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Evolution and Future Trends in Global Research on Women Digital Entrepreneurs: A Bibliometric Analysis

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Digital entrepreneurs, Women, Bibliometric review, Female digital entrepreneurs

JEL Classification

B54, L26, L81, L86, M15

Abstract: The study of women in digital entrepreneurship is a vibrant, expanding, and rapidly developing academic subfield with deep roots in the field's history of thought. This paper provides a bibliometric evaluation of the research articles published on female digital entrepreneurs between 2007 and 2023. Publication output, co-occurrence networks, and co-authorship networks were just some of the bibliometric markers employed in the study to reveal recurring topics and directions in the field. According to the research, the number of articles on successful female entrepreneurs on the Internet has increased dramatically over the previous decade. The study also shows how digital tools can help women succeed as business owners online. This research adds to the existing literature on women business owners in the digital sphere and highlights the prospects of entrepreneurship to promote social and economic progress. The essential contribution is a timeline of the topic's development that future scholars can use in developing theoretical frameworks and conducting empirical studies.

1. Introduction

The digital arena has become an increasingly vital sector for entrepreneurship since it offers prospects for new businesses, innovation, and expansion. Entrepreneurs, especially those underrepresented in traditional sectors, have access to novel and exclusive opportunities in the digital world. Mainly women entrepreneurs have been able to use digital platforms to overcome formal entry restrictions and establish profitable firms. Notwithstanding the benefits provided by the digital realm, women entrepreneurs continue to confront substantial obstacles, such as gender bias and discrimination, unequal access to resources and capital, and a lack of exposure and recognition. These difficulties are well-documented in the literature, and a growing corpus of study strives to comprehend and overcome them. An increasing interest in the aspects that contribute to the success of women digital entrepreneurs has emerged in

recent years. Bibliometric analysis, which involves studying the patterns and trends in the literature on a specific subject, can provide significant insights into the present level of research on this topic. This work conducts a bibliometric analysis of the literature on female entrepreneurs in the digital space. This paper aims to identify the most critical research themes, trends, and gaps in the literature and provide a complete assessment of the state of research in this field. We study a large dataset of academic articles, conference papers, and other scholarly publications using various bibliometric methods and methodologies. Our study assesses the existing studies on female entrepreneurs in the digital arena and identifies numerous crucial areas for future investigation.

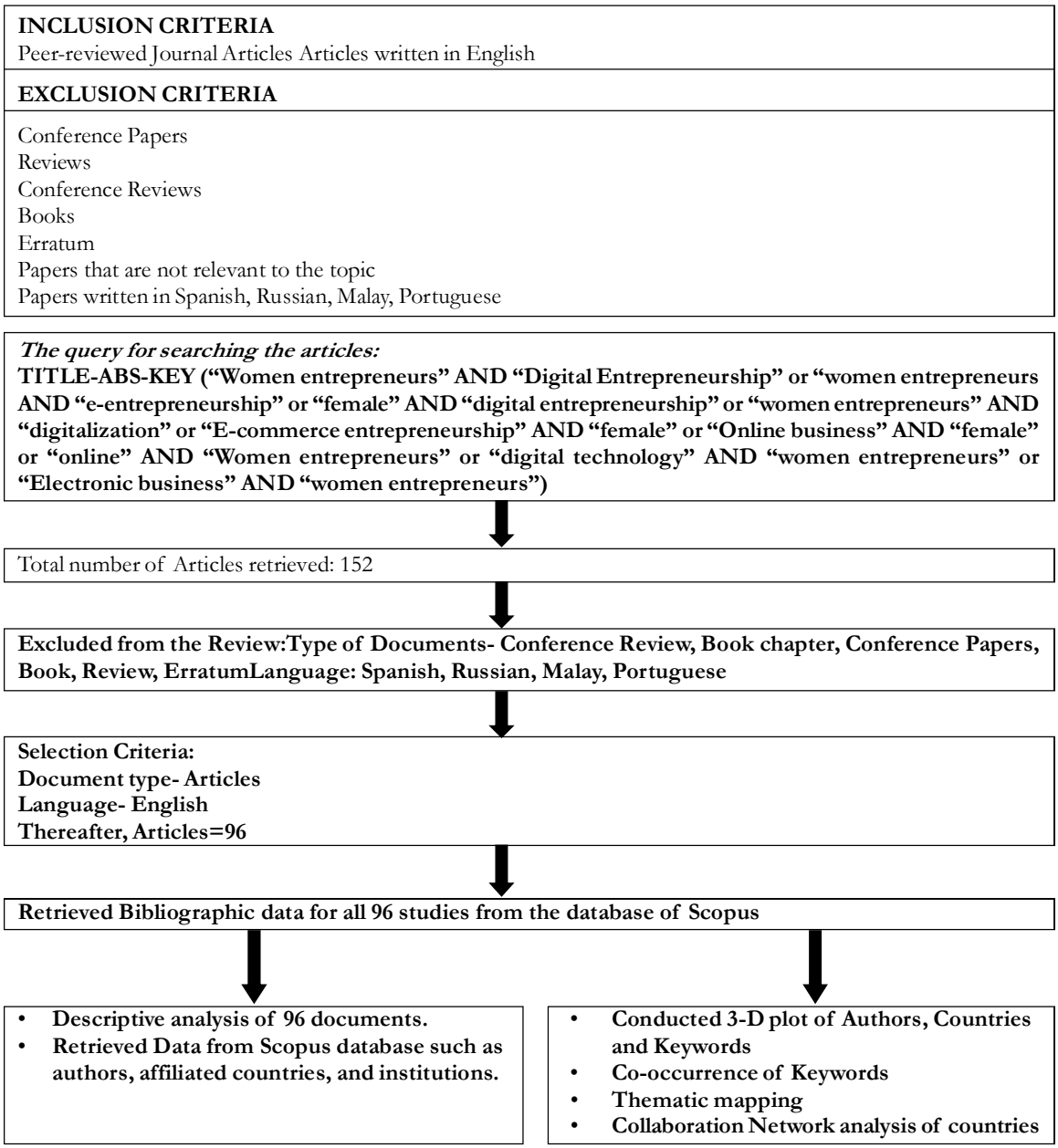
2. Research Methodology

The present study employs bibliometric analysis to examine the literature on female entrepreneurs in the digital environment. Bibliometric analysis is a quantitative research approach that employs statistical and computational methods to analyze and visualize patterns and trends in the scientific literature. It involves collecting, organizing, and analyzing bibliographic data from many publications in a specific field, including authors, journals, keywords, and collaborations. To acquire data for this study, we searched the Scopus database for relevant publications on female entrepreneurs in the digital space- "Women entrepreneurs" AND "Digital Entrepreneurship" OR "women entrepreneurs AND "e-entrepreneurship" OR "female" AND "digital entrepreneurship" OR "women entrepreneurs" AND "digitalization" OR "E-commerce entrepreneurship" AND "female" OR "Online business" AND "female" OR "online" AND "Women entrepreneurs" OR "digital technology" AND "women entrepreneurs" OR "Electronic business" AND "women entrepreneurs". The search scope was restricted to publications published between 2007 and 2023. We applied the following inclusion criteria to select articles for analysis: the paper had to be peer-reviewed, concentrate on women entrepreneurs in the digital space, and be published in English. We extracted bibliographic information from each selected article, including author names, affiliations, publication dates, journal titles, keywords, abstracts, and collaboration information. Each piece of information was entered into a Microsoft Excel spreadsheet for analysis. Biblioshiny and Microsoft Excel were used to analyze the collected data (Saini and Sharma, 2022). We used biblioshiny to generate network maps of co-authorship, country collaboration, and keyword co-occurrence, illustrating the relationships and patterns between authors, articles, and keywords in the scientific literature. In addition, Microsoft Excel was utilized to calculate the frequency, percentage, and ranking of authors, journals, keywords, and institutions in the literature. This investigation was conducted according to ethical principles and guidelines for research involving human subjects. No personally identifiable information was collected or disclosed, and all data utilized in this investigation were accessible to the public. The study did not require ethical approval because it did not entail any intervention or interaction with human participants.

2.1. Study's scope

Using the Scopus database, the current research thoroughly analyzed empirical research papers published in academic journals from 2007 to 2023. Only empirical publications in English and peer-reviewed journals were considered for inclusion in this review. Articles published as conference reviews, conference papers, or book chapters were not considered. The figure compiled below summarises the selection criteria used by the researcher to choose the most pertinent documents. The researcher stored the

retrieved data with due care. The extracted data were imported as comma-separated values (.csv) and BibTeX files and kept in the Mendley library for further study. In addition, we preserved a copy of selected articles in the Scopus saved list folder for future bibliometric study. The next part presents and analyzes bibliographic data from the database of Scopus utilizing a freely available R-package.



3. Result of the Bibliometric Analysis

3.1. Primary Information

There are 96 papers authored by 263 writers and published in 70 reputable peer-reviewed journals (Table 1). These publications cover various disciplines, including Business and management, engineering, energy, computer science, psychology, environment, arts and humanities, etc. 251 writers have co-authored the research publications, indicating increased authorship collaboration. There are 12 single-authored articles out of a total of 96. The number of authors per document is 13, and the value of co-authors is 2.94.

Table 1: Main Information

Main Information	*Results*
Timespan	2007-2023
Number of Sources	70
Number of Articles	96
Annual growth rate %	9.05
Document Average Age	3.36
Document-wise Average citations	11.48
Number of References	1
Contents used in documents	
Indexed Keywords	221
Keywords provided by authors	346
Information about Authors	
Total number of Authors	263
Number of Authors in single-authored documents	12
Collaboration by Authors	
Documents with Single-author	13
Number of Co-authors per document	2.94
Co-authorship % at the International level	27.08%
Type of Documents included	
Papers	96

Source: Authors' Own Compilation

3.2. Chronological Evaluation of the Articles Published

Figure 1 depicts the number of annual publications about female digital entrepreneurs. In 2007, the earliest research on this topic was conducted. Before 2013, research on women entrepreneurs in the digital space remained stagnant. Since 2014, it appears to have aroused the interest of practical

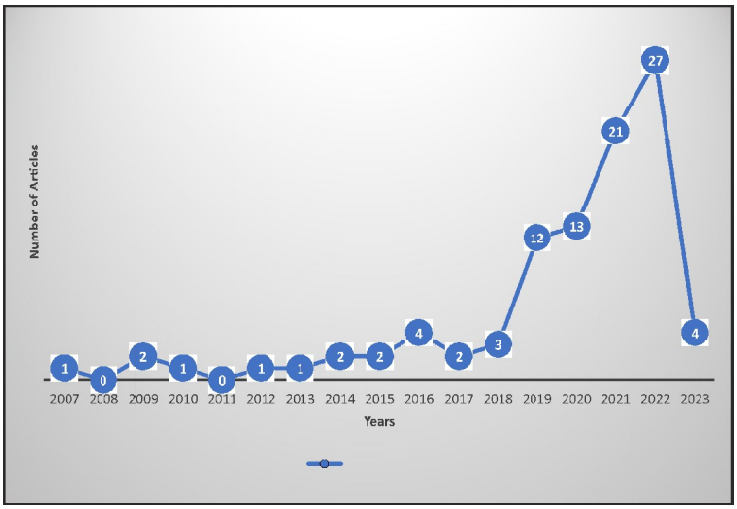


Figure 1: Annual Publication trend

Source: Authors' Own Compilation

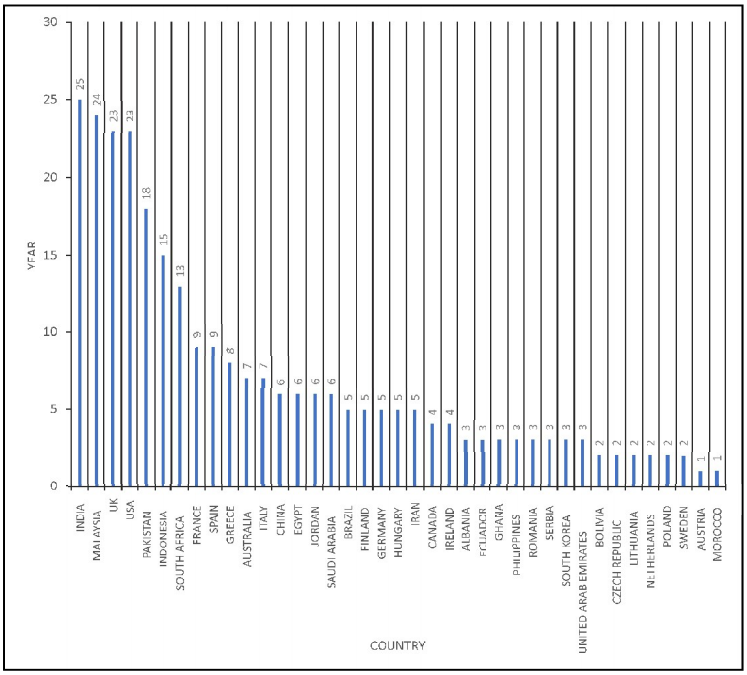


Figure 2: Country-wise Publication Trend

Source: Authors' Own Compilation

scholars since the number of research publications published has surged considerably. The number of annual publications grew in 2018, and this trend continues. The yearly growth rate of scientific production is approximately 9.05%, reflecting a sustainable growth rate. In Figure 2, the review of country-wise publishing trends revealed that most research is conducted in nations such as India, Malaysia, the United States, and the United Kingdom. India emerged with the most research articles among the 39 best-performing countries, with the number of articles (n) = 25, followed by Malaysia (n = 24), the United States (n = 23), and the United Kingdom (n = 23).

3.3. Source Analysis

Female digital entrepreneurs have been featured in many journals. Over time, this topic has advanced. The 20 most influential periodicals are listed in Table 2. "International Journal of Gender and Entrepreneurship Journal" Journal Women's Entrepreneurship and Education" were the most productive. "The International Journal of Gender and Entrepreneurship" has the highest H-index, g-index, and m-index. Table 2, which synthesizes the total citations for the dataset's articles, confirms this. The journals with the most citations are the "International Journal of Gender and Entrepreneurship and Computers in Human Behavior".

Table 2: Top 20 Journals on Women Digital Entrepreneurs

Names of the Journals	*h_index*	*g_index*	*m_index*	*Total Citations*	*Number of Papers*
International Journal Of Gender and Entrepreneurship	7	11	0.5	144	11
Journal Women's Entrepreneurship and Education	2	4	0.5	24	4
Gender in Management	3	3	0.2	47	3
Sustainability (Switzerland)	3	3	0.6	19	3
Small Business Economics	2	3	0.5	72	3
Asia Pacific Journal of Marketing And Logistics	2	2	0.5	21	2
Computers In Human Behavior	2	2	0.4	129	2
Mediterranean Journal of Social Sciences	2	2	0.2	43	2
Frontiers in Psychology	1	2	0.333	5	2
Journal of Enterprising Communities	1	2	0.333	6	2
Technovation	1	1	0.5	3	2
Asian EFL Journal	1	1	0.2	2	1
Asian Journal of Management Cases	1	1	0.125	2	1
Cadernos De SaudePublica	1	1	0.333	1	1
Cities	1	1	0.333	5	1
Emerald Emerging Markets Case Studies	1	1	0.091	2	1
Entrepreneurship: Theory And Practice	1	1	0.5	1	1
Frontiers In Sociology	1	1	0.5	1	1
Gender, Technology and Development	1	1	0.143	14	1
Global Business and Organizational Excellence	1	1	0.333	6	1

Source: Authors' Own Compilation

3.4. Countries and Authors Analysis

Table 3 shows that biblioshiny retrieved 358 citations for digital women entrepreneurs in the U.K. From 2007 to 2023, the U.S. and Finland supplied 150+ citations with 18.5 and 73 average article citations. Finland had the most average article citations, followed by Netherlands and U.K. While assessing an author's significance within a particular discipline; it is crucial to consider both productivity and impact. In Table 4, both of these metrics are evaluated to provide an overview of the top twenty most prolific authors. An author's productivity was measured by the number of articles they published within a specified time frame. In contrast, the impact was evaluated by considering the annual quantity of citations. Mcadam M. is the most prolific author, while S. Marlow and L. Martin received the most citations yearly. However, productivity does not indicate the overall quality of researchers' output. Scholars have typically used metrics besides the total number of citations received and the number of articles published to evaluate the significance of a researcher's work to the scientific community. Therefore, the g-index, h-index, and m-index are presented in Table 4 for the local dataset and the 20 most prolific authors.

Table 3: Top countries in the Research Field of Women Digital Entrepreneurs

Countries	*Total Citations*	*Average Article Citations*
United Kingdom	358	44.80
USA	111	18.50
Finland	73	73.00
Netherlands	49	49.00
Australia	44	14.70
Ireland	40	20.00
Austria	39	39.00
Greece	32	16.00
Pakistan	30	10.00
Canada	23	11.50

Source: Authors' Own Compilation

3.5. Three-Field Plot

Figure 3 comprehensively lists authors, countries, and keywords for digital women entrepreneurs. The picture contains a three-field plot of the digital women entrepreneurs' articles contributed by writers, nations, and the frequency of keyword occurrences. The left column displays the countries with the most author affiliations. The central column indicates the authors contributing from those countries, and the right column shows the most frequently used terms in the Women/Gender in the digital business Sector. Greater attention is placed on the height of the box and the thickness of the connecting line; the more work in the field is created, the taller the box and the thicker the lines. Figure 3 demonstrates

Table 4: Top 20 Influential Authors in the Field of Women Digital Entrepreneurs

Authors	*h_index*	*g_index*	*m_index*	*Citations*	*Total Articles*
Mcadam M	2	4	0.40	90	4
Crowley C	2	2	0.40	88	2
Harrison Rt	2	2	0.40	88	2
Marlow S	2	2	0.29	228	2
Martin L	2	2	0.29	228	2
Slabbert Ad	2	2	0.20	43	2
Ukpere Cl	2	2	0.20	43	2
Ukpere Wi	2	2	0.20	43	2
BiswalSk	1	1	0.50	1	2
Chakraborty U	1	1	0.50	1	2
Fakhreldin H	1	2	0.50	5	2
Maalaoui A	1	2	0.33	4	2
Miniesy R	1	2	0.50	5	2
Zani B	1	1	0.33	1	2
Abuhussein T	1	1	0.50	1	1
Abulaila H	1	1	0.50	4	1
Afshan G	1	1	0.33	39	1
Ahmdon Mas	1	1	0.25	2	1
Ahmed Z	1	1	0.50	10	1
Al-Dajani H	1	1	0.50	3	1

Source: Authors' Own Compilation

that the United Kingdom has the highest author affiliation rate, followed by South Africa and India. By observing the thickness of the connecting line between nation and author, we can determine that Marlow and Martin are Canada's two most prolific contributors. Slabbert and Ukpere remain the most prolific authors in South Africa. Similarly, Biswal and Chakraborty are India's primary contributors.

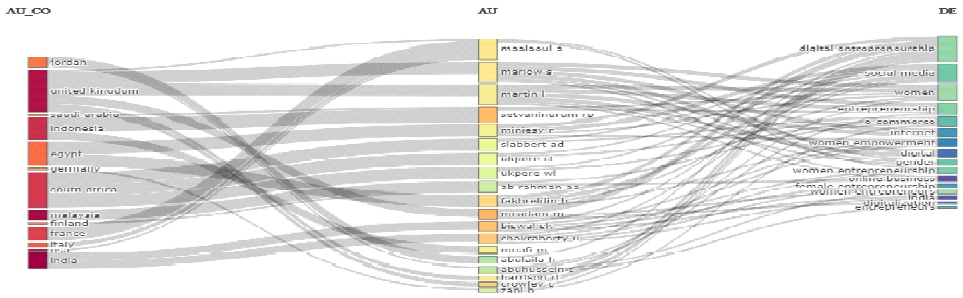


Figure 3: Three-Field Plot

Source: Authors' Own Compilation

3.6. Source dynamics

The frequency with which the word "digital women entrepreneurs" appears in print publications each year is detailed by source dynamics. As shown in Table 5, "the International Journal of Gender and Entrepreneurship" was the most prolific publication frequency between 2010 and 2023. "The Journal of Gender in Management" contributed 24 titles to the research on digital women entrepreneurs, followed by "The Journal of Women's Entrepreneurship and Education", which contributed 11 articles. Table 5 demonstrates that the Journal of Small Business in Economics and Sustainability (Switzerland) contributed the same number of articles (ten). Bradford's law characterizes the frequency of specific journal titles appearing in the study. According to Singh *et al.* 2016, the law is founded on centric productivity zones, which show a diminishing return after a certain threshold of publications has been written. The law divides publications into zones according to their article count. Law defines three zones, with Zone 1 having nine journals, Zone 2 having thirty, and Zone 3 having thirty-one, as shown in Table 6. Journal output is expected to rise as one moves from one zone to the next, as predicted by Bradford's law of scattering (Bradford, 1985; Swain, 2013).

Bradford anticipated three zones corresponding to the following breakdown of papers and journals: Zone I has nine journals and thirty-two articles, Zone 2 has thirty-zero journals and thirty-three articles, and Zone 3 has thirty-one journals and thirty-one articles.

Table 5: Source Dynamics

Year	*International Journal of Gender and Entrepreneurship*	*Journal Women's Entrepreneurship and Education*	*Gender in Management*	*Small Business in Economics*	*Sustainability (Switzerland)*
2007	0	0	0	0	0
2008	0	0	0	0	0
2009	0	0	1	0	0
2010	1	0	1	0	0
2011	1	0	1	0	0
2012	1	0	1	0	0
2013	1	0	1	0	0
2014	1	0	1	0	0
2015	2	0	1	0	0
2016	4	0	1	0	0
2017	4	0	1	0	0
2018	4	0	1	0	0
2019	6	0	2	0	1
2020	6	1	3	2	1
2021	9	2	3	2	2
2022	11	4	3	3	3
2023	11	4	3	3	3

Source: Authors' Own Compilation

Table 6: Bradford's law Zones

Journals	*Rank*	*Frequency*	*Cumulative Frequency*	*Zone*
"International Journal Of Gender And Entrepreneurship"	1	11	11	Zone 1
"Journal Women's Entrepreneurship And Education"	2	4	15	Zone 1
"Gender In Management"	3	3	18	Zone 1
"Small Business Economics"	4	3	21	Zone 1
"Sustainability (Switzerland)"	5	3	24	Zone 1
"Asia Pacific Journal Of Marketing And Logistics"	6	2	26	Zone 1
"Computers In Human Behavior"	7	2	28	Zone 1
"Frontiers In Psychology"	8	2	30	Zone 1
"International Journal Of Innovation, Creativity And Change"	9	2	32	Zone 1
"Journal Of Enterprising Communities"	10	2	34	Zone 2
"Mediterranean Journal Of Social Sciences"	11	2	36	Zone 2
"Technovation'	12	2	38	Zone 2
"Asian EFL Journal"	13	1	39	Zone 2
"Asian Journal Of Management Cases"	14	1	40	Zone 2
"Cadernos De SaudePublica"	15	1	41	Zone 2
"Case Journal"	16	1	42	Zone 2
"Cities"	17	1	43	Zone 2
"Emerald Emerging Markets Case Studies"	18	1	44	Zone 2
"Entrepreneurship: Theory And Practice"	19	1	45	Zone 2
"Eurasian Studies In Business And Economics"	20	1	46	Zone 2
"Frontiers In Sociology"	21	1	47	Zone 2
"Gender, Technology And Development"	22	1	48	Zone 2
"Global Business And Organizational Excellence"	23	1	49	Zone 2
"Global Media And China"	24	1	50	Zone 2
"Globalization"	25	1	51	Zone 2
"Human Relations"	26	1	52	Zone 2
"Information Development"	27	1	53	Zone 2
"Information Technology And People"	28	1	54	Zone 2
"International Entrepreneurship And Management Journal"	29	1	55	Zone 2
"International Journal Of Data And Network Science'	30	1	56	Zone 2
'International Journal Of Economics And Financial Issues"	31	1	57	Zone 2
'International Journal Of Emerging Markets"	32	1	58	Zone 2
"International Journal Of Entrepreneurial Behaviour And Research"	33	1	59	Zone 2
"International Journal Of Entrepreneurship"	34	1	60	Zone 2
"International Journal Of Entrepreneurship And Innovation"	35	1	61	Zone 2

contd. table 6

Journals	*Rank*	*Frequency*	*Cumulative Frequency*	*Zone*
"International Journal Of Environmental Research And Public Health"	36	1	62	Zone 2
"International Journal Of Innovation And Technology Management"	37	1	63	Zone 2
"International Journal Of Manpower"	38	1	64	Zone 2
"International Journal Of Media And Information Literacy"	39	1	65	Zone 2
"International Journal Of Scientific And Technology Research"	40	1	66	Zone 3
"International Journal Of Supply Chain Management"	41	1	67	Zone 3
"International Journal Of Technology Management"	42	1	68	Zone 3
"International Social Science Journal"	43	1	69	Zone 3
"Journal Of Asian Finance, Economics And Business"	44	1	70	Zone 3
"Journal Of Chinese Overseas"	45	1	71	Zone 3
"Journal Of Educators Online"	46	1	72	Zone 3
"Journal Of Islamic Marketing"	47	1	73	Zone 3
"Journal Of Knowledge Management"	48	1	74	Zone 3
"Journal Of Open Innovation: Technology, Market, And Complexity"	49	1	75	Zone 3
"Journal Of Research In Marketing And Entrepreneurship"	50	1	76	Zone 3
"Journal Of Small Business And Enterprise Development"	51	1	77	Zone 3
"Journal Of Sustainable Tourism"	52	1	78	Zone 3
"Journal Of The Canadian Chiropractic Association"	53	1	79	Zone 3
"Library Philosophy And Practice"	54	1	80	Zone 3
"Malaysian Journal Of Consumer And Family Economics"	55	1	81	Zone 3
"Management Research Review"	56	1	82	Zone 3
"Management Science Letters"	57	1	83	Zone 3
"Organization"	58	1	84	Zone 3
"Plos One"	59	1	85	Zone 3
"Quality - Access To Success"	60	1	86	Zone 3
"Sa Journal Of Human Resource Management"	61	1	87	Zone 3
"Scientific Programming"	62	1	88	Zone 3
"Serbian Journal Of Management"	63	1	89	Zone 3
"Service Business"	64	1	90	Zone 3
"South African Journal Of Business Management"	65	1	91	Zone 3
"Technological Forecasting And Social Change"	66	1	92	Zone 3
"Transformations In Business And Economics"	67	1	93	Zone 3
"World Applied Sciences Journal"	68	1	94	Zone 3
"World Journal Of Entrepreneurship, Management And Sustainable Development"	69	1	95	Zone 3
"Wseas Transactions On Business And Economics"	70	1	96	Zone 3

Source: Authors' Own Compilation

3.7. Analysis of Keywords

The word cloud in Figure 4 depicts the most frequently used terms in publications about female digital entrepreneurs. "Women entrepreneurs," "Digital entrepreneurship," and "women entrepreneurship" were the terms most commonly used, followed by "entrepreneurship," "social media," and "gender." The word cloud displays words in various proportions based on their frequency of appearance. The arrangement of the words is irregular, but essential words are placed in the centre to draw attention to them due to their disproportionate size.

Figure 4: Word Cloud

Source: Authors' Own Compilation

3.8. Co-occurrence of Keywords

Research content, central issues, and methodology/technology used in a discipline are typically identified by keywords (Huang et al., 2020). We used co-occurrence networks to identify and analyze the distribution of keywords in digital women entrepreneurs' research. The term "co-occurrence" refers to the statistical connection between two or more keywords that exist in the same document. As a result, a keyword co-occurrence network presents the relationship among these keywords as a network diagram. Multiple parameters, such as field, network architecture, normalization, and clustering algorithm, inform the co-occurrence network. Automatic layout selects the optimal format for graph legibility (Holten& Van Wijk, 2009). Normalizing co-occurrence with similarity measures such as Jaccard's index, Salton's Cosine, equivalence index, and association strength is possible (van Eck & Waltman, 2009). In bibliometric studies, numerous clustering algorithms are utilized, including edge betweenness, info map, leading eigenvalues, Louvain, Spinglass, and Walktrap. However, Louvain and Walktrap are the finest (Lancichinetti& Fortunato, 2012). The results of the co-occurrence network reveal several keywords, including women entrepreneurs, women, digital entrepreneurship, social media, gender, and e-commerce; however, the magnitude of the vertex indicates that women entrepreneurs are at the centre of the network. Each network vertex represents an item or keyword, and vertex size is proportional to item frequency. The size of the edge indicates the degree of association among the keywords. The breadth

of the line between two keywords represents their citation relationship. The thickness of the lines between nodes demonstrates the frequency with which two authors' keywords appear together (Yu et al., 2020). As shown in Figure 5, the thickness of the margin indicates that women entrepreneurs have been extensively studied in conjunction with digital entrepreneurship, social media, and empowerment.

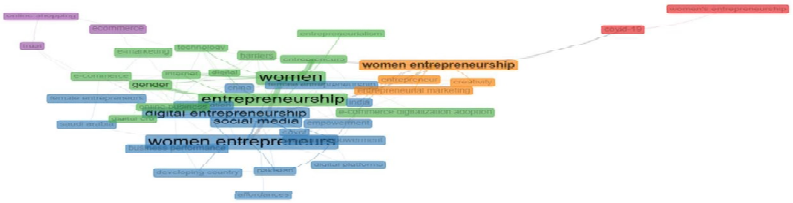


Figure 5: Co-occurrence of Keywords

Source: Authors' Own Compilation

The study employs closeness centrality and betweenness centrality as metrics of the co-occurrence of keywords in this research paper.Relationships between nodes in a scientific collaboration network

Figure 6: Treemap of Keywords

Source: Authors' Own Compilation

are used to determine centrality indices. The most betweenness-central keywords are social media, female entrepreneurs, and women. This means that these keywords are the ones that are the closest to each other. Table 7 demonstrates that in Cluster 1, digital entrepreneurship has the highest betweenness centrality. E-marketing, m-commerce, online social networking, and online strategy have the same and highest closeness centrality within Cluster 4, followed by social media within Cluster 2 and women within Cluster 3. These keywords have the highest degree of network proximity to other keywords, indicating that they are examined extensively with one another.

Table 7: Keywords ranking based on the measure of centrality

Keywords	*Cluster*	*Betweenness*	*Closeness*	*Page Rank*
digital entrepreneurship	1	56	0.02	0.064
women entrepreneurship	1	20	0.015	0.034
covid-19	1	0	0.011	0.020
Saudi Arabia	1	0	0.014	0.017
Egypt	1	0	0.019	0.036
Mses	1	0	0.019	0.036
women entrepreneurs	2	90.28	0.024	0.101
social media	2	105.19	0.027	0.072
Pakistan	2	2.27	0.017	0.027
women empowerment	2	3.2	0.018	0.027
Digitalization	2	0	0.016	0.016
business performance	2	0	0.016	0.016
developing country	2	0	0.016	0.016
gender bias	2	0	0.016	0.016
Women	3	77.34	0.023	0.107
Entrepreneurship	3	39.72	0.021	0.087
Gender	3	0	0.018	0.029
Entrepreneurs	3	0	0.018	0.033
Internet	3	0	0.018	0.034
Digital	3	0	0.018	0.030
Technology	3	0	0.015	0.014
Entrepreneurialism	3	0	0.016	0.014
e-marketing	4	0	0.33	0.038
m-commerce	4	0	0.33	0.038
online social networking	4	0	0.33	0.038
online strategy	4	0	0.33	0.038

Source: Authors' Own Compilation

3.9. Thematic Mapping

Thematic keyword mapping is a method used to analyze research topics and their relationships. This method uses a word-frequency network to draw out commonalities and trends within a subject area. The resulting thematic map, as shown in Figure 7, categorizes the literature on a specific topic into four distinct theme types. The issues in the top-right region are the most important and dense to the discipline. These topics represent the developed and significant research arenas within a specific research field. The topics in the top left region are typically referred to as niche themes due to their high centrality and low density. The topics in the lower left quadrant are featured by low centrality and low density and are regarded as emerging or diminishing. The topics in the lower right region are featured by low density and high centrality and are deemed fundamental. The themes "women entrepreneurship," "trust," "online shopping," "social media," "resilience," and "digital entrepreneurship" are fundamental, with low density but high centrality in the lower right quadrant. However, the themes located in the upper right quadrant, such as "women," "female entrepreneurs," "internet," "creativity," "entrepreneurial marketing," and "technology," have a high centrality and high density, indicating that these issues are highly developed and essential to the field of women digital entrepreneurs. The "Covid-19" and "developing country" represent a declining or emerging theme with low density and low centrality, indicating that the topic is underdeveloped but emerging in other disciplines. Figure 7 reveals that the remaining four specialized topics in the upper left quadrant are "e-marketing," "information technology," "online social networking," and "digital platforms", based on the magnitude of each node.

3.10. Collaboration Network

This section examines international collaboration in the field of digital women entrepreneurs. A collaboration network illustrates how nations collaborate in a particular discipline. Based on closeness

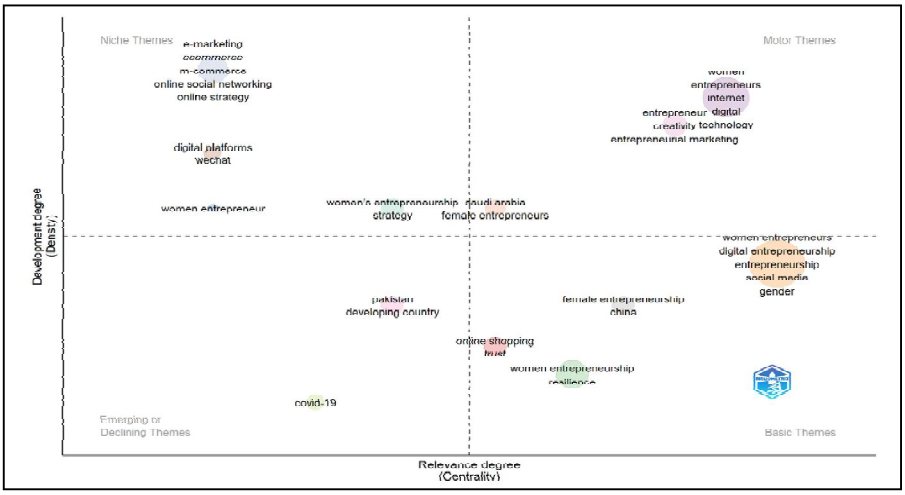


Figure 7: Thematic Map

Source: Authors' Own Compilation

and betweenness centrality, countries' international cooperation is examined. Closeness and Betweenness centrality are widely utilized network gauges of collaboration. When analyzing a network, one measure of importance is how close a given actor is to every other node in the network. A network node's betweenness indicates the number of times it serves as a connection point for other network nodes. The United States is a hub for the international cooperation network because of its central location, as shown in Table 8.

Regarding the collaboration network, Ecuador, Bolivia, Hungary, and Iran have the highest proximity centrality, meaning they have the shortest paths to other nodes. Figure 8 depicts the international collaboration network. Based on their collaboration network, associated nations are divided into eight groups. A distinct colour denotes each cluster to distinguish the aggregation of the collaborative nation networks.

Table 8: Collaboration Network

Node	*Cluster*	*Betweenness*	*Closeness*
India	1	42.00	0.015
Hong Kong	1	22.00	0.012
Korea	1	0.00	0.009
Malaysia	2	22.00	0.009
China	2	42.00	0.012
Finland	2	0.00	0.008
Indonesia	3	0.00	0.013
Saudi Arabia	3	42.00	0.013
Poland	3	76.00	0.016
Morocco	3	0.00	0.015
Pakistan	4	60.00	0.015
France	4	107.00	0.019
Jordan	4	0.00	0.013
Austria	4	0.00	0.014
United Kingdom	5	52.77	0.018
USA	5	151.98	0.021
Spain	5	0.00	0.015
Italy	5	19.25	0.018
Brazil	5	0.00	0.013
Germany	5	0.00	0.015
Ireland	5	0.00	0.013
Netherlands	5	0.00	0.013
Australia	6	22.00	0.010
Romania	6	0.00	0.008
Ecuador	7	0.00	1.000
Bolivia	7	0.00	1.000
Hungary	8	0.00	1.000
Iran	8	0.00	1.000

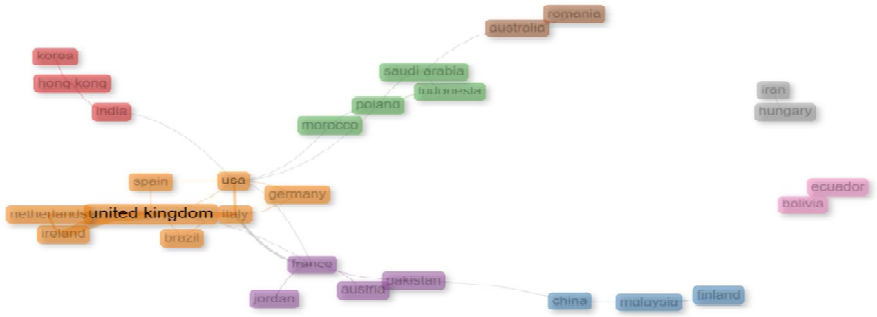


Figure 8: Collaboration Network

Source: Authors' Own Compilation

4. Discussion

The present research utilized bibliometric analysis to investigate the literature on female entrepreneurs in the digital space. The study uncovered several intriguing patterns and tendencies that illuminate the current knowledge in this field and highlight the areas needing additional research and intervention (Sharma & Parida, 2022). The first significant finding is the increasing interest in women entrepreneurs in the digital space over the past decade. Since 2012, the number of publications on this subject has increased consistently, indicating a growing recognition of the significance of women entrepreneurs in the digital age. This trend is consistent with global efforts to enhance women's empowerment and gender equality in technology and entrepreneurship. The second finding emphasizes the contribution of digital technologies in strengthening female entrepreneurship in the digital environment. The literature emphasizes the potential of digital tools, like social media, e-commerce platforms, mobile apps, and cloud computing, in enabling women entrepreneurs to launch and expand their businesses, access new markets, and overcome traditional barriers to entrepreneurship. The literature also acknowledges the digital divide and the need for digital literacy and skills among women entrepreneurs, especially in developing nations. The persistence of gender biases and stereotypes in the literature on women entrepreneurs in the digital space is the third finding. Despite the growing recognition of the significance of gender diversity and inclusiveness in entrepreneurship and technology, the literature reveals the persistence of gender biases and stereotypes that hinder women entrepreneurs' access to funding, networks, and markets and their leadership styles and decision-making processes. This indicates that additional research on the underlying factors that perpetuate gender inequality in entrepreneurship and technology, as well as interventions promoting gender equity and social justice, are still required. The fourth finding is emerging topics and themes in the literature on women entrepreneurs in the digital space. The analysis revealed several emerging issues and themes that reflect the shifting entrepreneurial landscape of women in the digital age. These topics and themes provide new avenues for research and intervention that address the dynamic and complex challenges women entrepreneurs face in the digital space.

5. Conclusion

The findings have significant repercussions for policymakers, practitioners, and researchers. The research study calls for more inclusive and diverse contexts and perspectives in the research agenda on female entrepreneurs within cyberspace and intervening technologies that promote gender equity and social justice. In addition, the study highlights the potential of digital technologies to facilitate females' entrepreneurship in the digital world and the pervasive gender biases and stereotypes that limit women entrepreneurs' access to funding, networks, and markets. This study offers a practical bibliometric analysis of the literature on women entrepreneurs in the digital space. The analysis reveals several patterns and trends that cast light on the current knowledge in this field and highlight the areas needing additional research and intervention. The study highlights the significance of promoting gender parity and empowering women in entrepreneurship and technology. It provides insights into the emerging topics and themes that reflect the shifting landscape of female entrepreneurs in the digital age. This study provides a roadmap for future research and intervention that acknowledges the shifting landscape of female entrepreneurs in the digital era and harnesses the potential of digital technologies for women's empowerment and sustainable development.

Further research is required to collect and analyze empirical data on female entrepreneurs in the digital environment and to develop interventions to address the dynamic and complex challenges female entrepreneurs face in the digital era. This research contributes to our understanding of digital women entrepreneurs and brings to light the potential contribution of entrepreneurship to economic and social progress. Despite this study's valuable insights, it is necessary to acknowledge several limitations. First, the study only considers publications indexed in the Scopus database, which may not represent the entire literature on women entrepreneurs in the digital space. Other databases, such as Google Scholar and Web of Science, may offer broader coverage of the literature. Second, the study relies on quantitative bibliometric analysis, which may not capture the richness and complexity of women's entrepreneurship literature in the digital domain. In the digital age, qualitative research may provide a more comprehensive knowledge of the experiences and viewpoints of women entrepreneurs. Thirdly, the study concentrates on a review of the existing literature and provides no new empirical data on female digital entrepreneurs. Collecting and analyzing empirical data on the experiences and difficulties of female entrepreneurs in the digital age requires additional research.

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