreneurship*, created by Caterina Lucarelli.

The applicability of analytic tools provided by Scopus is multiple and it enables the perception of the production trend from different points of view. For the purposes of this paper, Scopus analytics was employed in order to analyze the observed corpus of papers from the position of the author's affiliation as well as to represent the most influential countries in papers' creation. Data related to the country was derived from bibliographic data section of the authors' affiliation. Furthermore, they were formed as a determinant of geographical distribution depending on the scientific institution's location of and do not necessarily indicate to the observed authors' nationality. The data shown in Table 3 represent top twenty most

dominant institutions in which authors were employed at the time of publication (as well as belonging countries).

Table 3: Geographical distribution by Institutions

Affiliation	**Country**	**Number of papers**
Babson College	USA	5
Umeå Universitet	Sweden	5
Østlandsforskning	Norway	4
Universitat Autònoma de Barcelona	Spain	4
Università Politecnica delle Marche	Italy	4
Tecnologico de Monterrey	Mexico	3
Univerzita Tomase Bati ve Zline	Czech Republic	3
Stanford University	USA	3
University of Ghana	Ghana	3
Boston University	USA	3
Universiteit van Pretoria	South Africa	3
Manchester Metropolitan University	UK	3
Lunds Universitet	Sweden	3
Simmons School of Management	USA	2
Institute of Economic Sciences	Serbia	2
Commission of a Socially Sustainable Malmö	Sweden	2
Brock University	Canada	2
Pennsylvania State University	USA	2
Universitat de Barcelona	Spain	2
University of South Africa	South Africa	2

Source: Authors' own

The top 20 institutions which were most influential in creating the observed corpus of knowledge, indicated that those located in the USA were most often engaged in research activities. Authors located in 5 of those institutions have created 15 papers in the field of WEE. They are followed by authors from 3 Swedish institutions - Umeå University, Lunds University, Commission of a Socially Sustainable Malmö. Two institutions from Spain were registered among 6 papers' bibliographic data, while 5 papers were written by authors from two institutions in South Africa. The next number of publications is characterized by only one research institution from each

country - 4 papers were written by authors from institutions in Norway and Italy and affiliations of 3 papers' authors were institutions from Mexico, Czech Republic and Ghana. Scholars from institution in Serbia (Institute of Economic Sciences) and Canada (Brock University) created 2 papers within the observed group of publications. Geographical distribution from the point of the most presented countries indicated to different conclusions. Although, as expected, the Anglo-Sanskrit-speaking countries were at the very top of productivity (USA with 74 and UK with 32 published publications), they were followed by India with 26 documents. Researchers from Spain were the authors of 20 publications, scientists from Canada of 13, while German authors wrote 12 papers from the observed corpus. Authors of 10 papers from institutions from Italy, Malaysia, South Africa and Sweden were registered on proper bibliographic section.

Characteristics of Scientific Productivity, According to Publications' Content

Further steps of bibliometrics' examinations lies in the analysis of publications' content. In this manner, sections of bibliographic data related to the title, abstract and keywords of publications play a major role in further processes. The presented indicators relied on the concept of frequency analysis, so the text units were ranked according to the number of identified repetitions for the observed written corpus. Frequency analysis of words in title, abstract and keywords sections were employed in order to identify the most dominant research topics for WEE publications, while keywords' frequency results pinpointed to the most present terms in published papers descriptions. These terms were exclusively authors' choices and they did not rely on standardized textual determinants, which may be available within specialized bibliographic databases.

Figure 1 contains two types of data presentation - the graphical segment of terms used in titles, abstracts and keywords, and tabular frequency presentation of observed textual units. While the intensity of repetition was indicated by the size of presented terms in the graphical section, this phenomenon was treated in table numerically. The graphical and tabular section of data presentation simultaneously represents two stages of analysis. While the graphical part was exported from free online word cloud generator's frequency analysis visual results, the tabular section presents the results of further exported material treatment. The main necessity for manual data processing lies into the fact that Wordcloud text generator is treating set

of textual inputs as the individual and unique data units, without possibility of similarities recognition. Therefore, the validity of the results would be compromised without further selection of terms and their grouping by similarity (according to the principle of the same root word, where nouns are represented in the singular, and all plurals, derived adjectives or verb nouns are combined), so the presented frequency values are the sum of individual data values. Those textual units that do not contribute to the greater understanding of the published content (such as the terms “data”, “study”, “sample”, “analysis”, “purpose”, etc.) are excluded from the final tabular presentation.

Figure 1: Frequency of terms in title, abstract and keyword sections

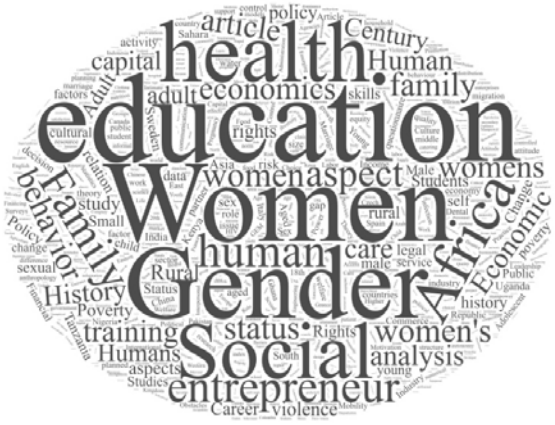
Term	Frequency
entrepreneurship	1214
Woman	840
Student	531
Education	383
Gender	312
Business	290
Society	229
Economy	203
Female	201
Man	107

Source: Authors’ own

As expected, matching between terms used as inclusion criteria and textual results of the frequency analysis was noted. Detected for 1215 times, term "entrepreneurship" was most commonly used term in the title, abstract and keywords. Although the term "women" is the second most common word for the observed set of bibliometric indicators with frequency of 840, this should be taken with skepticism, due to the assumption that the terms “women” and “female” are used for the purpose of examining the same phenomenon. According to Thelwall (2018), classifying people by biological sex rather than socialized gender is more appropriate in social phenomenon examinations than vice versa. For the purposes of this section, these terms were equated, therefore frequency value was expressed collectively, by

summation frequency for term "women" and "female". Value amounted 1041 and indicated to high frequency of observed terms. On the other hand, terms "man" and "male" were identified for only 186 times in total, which emphasizes even more female-orientation of WEE papers. The same method was used to identify the most commonly used keywords, which are shown in Figure 2. In this case, the only textual inputs corresponding to the bibliographic section of the keywords were employed, which leads to conclusion that frequency analysis was performed on a total of 3548 terms.

Figure 2: Frequency of terms in keyword section



Term	Frequency
entrepreneurship	442
woman	259
education	178
gender	166
health	106
society	101
female	73
factor	65
employment	48
Africa	44

Source: Authors' own

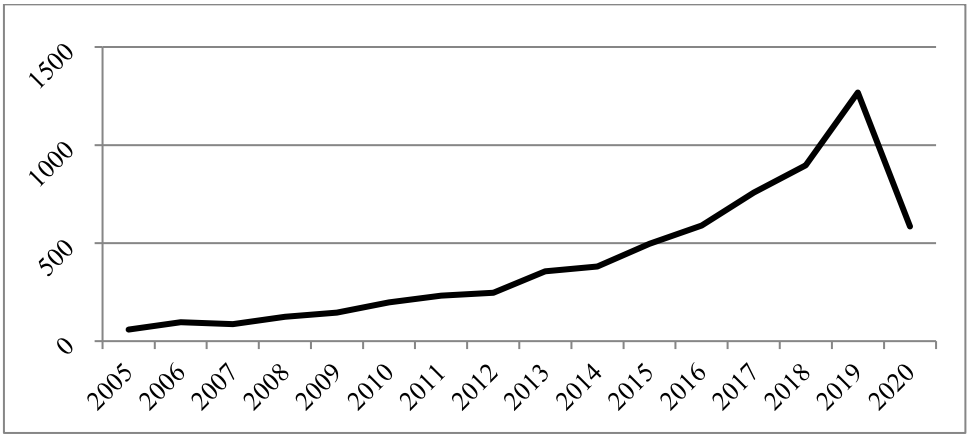
The procedure used in the previous section was repeated. Therefore, presented terms express results of textual units grouping. In this manner, frequency value for term "entrepreneurship" corresponded to sum value of frequency for terms "entrepreneurial", "entrepreneurs", "e-entrepreneurship", "STEM entrepreneurship" etc. Repeated for more than 440 times, this group of units represent 12.4% of entire text in keyword section. The results do not differ much from those presented by Figure 1, as the group term "woman" was registered as the second common textual group through obtained bibliographic data. In this case, the term "female" was not assigned to group "woman", as it refers to social movement more than socialized gender. Furthermore, it corresponds to separate text group consisting of the terms as "feminism" or "feminist" and its frequency value amounts 73. Grouped under

the term "gender", the examined frequency of the corresponding units (as "genders", "gender-based", "gender-role") amounts to 166. Term "Africa" was repeated 44 times in the first ten most frequently used keywords, indicating a closer geographical determinant of the samples used in 44 different papers.

Characteristics of Scientific Productivity, According to Publications' Content

References lists for 4999 documents covered in Scopus contained at least one of the 330 WEE papers. This indicates that the observed articles had influence on the scientific content creation of almost 5000 publications - 77.5% were categorized as scientific articles, 9.8% as book chapters, and 4.9% as conferences paper. Reviews, books etc. amounted 7.8% of the total number of citing documents. In the last 15 years WEE papers were cited 6517 times. In Graph 2, linear trend serves for presentation of citation metric through period of time (starting with 2007 received citations' exponential growth have been noted). Presentation was formed by exclusion of authors' self-citations data, which caused decrease of total citations' value by 323. Moreover, excluding self-citations reduced the initial values by only 3.9% per year in average, indicating to WEE papers' recognition among other scholars.

Graph 2: Citation trend per years



Source: Authors' own

The highest citation of papers was recorded in 2019, when it counted a total of 1268 citations. This resulted in a growth of 42% compared to the number of citations registered in the previous year. The lowest citation was identified in 2005, when it amounted to a total of 59 citations or 0.9% of the total citations number for the observed period of time. The citation of WEE publications can be further interpreted from the point of the scientific journals in which it was detected. The most frequently cited WEE papers were established by the analysis of the references lists among scientific production of the *Journal of Business Venturing*. It is not surprising that this journal stands as one of the most influential for the observed research area and is regarded as the journal with highest cite score of 11.13 in Table 1. Its influence on reshaping the research results within examinations of "women", "entrepreneurship" and "education" phenomenon was pinpointed through observation of the 10 most cited WEE papers as well. Furthermore, 5 of the most cited articles were published in this journal:

- *Does entrepreneurial self-efficacy distinguish entrepreneurs from managers* in 1998,
- *A theoretical overview and extension of research on sex, gender, and entrepreneurship* in 1993,
- *Israeli women entrepreneurs: An examination of factors affecting performance* in 1997,
- *Entrepreneurship and female youth: Knowledge, attitudes, gender differences, and educational practices* in 1998 and
- *Entrepreneurship and the initial size of firms* in 1989.

The most cited publication dates back to the older period of production and is the outcome of the joint activity by researchers Chen C.C., Greene P.G. and Crick A. This paper was joined by the other 5, since they were all created before 2003. In addition to *Gender, Work and Organization* (as the journal in which article named *The changing experience of Australian female entrepreneurs* was published in 2000), all other papers of the older period of production were published in the *Journal of Business Venturing*. The homogeneity in terms of journals as publication source does not characterize documents dated throughout the younger period of production - all papers have been published in several scientific journals: *Journal of Applied Psychology*, *Entrepreneurship: Theory and Practice*, *Management Science* and *Entrepreneurship and Regional Development*.

Discussion and Limitation

Issues of women in entrepreneurship and the role of education for successful entrepreneurial achievements have become numerous researchers' preoccupations. Women empowerment was registered not only through published content of WEE papers, but also through the authorships - more than 50% of the most prolific authors presented by Table 3 were female. As it has been emphasized before, the vast majority of the most prolific authors' articles were created as scientific collaboration, so this disable drawing conclusions about cooperation behavior in order of gender. In aim to enlighten this question, it is necessary to establish the gender for all 811 authors registered in Scopus and to perform the cross analysis of their research activities. Observing collaboration index of the most prolific authors, as indicators of their research styles, leads to conclusions that co-authorships are the most dominant research form among WEE papers, but this does not describe in more details the nature of collaborations. Based on a sample of the 10 most profiled authors, it is concluded that research collaborations are the most common research style. Moreover, although it was assumed that exclusively female or exclusively male scientific collaborations would be characterized by a larger number of papers, this was found for only 11% of the bibliography presented in the table. One of these publications (*Entrepreneurial intent of engineering and business undergraduate students)* was signed by as many as 7 female authors, which was significantly above the average number of authors per paper (2.6).

The younger period of production brings novelties from the point of the scientific journal heterogeneity. Journals whose scope corresponded to the topics of WEE papers are significantly less numerous than those in which papers were published after 2003. The *Journal of Business Venturing* stands out as a respectable source of publications of the older period of production, and its influence on the work of researchers of the WEE phenomenon is evidenced by the high values of Cite Score. The growing linear trend of citing WEE papers indicates that the relevance of the dominant topics of these publications does not abate, and indicates that publications focusing on "women", "entrepreneurship" and "education" will continue to be present through future scientific endeavors. However, in order to present more precise projections on the future publications trends within WEE frame, it is necessary to overcome the limitations of this paper.

Examining the sample formed by searching bibliographic materials, so that they correspond to the publication type of the journal and contain the observed terms in the fields of titles, abstracts and keywords, was effective in monitoring the dynamics of publishing, but also for describing some of the examined characteristics of publications. However, from the point of the published content, this inclusive criterion also had some shortcomings. Although verified through other publications in the field of bibliography, the results of the frequency analysis of textual units do not represent a breakthrough. Analysis of the published content is a complex research endeavor and requires the inclusion of other types of published documents. Also, in order to form a credible research framework in order to better understand the movement of research trends from the position of "women", "entrepreneurship" and "education", it is necessary to include secondary documents stored on the Scopus bibliographic database. It should be noted that Scopus only analyzes the citations of the journals in its index, which could limit bibliographic research as well.

Although the study is the result of descriptive bibliometric analysis, the inclusion of a larger number of quantitative bibliometric indicators would enable more precise monitoring of the research trends evolution and its development. By quantifying the model, it would be possible to examine the fit of the obtained results into the "Price's Law" as a measure of "scientific productivity in the field", fitting into the "Bradford's Law" in order to identify scientific journals in the "nucleus zone" and into the Lotka's Law" in order to find "different levels of research contribution" per author (Palomo et al. 2017). On the other hand, the use of bibliometric indicators and the implementation of standard bibliometric analyze such as co-occurrence analysis would provide greater detail and precision for the observed set of publications, explaining several different natures of their interdependence.

Conclusion

The academic community has shown increased interest in scientific research on the phenomena of "women", "entrepreneurship" and "education" within the last 15 years. This conclusion is supported by bibliographic analysis' results especially from the point of the publishing dynamics, so as the citation metrics for the observed scientific corpus. While similar researches are registered only sporadically through earlier publication periods, the specific scientific domain of such works mostly corresponded to

the spectrum of social sciences (with a part of the research being attributed to the Arts and Humanity). The contents of the works published after 2003 bring some novelties in terms of the examined phenomena. In addition to the fact that such publications are incomparably more numerous than those created before 2003, the researchers have been approached more intensively to scientific projects from the point of Business, Management, Economics or Finance.

Since there are no bibliographic articles examining WEE papers, this study serves to pinpoint to some significant conclusions. The growing trend in the number of WEE papers indicates that the relevance of research issues "women", "entrepreneurship" and "education" is not waning, but that these topics are commonly received by publishers. Supporting the strengthening of these topics in the scientific community is not exclusively related to Journals with Gender diversity in aims and scopes section. Contrary, gender perspective within different scientific disciplines represents a necessity for wide range of scientific topics. The permanent citation of papers indicates their active role in the creation of science, while the respectability of papers is indicated by high citation indicators and since self-citations are excluded. As it has been shown high interests in analyses of the different entrepreneurial endeavors led by women or interpretations of education serving in women's empowerment processes, the framework from the future bibliographic researches has been established by this article.

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Article history: Received: 9 July, 2020

Accepted: 10 September, 2020