

Analysis and categorization of studies of digital marketing in small and medium enterprises

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Abstract

Purpose: This study analyzes and categorizes the scientific production in the field of digital marketing in the specific context of small and medium enterprises.

Design/methodology: We retrieved the bibliographic information of 294 publications in this field indexed in Scopus database and employed technology-mining techniques and cluster analysis of keywords to gain insights into the most relevant trends in this research area. We conducted a keyword cleaning process to remove ambiguity, synonyms, and obvious results and employed our own Python scripts and the Bibliometrix package in the R programming language for the calculations.

Findings: Our results depict a broad picture of this research area, highlighting the most important journals, countries, researchers, and keywords, as well as their interactions. We also identified and explained five thematic clusters: electronic commerce, social media, corporate websites, internationalization, and brand. We found that social media, big data, search engine optimization, advertisement, internationalization, websites, and Facebook are hot research topics in this field. In addition, we present a number of pending research questions in the field related to thematic and methodological issues.

Originality/value: This study offers updated information on the trends of the scientific production in the above mentioned research field, covering a time window from 1989 until 2021. This review goes beyond existing traditional bibliometric analysis, and reveals the structure of the knowledge in the field. This paper is expected to be used as a reference point from which to define a future research agenda in this area.

Keywords: Digital marketing, small business, Bibliometric analysis, Social media, Electronic commerce, Trends

Jel Codes: M31, M00

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1. Introduction

Due to technological advancements and innovation, marketing channels evolve over time, aiming at constantly improving factors like efficiency and persuasive power, and providing relationship advantages to attract more

clients and value partners (Purnamaningsih & Rizkalla, 2020; Luque-Ortiz, 2021). Consequently, the introduction of the internet—as a force in the market—has resulted in many concepts and strategies being rethought (Kozlenkova, Hult, Lund, Mena & Kecec, 2015). Among these, digital marketing stands out as an opportunity with long-lasting potential. Digital marketing, i.e., the promotion of products and services using internet-based digital tools (Adwan, Aladwan & Al-Adwan, 2019; Cole, DeNardin & Clow, 2017; Key, 2017) is the natural consequence of recent changes in consumer habits (Wang, Liu, Ma & Zhang, 2011) and has modified the traditional processes of companies that provide services and products (Kaplan & Haenlein, 2010; Makrides, Vrontis & Christofi, 2020). This new form of marketing uses a different supply chain comprised of methods and tools that deliver solutions via online digital connections (Pride & Ferrell, 2017). Digital marketing has also been said to reduce costs and improve sales (Somjai, Charoen-Rajapark & Pocmontri, 2020), profitability, the contact with customers, the identification of customer needs, and even employee creativity (Simion, Militaru, Popescu & Niculescu, 2017; Luque-Ortiz, 2021).

This technological revolution is not only limited to big companies; it has also reached small and medium enterprises (SMEs) (Octavia, Indrawijaya, Sriayudha, Heriberta, Hasbullah & Asrini, 2020), as the adoption of the internet and its marketing tools has a significant impact on their success (Eid & El-Gohary, 2013). Thanks to digital marketing, SMEs can penetrate global mass markets they would not be able to enter otherwise (Chatterjee & Kumar Kar, 2020; Nuseir, 2018). Notwithstanding, SMEs have been sluggish in the adoption of digital tools because they prefer traditional technologies due to factors such as their low cost and ease of use, leaving them unprepared for the changes brought by the technological environment and the evolution of the market (Centobelli, Cerchione, Esposito & Raffa, 2016). Therefore, the penetration of digital marketing at SMEs has advanced at a slow pace (Bordonaba-Juste, Lucia-Palacios & Polo-Redondo, 2012; Caniels, Lenaerts & Gelderman, 2015), which has sparked scholarly interest in this phenomenon.

Although the existing literature of digital marketing in SMEs is scarce, some recent studies have tried to disentangle the reasons why digital marketing has had such a slow diffusion among SMEs. At this point, it is important to understand how these enterprises use internet marketing technologies in order to create connections between different factors. For instance, the lack of knowledge about information technologies and the absence of specific financial resources devoted to monitoring the evolution of technology (Kovalenko & Kuzmenko, 2020; Pradhan, 2020) make it harder for SMEs to adopt these technologies. In this regard, Sidorchuk (2012) points out that the owners of these enterprises do not have the necessary capabilities to characterize the internet marketing tools that they can use in their enterprises and business models, resulting in a lack of awareness of how these technologies could benefit their marketing efforts.

Other key factors, as signaled by (Pradhan, 2020), are associated with the age and size of SMEs, according to which the number of employees, organizational demographics, and time in the market play a role in the adoption of digital marketing. In fact, age is a relevant factor that links aspects of adaptability to new technologies and can help define the profiles of SMEs' end consumers and employees. As found in (Adwan et al., 2019; Kumar, & Shukla, 2020), digital marketing is an essential sales strategy in SMEs, and observed that testimonials are of great importance and that young people are more likely to use these tools. Today, youth plays a crucial role in the market, not only as a buying force but also as a source of influence, thus impacting the buying behavior both as trend followers and trend shapers (Venugopal & Swamynathan, 2016; Purnamaningsih & Rizkalla, 2020).

In addition, the cost of integrating digital tools and the scarce resources of SMEs are obstacles for the implementation of this new form of marketing. SMEs are more likely to incorporate digital tools if their cost is lower than that of traditional technologies. Employees' training programs in these tools and managers' motivation to implement them are also critical. Employees' knowledge of these digital technologies should also be considered to better use and integrate different digital tools, as human capabilities are as important as technology and business factors (Centobelli et al., 2016; Chatterjee & Kumar Kar, 2020; Harrigan, Ramsey & Ibbotson, 2011). The absence of top management motivation (Gono, Harindranath & Berna Özcan, 2016; Jokonya & Mugisha, 2020; Real, Roldán & Leal, 2014) and resistance to change (Pradhan, 2020) are other factors that have been investigated by different authors. In summary, SMEs seem to underuse the potential of new digital tools and, as a consequence, they are not enjoying the benefits the latter offer (Taiminen & Karjaluo, 2015).

Social networks have become an important part of digital marketing in recent years. To boost marketing effectiveness, companies must learn how to use these tools because they have been proven to have a real impact on increasing product and service advertising and in improving marketing results (Hensel & Deis, 2010). The use of social media as a promotion and customer attraction tool has become very popular as it allows SMEs to be more visible, viable, and even sustainable (Taeuja & Toombs, 2014; Arango-Botero, Valencia-Arias, Bermúdez-Hernández & Duque Cano 2020). Thus, given the large reach and popularity of social networks, especially in the growing context of e-commerce (Cole et al., 2017), it becomes crucial for SMEs to learn how use them appropriately in order to fully exploit the benefits they offer (Cesaroni & Consoli, 2015).

The literature has explored possible instruments to revert this phenomenon. For example, institutional support to the promotion of digital marketing as part of the activities of SMEs has been shown to be one of the main elements driving transformation in these companies (Carpio, Arce, Enjolras & Camargo, 2020; Peter, Kraft & Lindeque, 2020). Likewise, the design of methodological guides to manage digital tools (Setiaboedi, Sari & Prihartono, 2018) or to develop and cost them out (Louw & Nieuwenhuizen, 2020) also contributes to that goal. Other authors have developed models to measure the impacts of using digital marketing and better understand the behavior of SMEs in the face of this new form of marketing (Sarkar, Bimal, Nath & Scholar, 2020), behavioral technology acceptance models (Pradhan, 2020; Ritz, Wolf & McQuitty, 2019), and statistical models to measure the change in sales after digital tools are implemented (Ritz et al., 2019; Sulistiyono, 2019).

Due to the importance of digital marketing for SMEs and the different approaches that can be adopted to investigate it, it is convenient to categorize the scientific literature produced around this topic in order to see the big picture of the field, as well as to describe the dynamics of its publications, journals, and authors and the countries that have published studies in the field. Accordingly, this paper describes the results of organizing, analyzing, hierarchizing, and categorizing 294 scientific and technological research articles about digital marketing in small and medium enterprises (SMEs) using a methodology based on tech mining, analysis of keyword co-occurrences, and clustering. Our results portrait a broad picture of this research field, which can be used to identify its most important journals, countries, authors, and keywords, as well as their interactions. An analysis of keyword co-occurrences and the application of clustering techniques enabled us to detect the existing research topics in the field, as well as the emerging ones that have recently captured researchers' attention.

In particular, this paper aims to answer the following research questions:

1. Publications: What is the evolution over time of the number of publications in this field? What is the growth rate of the publications? Which years concentrate the most relevant studies in terms of citations? What is the average life of the scientific literature in the field?
2. Sources: What are the most important publication sources in this field? How can they be ranked according to their productivity and impact?
3. Authors: Who are the main authors in the area? How can they be ranked according to their productivity and impact? How are they connected to each other? How does this co-authorship network evolve over time?
4. Countries: Which countries accumulate the major number of publications in this field?
5. Topics: What are the main topics addressed in this area? How can publications in this field be grouped to identify thematic clusters, as well as consolidated, emerging, and declining topics in the area?

To address these questions, we used an empirical research methodology based on evidence from the peer-reviewed scientific literature and following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guideline (Page et al., 2021). The methodological steps proposed by the PRISMA guideline refer to a strategy for improving the publication quality of systematic reviews and meta-analyses (Urrutia & Bonfill, 2010).

This study is expected to contribute to a better understanding of digital marketing in SMEs and its underlying topics. To do so, we organized, analyzed, hierarchized, and categorized a bibliographic database of 294 scientific

and technological research articles about digital marketing in SMEs using a methodology based on technology watch, bibliometrics, tech mining, keyword co-occurrence analysis, and clustering.

2. Methodology

To accomplish our goal, we reviewed secondary information sources and divided the methodology process in three stages: data collection, data processing, and data analysis (Aria & Cuccurullo, 2017), as shown in Figure 1. Full details for each stage are explained in the subsections that follow.

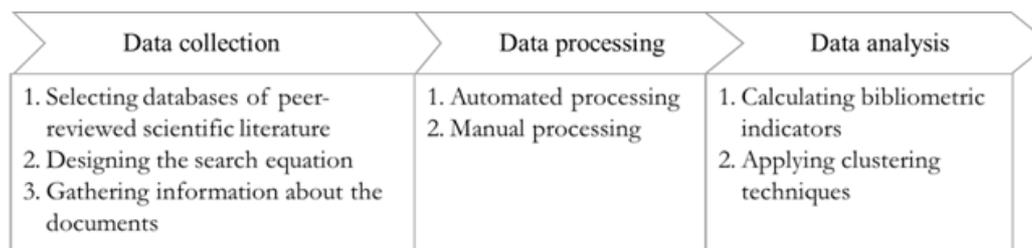


Figure 1. Methodology

2.1. Data collection

In this first stage of the methodology, we conducted a literature search in Scopus. We selected this database because it has a large collection of high-quality publications and reliable information (Muritala, Sánchez-Rebull, & Hernández-Lara, 2020), which makes it a database commonly used for bibliometric analysis (Arias, Restrepo & Restrepo, 2016; Kalemba & Campa-Planas, 2017; Shi & Li, 2019). It was also chosen because it provides users with easy access to the documents that are retrieved and has a wide range of publications (Granda-Orive, Alonso-Arroyo, García-Río, Solano-Reina, Jiménez-Ruiz & Aleixandre-Benavent., 2013), as well as a high-quality review of content (Lasda Bergman, 2012).

We designed the following search query using different terms related to digital marketing and SMEs and thesauruses:

```
TITLE-ABS-KEY ( ( ( digital OR online OR internet OR web ) PRE/3 ( marketing OR advertising ) )
AND ( ( sme* OR "medium enterpris*" ) OR ( ( small OR micro ) PRE/1 ( business OR firm* OR
compan* OR enterpris* OR "new ventur*" OR startup OR organization* ) ) ) )
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This search strategy retrieved a total of 379 documents, which were subjected to the steps proposed in the PRISMA guideline, as shown in Figure 2.

In the identification step, we reviewed and removed duplicates. Then, in the screening step, which constitutes the first exclusion criterion, we removed records that represented incomplete items or were not accessible, because they could not be analyzed. In the eligibility step, which is considered the second exclusion criterion, after reading the different studies that were retrieved, we discarded those that were not directly linked to the subject. As a result, in the inclusion step, we had a total of 294 records (all of which are qualitative studies), which were subjected to further analysis.

From the final number of articles that successfully passed all the filters (294), we gathered the following information: authors, author affiliations, name of journal or conference proceedings, document title, author keywords and index keywords, abstract, and times cited.

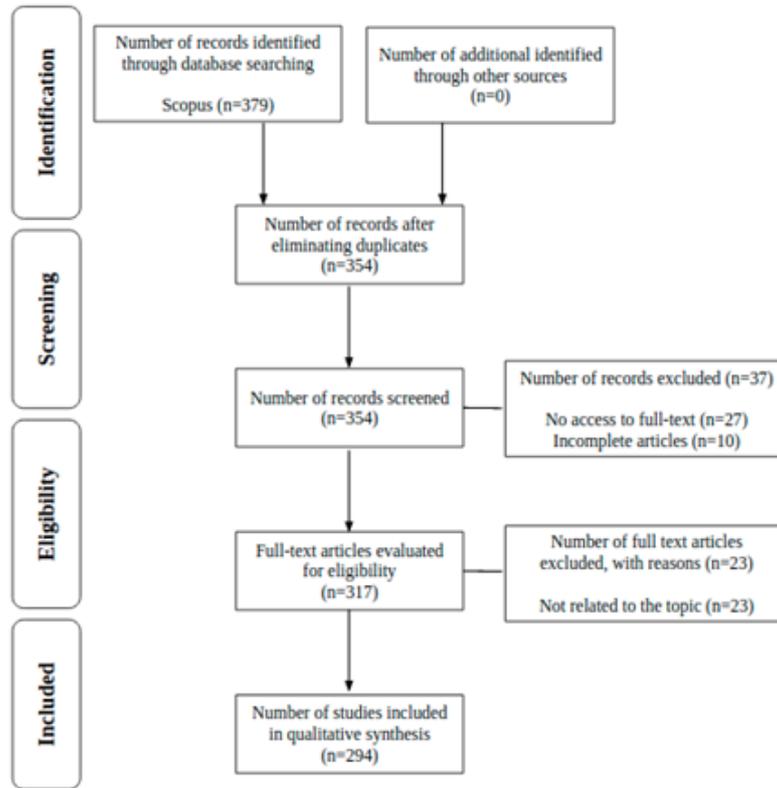


Figure 2. PRISMA flow diagram

2.2. Data processing

At this stage, we extracted and cleaned the text strings using TechMiner (Velásquez, 2021), which is an open-source and friendly-user package developed and tested in Python version 3.6 and used to perform bibliometric analyses. Data were processed both automatically and manually (Cadavid & Salazar-Serna, 2021). Concerning the automated intervention, we processed the information about those 294 documents following the automated tasks presented in Table 1.

Task	Explanation	Purpose	Example
Automatically cleaning and homogenizing the text	Special characters (such as accents, apostrophes, colons, parentheses, dashes, hyphens, slashes <i>Original</i> , and backslashes) are removed from the key fields of the collected documents.	To prevent the algorithm from labeling identical words as different	<i>Original word:</i> e-Commerce <i>Final word:</i> eCommerce
Changing all text to lowercase	All text is changed to lowercase.	To prevent information loss and algorithm's misunderstandings regarding unique keywords	<i>Original word:</i> SME <i>Final word:</i> sme
Disambiguating author names	Each author is identified with their unique Scopus Author ID, which distinguishes authors with similar names by assigning each one a unique number [62].	To prevent information loss and algorithm's misunderstandings regarding unique authors	Although authors "Lorena Cadavid" and "Laura Cadavid" are labeled as "Cadavid, L." by Scopus, they are actually two separate authors with different Author IDs.

Task	Explanation	Purpose	Example
Extracting countries	Countries are extracted from the <i>Affiliations</i> field, which includes additional information that is not relevant to the research (such as department of the university and address).	To prepare the data for the research questions related to country's productivity.	<i>Affiliations</i> field: "Department of Management Studies, Indian Institute of Technology Delhi, India" <i>Text extracted:</i> India

Table 1. Data processing tasks

Also, we manually cleaned keywords in order to:

1. Exclude the expressions we used in the search equation because they not only provided irrelevant information for the bibliometric analysis but could even bias some of the results (such as groups and trends). For example, we did not include terms like *small and medium enterprise*, *digital marketing*, *Internet*, *market*, *e-market*, and *e* and their synonyms.
2. Include non-obvious groups of terms in the field. For instance, although they are very different words, we included *electronic commerce* into the *ecommerce* group because they represent the same concept for the purposes of this research.

2.3. Data analysis

Finally, in the data analysis stage, we used figures and tables to explore the data and highlight interesting facts in this study, which are presented in Section 3. We employed TechMiner for this purpose and the Bibliometrix package for the R programming language to identify communities among authors, countries, and keywords (Aria & Cuccurullo, 2019).

To answer research questions 2, 3, and 4, we calculated a number of productivity and impact indicators (Cadavid & Salazar-Serna, 2021; Shi & Li, 2019) that give us accurate information about the journals, authors, and countries that have published studies in the field. Table 2 presents the bibliometric indicators used in this study, as well as other indicators employed for the analysis.

Index	Purpose	Measurement
H-index (Hirsch, 2005)	To measure and rank the productivity and impact of authors and journals.	It is the maximum value of h such that a given author/journal/country has published at least h papers, each of which has been cited at least h times.
G-index (Egghe, 2006)	To measure and rank the productivity and impact of authors and journals. It allows citations from higher-cited papers to be used to bolster lower-cited papers in meeting the "quality" citations threshold.	Given a set of articles ranked in decreasing order of the number of citations that they received, it is the unique largest number such that the top g articles received together at least g^2 citations.
M-quotient (Hirsch, 2005)	To measure and rank the productivity and impact of authors and journals. It facilitates comparisons between academics with different lengths of academic careers.	It is calculated by dividing the h-index by the number of years the academic has been active (measured as the number of years since the academic's first published paper).
Average life of scientific literature (Diodato, 2012, p. 119)	To measure the time interval in which new publications are relevant.	It is the number of years necessary for the cumulative number of publications to duplicate.
Bradford's law (Bradford, 1885)	To measure and rank the importance of a source in a research field.	Sources are divided into three groups, each of which covers a third of the articles published in a research field. The number of sources in each group follows a proportion of $1:n:n^2$. The sources in the first group are considered central to an area.

Index	Purpose	Measurement
Lotka's productivity (Lotka, 1926)	To measure the concentration of the author's productivity in a research field.	Concentration is detected by calculating the frequency distribution of the number of papers by author.
Average Growth Rate (AGR) (Ruiz-rosero, Ramirez-Gonzalez & Viveros-Delgado, 2019)	To identify trending and declining topics in a given field through the keywords.	It is the average difference between the number of documents published in one year and the number of documents published in the previous year during a given period of analysis. Positive values suggest a growth in the number of publications on the topic in recent years, while negative values suggest the opposite.
Louvain's algorithm (Blondel, Guillaume, Lambiotte & Lefevre, 2008)	To extract communities from a network of authors, keywords, and countries	It detects small communities at the beginning of the algorithm.; then it groups each small community into one node, and repeats the process.
Association strength index (Van Eck & Waltman, 2007)	To normalize co-occurrence frequencies between paired nodes (authors, countries, or keywords).	It is the ratio between the co-occurrence frequency of the nodes and their expected co-occurrence frequency (obtained under the assumption that occurrences of the vertex are statistically independent).

Table 2. Bibliometric indicators used in this study

We used a 0.1 repulsion force for the Association Strength index, which indicates the repulsion force among network communities (Aria & Cuccurullo, 2018, 2021; Quiles, Macau & Rubido, 2016), and one number of edges as the minimum to identify paired nodes.

Although we obtained the network of keywords as it is commonly done in bibliometric analysis (Kalemba & Campa-Planas, 2017), we went farther and identified clusters of keywords through co-citation networks using the process described above (Seguí-Mas, Sarrión-Viñes, Tormo-Carbó & Oltra, 2016; Seguí-Mas, Signes-Pérez, Sarrión-Viñes & Vidal, 2016). That is, thematic clusters were not identified by counting the number of keywords as in previous studies (Arias et al., 2016) but by statistically analyzing the relationship between them. We also provide an interpretation of the results to give some structure to the field.

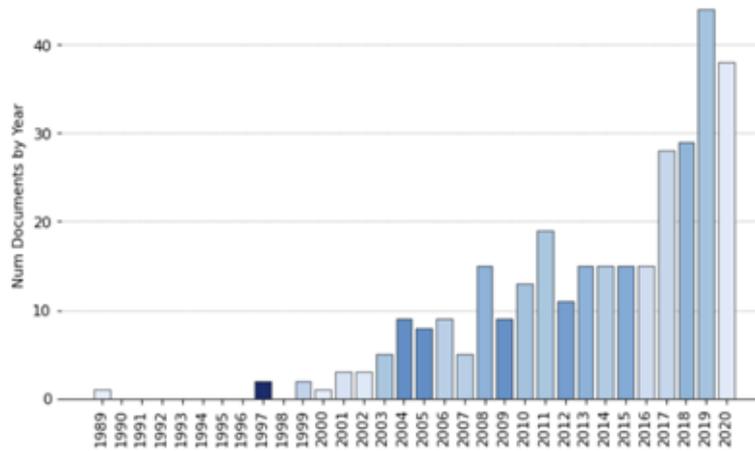
Although a static visual inspection of the networks is useful and common to understand the relational behavior among authors (Kalemba & Campa-Planas, 2017; Seguí-Mas, Signes-Pérez, et al., 2016; Shi & Li, 2019), we analyzed how the properties of the co-authorship network evolve over time and provide an interpretation to understand the longitudinal dynamics of co-authorships (Arias et al., 2016).

3. Results

3.1. Evolution of the number of publications over time

The search query retrieved a total of 294 documents featured in 211 different sources between 1989 and 2021, which have been written by 673 authors, affiliated to 343 institutions in 52 countries. There were 72 (24.5%) single-authored articles, while the remaining papers were written by an average of 2.29 authors per document. Figure 3 shows the evolution of the number of articles published each year (a).

As observed in Figure 3, there has been a rapid growth of publications, which indicates an increasing interest in this topic. The compound annual growth rate of the publications is 18.8% in the last five years. The year 1997 is especially relevant because it concentrates the highest average number of citations, which suggests that articles of relevance to this research field were published in that year. The average life of scientific literature is 4.1 years. That is, the findings in the studies become obsolete after 4.1 years on average. Table 3 lists the top 10 documents in this field in terms of citations.



*The darker the color, the higher number of citations of the documents published in those years. Number of citations goes from 0 (years 1998 and 2000, for example) to 278 (year 1997).

Figure 3. Number of documents published per year

Document	Times cited	Citations per year
Internet marketing in the internationalisation of UK SMEs (Hamil & Gregory, 1997).	183	7.6
Factors impacting on e-business adoption and development in the smaller firm (Fillis, Johansson & Wagner, 2004)	124	7.3
Social networks: The future of marketing for small business (Harris & Rae, 2009a).	107	8.9
Internet-enabled international marketing: A small business network perspective (Poon & Jevons, 1997).	99	4.1
The role of the internet in the internationalisation of small and medium sized companies (Loane, 2005).	91	5.7
Partial correlation analysis using multiple linear regression: Impact on business environment of digital marketing interest in the era of industrial revolution 4.0 (Syazali et al., 2019).	68	34.0
The internet as an alternative path to internationalization? (Sinkovics, Sinkovics & Jean, 2013)	65	8.1
Search engine marketing is not all gold: Insights from Twitter and SEOClerks (Aswani, Kar, Ilavarasan & Dwivedi, 2018).	65	21.7
A Longitudinal Study of Expectations in Small Business Internet Commerce (Poon, & Swatman, 1999).	61	2.8
E-marketing and SMEs: Operational lessons for the future (Gilmore, Gallagher & Henry, 2007).	54	3.9

Table 3. Top 10 documents

The first three documents hold 45.1% of the citations among the top 10 articles. Two of the most cited articles were published in 1997, which reaffirms the importance of that year for this field (as shown in Figure 3).

Among the most cited articles, there is an interest in analyzing the role of digital marketing in the internationalization of SMEs, as well as understanding the factors that lead SMEs to adopt digital marketing. There are also studies about the future trends in this field, which were written in 2009 and 2013.

Some papers are more immediately appreciated by the scientific community than others because the relevance of a document varies if we consider its age. For example, the study of Syazali et al. (2019) has fewer global citations than the most cited document, but it has the highest number of citations per year since publication, followed by that of Aswani et al. (2018).

3.2. Top sources

The selected documents were published in 211 outlets (journals and conference proceedings). The production index of the journals is 64, which means that 30.3% of the sources published 50% of the scholarly production and evidences a low concentration of knowledge in the sources. Likewise, the journal transiency index is 163, which means that 77.3% of the sources published a single paper.

Bradford's law (Bradford, 1985) proposes to divide the information sources into three groups that cover a third of the articles published in a research field. According to it, the number of sources in each group follows a proportion of 1:n:n². The sources in the first group are considered central to an area. In the case under study, we found that 18 sources (8.5% of the total) are in the first Bradford group and published 70 (23.8 %) of the items.

Table 4 presents the journals with the highest number of published articles and their impact indicators. In terms of number of publications, four journals stood out: *International Journal of Internet Marketing and Advertising*, *Journal of Small Business and Enterprise Development*, *Lecture Notes in Computer Science*, and *Emerald Emerging Markets Case Studies*. They have published 7.8% of the scholarly production in this field, which confirms the low concentration of publications in specific journals.

Source	Number of documents	Times cited	Times cited per year	Times cited per document	H-index	M-index	G-index
International Journal of Internet Marketing and Advertising	8	63	4.5	7.88	3	0.21	2
Journal of Small Business and Enterprise Development	5	125	6.58	25	5	0.26	3
Lecture Notes in Computer Science	5	17	0.94	3.4	2	0.11	1
Emerald Emerging Markets Case Studies	5	0	0	0	0	0	0
Journal of Research in Marketing and Entrepreneurship	4	12	0.57	3	1	0.05	1
Advanced Science Letters	4	7	1	1.75	2	0.29	1
Advances in Intelligent Systems and Computing	4	0	0	0	0	0	0
Test Engineering and Management	4	0	0	0	0	0	0
WIT Transactions on Information and Communication Technologies	4	0	0	0	0	0	0
International Journal of Entrepreneurship and Small Business	3	43	2.87	14.33	3	0.2	2

Table 4. Top 10 journals in the field

Simultaneously considering the number of publications and citations, the *Journal of Small Business and Enterprise Development* presents the highest h-index among the publications in this field, followed by the *International Journal of Internet Marketing and Advertising* and the *International Journal of Entrepreneurship and Small Business*. These three sources are in the same order in terms of the g-index. *Advanced Science Letters* has the highest m-quotient, although it reached the sixth place in number of publications.

3.3. Top authors and relationships

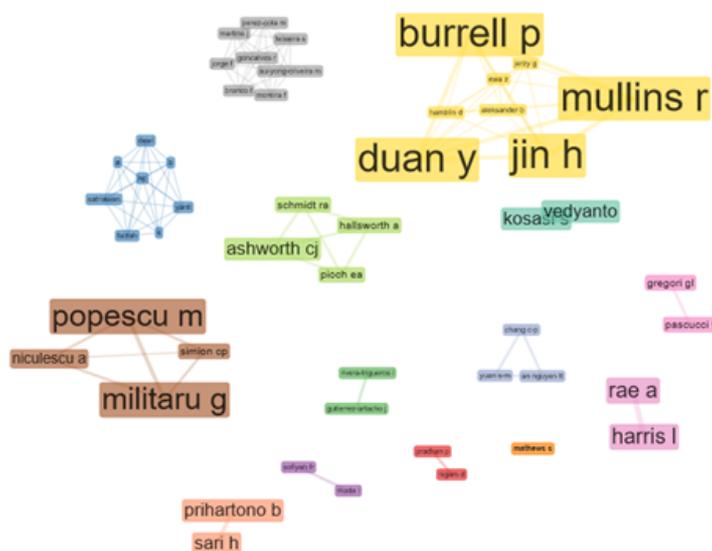
In total, 673 authors have published papers in this field. The author production index is 288, which means that 44.4% of the authors have published 50% of the scholarly documents. Likewise, the author transiency index is 621, which means that 92.2% of the authors have published a single paper. As a result, the distribution of publications of the authors follows Lotka's law, according to which few authors have a high number of

publications and many individuals have few of them. Table 5 lists the main authors in this field in terms of number of published articles, as well as impact indicators.

Author	Documents	Times cited	Times cited per year	Times cited per document	H-index	M-index	G-index
Harris L	4	141	10.85	35.25	4	0.31	3
Rae A	4	141	10.85	35.25	4	0.31	3
Ashworth CJ	3	69	4.31	23	3	0.19	3
Kosasi S	3	5	1	1.67	1	0.2	1
Vedyanto	3	5	1	1.67	1	0.2	1
Militaru G	3	4	0.8	1.33	1	0.2	1
Popescu M	3	4	0.8	1.33	1	0.2	1
Prihartono B	3	2	0.4	0.67	1	0.2	1
Sari H	3	2	0.4	0.67	1	0.2	1
Alnsour	3	0	0	0	0	0	0

Table 5. Top 10 authors in the field

L. Harris and A. Rae have the highest number of publications (4 each) and citations (141 each) and are co-authors in all their papers published in this field. Their contributions are related to the analysis of social networks (Harris, Rae & Misner, 2012; Harris & Rae, 2009a), the design of marketing strategies for SMEs (Harris & Rae, 2010), and the role of human talent in digital marketing (Harris & Rae, 2009b). The list above does not include the authors with the highest number of citations, K. Gregory and J. Hamill, who have published one only study into the impact of digital marketing on the internationalization of SMEs that has been cited 183 times (Hamill & Gregory, 1997).



* The size of the nodes is proportional to the degree of connectivity of the author (total number of coauthors). The colors of the nodes indicate the community they belong to.

Figure 4. Co-authorship network of the 50 most connected authors in the field (software: Bibliometrix (Aria & Cuccurullo, 2019))

Figure 4 presents the co-authorship network of the 50 most connected authors in the field.

In general, the co-authorship network is composed of several communities and numerous isolated components or subnetworks. P. Burrel, R. Millins, Y. Duan and H. Jun, who are in the same co-authorship subnetwork, reached the highest number of co-authorships: a degree of 7. Authors such as M. Popescu and G. Military also stand out because they have no co-authorships with the most connected authors, but they exhibit a degree of 6.

The most prolific authors, i.e., L. Harris and A. Rae are co-authors of each other and present a degree of 2. Nevertheless, co-authorship networks are not static; they evolve over time, as shown in Figure 5.

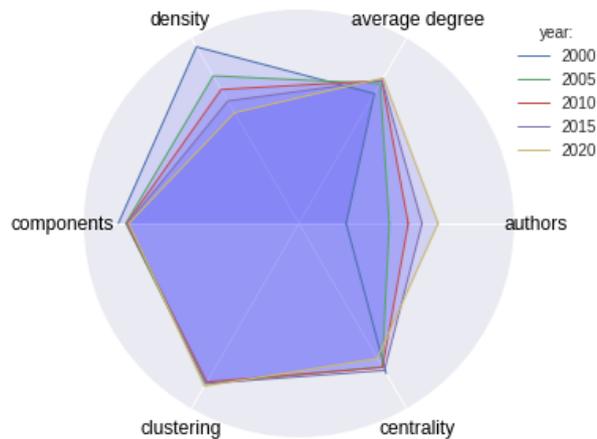


Figure 5. Evolution of the co-authorship network

The spider chart above shows a gradual increase in the number of authors that have contributed to the field with their publications. Likewise, the average degree of the network grew and subsequently stabilized; that is, at the start of the 2000's more relationships between authors were established, but that number has remained constant since 2005. Furthermore, the co-authorship network has become less central over time; in other words, the authors that once were central in their communities have lost their leading position, and knowledge has been distributed among authors. Furthermore, the density of the network has decreased over time, which is a common phenomenon that occurs when new authors are added and their dynamics keep the number of co-authorships per document stable.

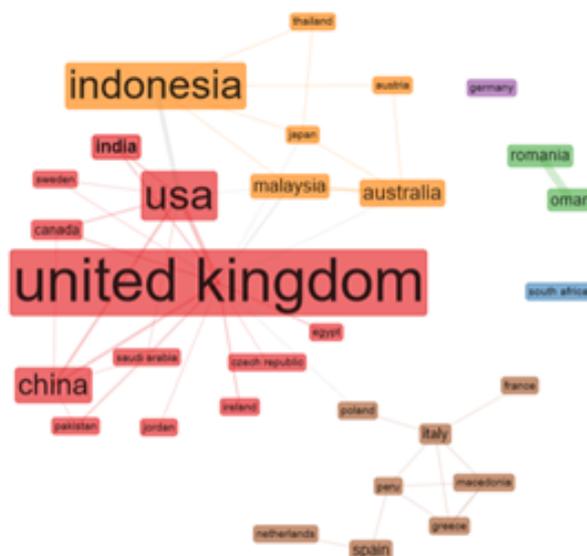
3.4. Leading countries in scientific publication

All the publications in our dataset come from 54 different countries. The national production index is 6, which means that 12.2% of the countries published 50% of the scholarly production. Likewise, the country transiency index is 16, which means that 32.7% of the countries published a single paper. The map in Figure 6 shows the top countries in number of publications. The United Kingdom concentrates the highest number of documents, 55 (18.7%), followed by Indonesia with 36 and the United States with 27. The research into digital marketing in SMEs in Latin America and Africa is still incipient.



Figure 6. Publications per country

Figure 7 shows the collaboration network established among the top 30 countries in terms of number of publications.



* The size of the nodes is proportional to the number of documents published by each country. The colors of the nodes indicate the community they belong to.

Figure 7. Collaboration networks among the top 30 countries in number of publications (software: Bibliometrix (Aria & Cuccurullo, 2019))

There is a strong relationship between the United Kingdom, Indonesia, and the United States, which form a big community. The latter is connected to the communities of Italy, Macedonia, Greece, and Peru through Poland. In turn, the relationship between Spain and Peru connects this cluster to The Netherlands. Romania and Oman share a strong bond, and there are no collaborations between Germany or South Africa and the other top 30 countries.

3.5. Most common topics

Figure 8 lists the most frequent keywords that were used at least 3 times and the number of documents each keyword appeared in every year.

Social media was found in 32 documents (10.9%), followed by *electronic commerce* (26), and *international* (14). Some of the main keywords have been used for the first time recently. For example, *digital transformation* was introduced in this field by Ulas (2019) in a study to evaluate the factors that influence the digital transformation process of companies; and *brand awareness* was employed by Dilham, Sofiyah and Muda (2018) in their analysis of the effect of brand awareness on customer loyalty and Setiaboedi et al. (2018) in the model they proposed for the survival phase of small ventures. Conversely, some other terms have been used for much longer. For instance, *electronic commerce* was first mentioned by Poon and Swatman (1999) in their analysis of the expectations of 20 small *electronic commerce* enterprises in Australia; and internet adoption was introduced by Patrick and Miller (2004) in their paper about the adoption of the internet by SMEs. Electronic commerce has been constantly addressed in publications since 1999, and *international* has been included since 2005.

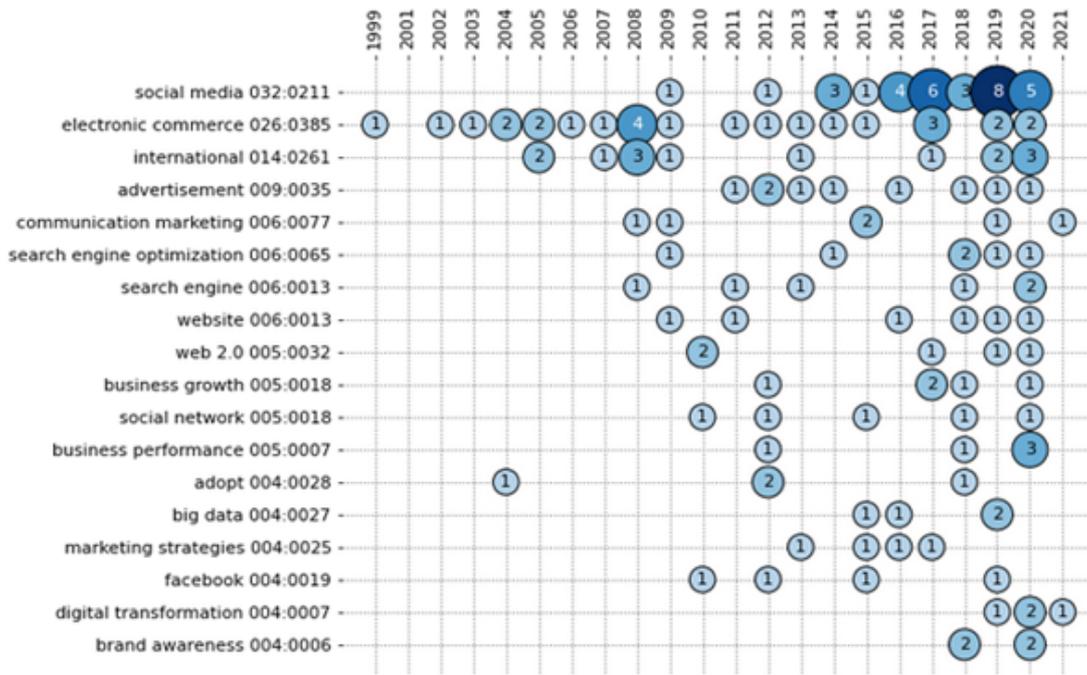


Figure 8. Keyword evolution over time

Figure 9 presents the co-occurrence of keywords (used at least 3 times) by country.

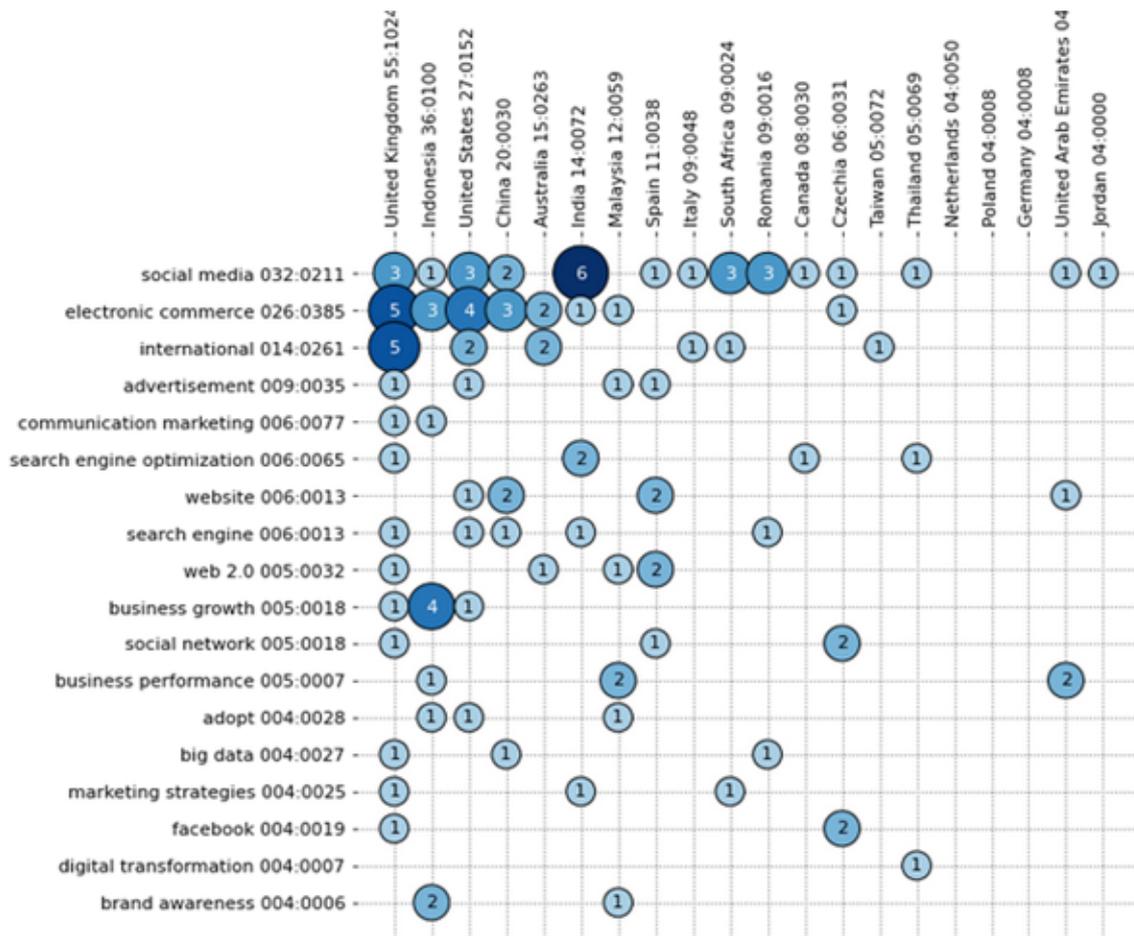


Figure 9. Keywords by country

optimization to promote products (Gaur, Sahu & Singh, 2020) and the impact of the adoption of electronic commerce on the performance of SMEs (Octavia et al., 2020).

Other publications in this cluster are, for example, about advertisement over the internet (Georgios, Nikolaos, Papaioannou, Stilianos-Eustratios & Zacharoula., 2015; Hanafizadeh, Behboudi, Ahadi & Varkani, 2012; Peet, 2012), social networks (Peet, 2012; Raut, Mitrović, Melović & Lolić, 2018), and digital TV (Raut et al., 2018), the adoption of electronic commerce (Marimuthu, Omar, Ramayah & Mohamad, 2012; Octavia et al., 2020), and the promotion of products over the internet (Hadining & Sukanta, 2018; Hanafizadeh et al., 2012; Patrick & Miller, 2004).

Several papers in this cluster have focused on evaluating the convenience of subcontracting electronic commerce activities (Porto & de Abreu, 2019), assessing the performance of SMEs after they have implemented electronic commerce (Marimuthu et al., 2012; Octavia et al., 2020), and determining the competences that are necessary to adopt electronic commerce (Fillis et al., 2004).

Regarding techniques, data mining has been used to analyze the competences that are necessary to improve the competitiveness of SMEs (Antlová, Popelínský & Tandler, 2011). Furthermore, big data techniques have been usually implemented to evaluate the loyalty of electronic customers (Donnelly, Simmons, Armstrong & Fearne, 2015), improve decision-making processes using information generated by electronic commerce (Banica & Hagiú, 2016), and enhance the promotion of the goods and services on offer (Ma, 2019).

The studies in the electronic commerce cluster are closely related to their counterparts in the social media subnetwork through the study of media as part of the marketing strategies of SMEs (Thrassou & Vrontis, 2008), as well as the analysis of the factors that affect the digital transformation of organizations (Ulas, 2019).

Cluster 2: Social media (green)

Social media are the computer technologies that enable users to create and share information, ideas, interests, or other forms of expression using networks and communities (Obar & Wildman, 2015). The adoption of this kind of media by SMEs, as part of their marketing strategies, has been seen as an innovative element in organizations (Darmon & Zeroukhi, 2014). Therefore, the barriers that prevent the adoption of this technology have been extensively investigated by many authors (Beier & Wagner, 2016; Simion et al., 2017; Taiminen & Karjaluoto, 2015).

The authors in this cluster have analyzed the incidence of social media on the marketing strategies of companies (Kujur & Singh, 2016) and developed strategies for the adoption of this kind of media by SMEs operating in places where an internet connection is not widely available (Oji, Iwu & Tengeh, 2017). The convenience of investing in the promotion of company websites in this type of media has also been analyzed (Oji et al., 2017) and explored different alternatives to have sustainable marketing strategies over social media (Dumitriu, Deselnicu & Popescu, 2019; Khan, Wang, Ehsan, Nurunnabi & Hashmi., 2019).

This cluster includes studies of search engine optimization (SEO), which refers to a set of actions aimed at improving the positioning of a website in the results page of an online search engine in order to increase its visibility (Gaur et al., 2020; Kovalenko & Kuzmenko, 2020). The literature in this cluster indicates that SEO is one of the main activities that companies can do to promote their products over social media (Somjai et al., 2020; Thomas & Simmons, 2010) and one of the factors that determine the adoption of digital marketing by SMEs (Darmon & Zeroukhi, 2014). Nevertheless, some authors have expressed concerns about the misinformation SEO generates among consumers (Aswani et al., 2018; Segev, 2008).

In relation to SEO, Google Analytics (Google, 2020) provides information about the traffic coming into a company website classified by audience, behavior, and purchases made on the site. Some authors have used this tool to monitor the performance of the websites of SMEs in the promotion of the products they offer (Moral, Gonzalez & Plaza, 2014; Thomas & Simmons, 2010).

Cluster 3: Corporate websites (blue)

This cluster includes studies that have evaluated the role of websites in the digital marketing of SMEs (Rivera-Trigueros, Gutiérrez-Artacho & Olvera-Lobo, 2019; Sheng & Erqin, 2011) and established the characteristics websites should have to enable effective electronic commerce (Ghandour, 2018). Other papers have assessed the way SMEs use their websites (Rivera-Trigueros, Gutiérrez-Artacho & Olvera-Lobo, 2020), the quality of the latter (Canziani & Welsh, 2016; Zhang, Zhang & Zhang, 2009), and the effects of sponsored search employed to promote them (Wang et al., 2011).

Some of these studies have been focused on the Web 2.0 (O'Reilly, 2005), which refers to those websites that enable information sharing, interoperability, user-centered design, and collaboration over the World Wide Web. In this cluster, some publications have been concerned with the value added that the Web 2.0 offers to SMEs (Gwadabe, 2017), as well as specific applications for companies in the health care sector (Rivera-Trigueros et al., 2019, 2020).

The articles in this cluster have analyzed social networks to determine the convenience of using them in the digital marketing of SMEs (Raut et al., 2018); proposed methodologies for advertisement over social networks (Beloff & Pandya, 2010); examined the process SMEs follow with respect to the use of social networks in their marketing strategies (Rivera-Trigueros et al., 2020) and evaluated market efficiency through such networks (Bilkova & Zelenka, 2015; Vejačka, 2012). Among the specific social networks that were found, Facebook was the most common (Beloff & Pandya, 2010; Bilkova & Zelenka, 2015; Vejačka, 2012).

Cluster 4: Internationalization (red)

The documents in this cluster have mainly analyzed the role of the internet in the internationalization process of SMEs (Hamill & Gregory, 1997; Sinkovics et al., 2013; Thrassou & Vrontis, 2008) and its application in countries such as Costa Rica and France (Carpio et al., 2020); Italy (Pascucci, Cardinali, Gigliarano & Gregori, 2017); Japan (Mathews, Maruyama, Sakurai, Perks & Sok, 2019); and Canada, Ireland, Australia, and New Zealand (Loane, 2005). They have also examined the support provided to the internationalization processes of SMEs, which can come from institutions (Carpio et al., 2020) or in the form of training in the capabilities needed to conduct internationalization activities (Umar, Sugiharto & Hartanto, 2020).

These articles are related to the electronic commerce cluster through the studies of the exports of SMEs (Morgan-Thomas, 2009) and the evaluations of the competitiveness of this type of organizations (Dvouletý & Blažková, 2020; Peralta Miranda, Salazar-Araujo, Álvarez Mendoza & Ortiz Cardona, 2019; Thrassou & Vrontis, 2008).

Cluster 5: Brand (orange)

This cluster connects two other clusters: internationalization and social media. Some documents in Cluster 5 are about brand awareness, which is defined as the extent to which consumers are familiar with the qualities or image of a brand (Keller, 1993).

This concept was first introduced when Arcos, Gutiérrez and Hernanz (2014) analyzed the impact of electronic word of mouth on brand awareness, and recent studies indicate that the SMEs that foster brand awareness through social media are more likely to survive in the long term than those who do not (Daugherty, 2018; Setiaboedi et al., 2018).

Other articles have addressed the effect of online marketing on electronic consumer loyalty and brand awareness (Dilham et al., 2018), as well as the impact of social media on the brand awareness of companies (Ahmad, Idris, Wong, Malik, Masri & Alias, 2020) that are exporters (Eid, Abdelmoety & Agag, 2020; Makrides et al., 2020) and non-exporters (Gwadabe, 2017).

Consolidated, emerging, and declining topics in the area

Figure 11 shows the Average Growth Rate (AGR) of the main keywords from 2017 to 2020, including keywords that have been used in the field in the past (based on the most frequent keywords that were used at least 3 times; see Figure 8), as well as new ones with a high AGR value.

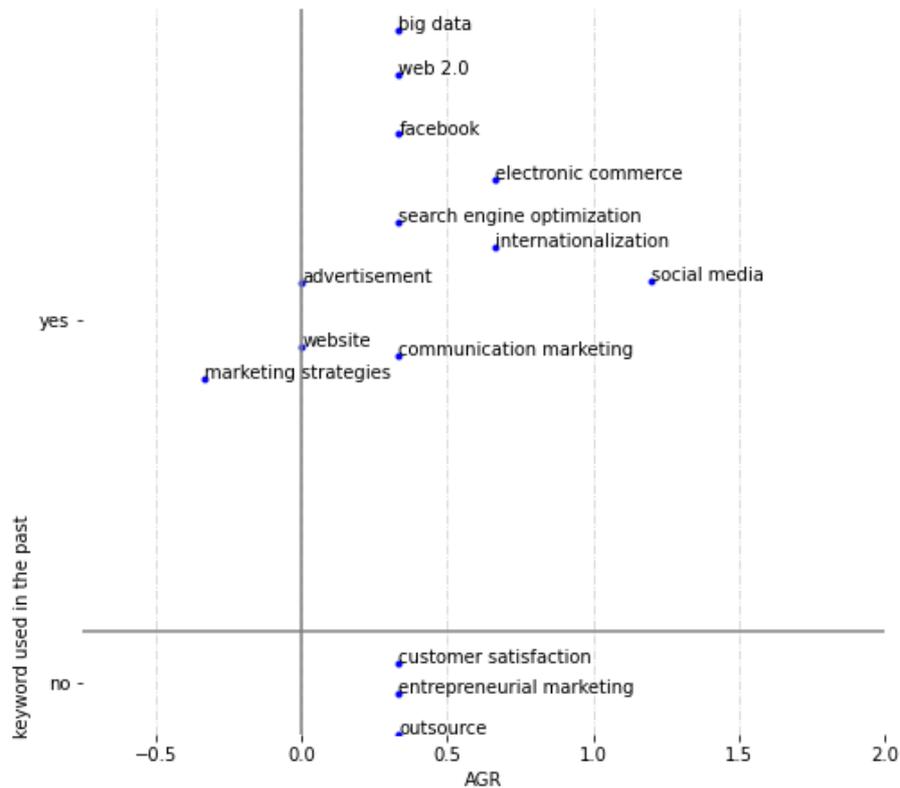


Figure 11. Trending, emerging, and declining topics

The keywords that have a positive AGR and have been used at least 3 times in the past are in the first quadrant. These topics can be considered consolidated in the field and are still being researched.

The term that has experienced the highest growth over the past three year) is social media and appears in 22 publications from 2017 to 2020. Electronic commerce and internationalization also have a high ARG, as well as big data, web 2.0, Facebook, search engine optimization, and communication marketing. Conversely, although marketing strategies has attracted an important number of publications, it showed a negative AGR; that is, the participation of this topic in the field has decreased yearly. Therefore, it can be considered a declining topic.

Three terms emerged as new relevant keywords with a high AGR: customer satisfaction, entrepreneurial marketing, and outsourcing. Recent studies have identified the factors that influence export performance using customer satisfaction as a monitored response variable (Kim & You, 2019). Other authors have studied the relevance of some specific big data tools for the growth of new enterprises (Conway & Hemphill, 2019) and assessed the return on sales of outsourcing advertising services (Porto & de Abreu, 2019).

Suggestions for future research

New topics in the field emerge as a result of pending research questions. Below, we present a number of current lines of research that we found in the different studies that were retrieved.

Pending research questions related to thematic issues

More research is needed on SMEs' adoption of digital marketing tools and techniques, as well as on their choice of specific social media platforms (Dumitriu et al., 2019; Kovalenko & Kuzmenko, 2020; Rivera-Trigueros et al., 2020). In addition, future studies should further explore the reasons why SMEs do not have corporate websites and do not create corporate profiles on social media sites (Rivera-Trigueros et al., 2019). Additional research is also required to measure the effect of investing in online advertising on SMEs' financial performance (Porto & de Abreu, 2019).

Furthermore, it is still necessary to gain a better understanding of the factors that influence SMEs' adoption of Facebook Ads to promote products over the internet; this can be accomplished by conducting surveys among SMEs in order to identify such factors and the relationships between them (Hadining & Sukanta, 2018). More research is also needed on social media platforms other than Facebook, Instagram, YouTube, Twitter, and LinkedIn and their potential benefits for SMEs' marketing activities (Khan et al., 2019). Another active line of research is the use of social media to collect likes and preferences from potential customers through big data techniques. This should lead to customer behavior prediction, which could benefit SMEs' marketing activities (Ma, 2019).

Further studies need to be undertaken on the impact of a business location on the effectiveness of brand awareness strategies (Makrides et al., 2020). The degree of internationalization of SMEs must also be investigated, with a focus on aspects such as website and social network translation, localization, and transcreation (Rivera-Trigueros et al., 2020). Additionally, there is still a need for tools to assess SMEs' knowledge and use of digital marketing for internationalization purposes. Moreover, training programs ranging from basic to advanced, including offline marketing training, should be designed and developed for SMEs to adjust to the current global context (Umar et al., 2020).

There are a number of isolated research questions that have yet to be answered. For instance, rather than focusing on sociodemographic factors, it is necessary to analyze the impact of different entrepreneurs' personal attributes, such as individual skills, on the internationalization of SMEs (Pascucci et al., 2017). Also, since men and women behave differently as shoppers, additional research on gender differentials is required to help businesses and marketers customize their marketing efforts in building brand awareness (Makrides et al., 2020).

Pending research questions related to methodological issues

Longitudinal studies are needed to better explain the relationship between entrepreneurial orientation, market orientation, e-commerce adoption, and business performance (Octavia et al., 2020). This type of studies are also required to assess the long-term effects of online advertising, as investments in advertising are expected to have a long-term impact on financial indicators (Porto & de Abreu, 2019).

Moreover, a wider range of research methods could provide richer data and improve studies on both general and specific social media platforms. Such methods could combine marketing analysis and sociological surveys with selective interviews (Kovalenko & Kuzmenko, 2020; Rivera-Trigueros et al., 2019, 2020). There is also a need to use simplified methodologies to investigate the impact of the characteristics of websites and social media platforms (such as the age of the website, the link profile, and the quality of text content optimization) on the visibility of internet sites, as well as their relationship with SMEs' financial results (Kovalenko & Kuzmenko, 2020).

Future research should include larger samples of SMEs in the analysis and interviews, and standardize sample size in cross-country studies in order to make geographical comparisons (Carpio et al., 2020). The findings reported by the studies in the field should not be transferred to other industries or countries different from those explicitly tied to them. Thus, further studies should specialize in specific economic sectors (e.g., industrial, commercial, and services) and places (Dumitriu et al., 2019; Kovalenko & Kuzmenko, 2020; Rivera-Trigueros et al., 2020), rather than trying to reach conclusions for general sectors and places. More studies from a broader range of industries and places would be most welcomed (Makrides et al., 2020; Mathews et al., 2019; Pascucci et al., 2017).

In studies into the internationalization of SMEs, using a measurement scale (instead of a binary variable) could provide more relevant information on these companies' level of internationalization (Pascucci et al., 2017).

According to qualitative studies, customer relationship, online marketing, fulfillment needs, and brand awareness can affect the level of customer loyalty (Dilham et al., 2018). Notwithstanding, since estimates of advertisement engagement in several online platforms are not statistically significant, quantitative analysis still requires variables that better explain brand awareness (Ahmad et al., 2020). Furthermore, since customers' online habits change over time, future research should focus on a longitudinal analysis of online preferences and behaviors of customers, which will provide insights with regard to how to build brand awareness (Makrides et al., 2020).

Implications for practitioners

From a practitioner's point of view, SMEs must stay current with changes and advancements in social media. They may require creative teams to explore their own social media platforms, as well as those of their competitors, in order to understand trending features related to value creation, profitability, and consumer satisfaction (Khan et al., 2019).

Practitioners, governments, academics, and other related institutions must, beyond providing equipment and technical and management support, assist SMEs in the use of new technologies and encourage entrepreneurs to develop a market orientation through the use of new technological tools. For example, more support is required to use the many currently available methods that include text, images, audio, and video for promoting activities online (Gaur et al., 2020). Additionally, governments should evaluate how the current legal and regulatory framework facilitates digital transformation and make the necessary adjustments (Ulas, 2019).

The potential benefits of integrating social media with SMEs' information systems to help in their everyday operation must be investigated further (Raut et al., 2018). New studies should also offer advice to online businesses on how to develop online strategies, set development objectives, and assess performance using their eCommerce website (Ghandour, 2018).

4. Conclusions

In this paper, we examined representative studies that address digital marketing in SMEs from different perspectives. Through a systematic literature review, we analyzed 294 scientific articles about digital marketing in SMEs using a methodology based on tech mining, analysis of keyword co-occurrences, and clustering. The technique we used enabled us to integrate sources, authors, countries, and keywords. As a result, we could analyze author activity, the specialization of certain countries in specific topics, emerging topics, and the structure underlying the knowledge generated in this field. Additionally, we studied collaborations between authors and countries and associations between keywords.

According to the results, the exponential growth in the number of publications in the field reveals a growing interest in the topic. Moreover, the year 1997 was found to concentrate the highest average number of citations of the documents published between 1989 and 2021.

A wide variety of sources have published studies into the topic, which evidences a low concentration of knowledge in the sources. Based on their productivity indicators, the Journal of Small Business and Enterprise Development, the International Journal of Internet Marketing and Advertising, the International Journal of Entrepreneurship and Small Business, and Advanced Science Letters are the most relevant journals in the field.

Few authors were found to have a high number of publications, and many have few of them. In general, the co-authorship network is composed of several communities and numerous isolated components or subnetworks. This network has become less central over time, i.e., the authors that once were central in their communities have lost their leading position, and knowledge has been distributed among authors.

Countries such the United Kingdom, the United States, and Indonesia were found to be among the most important reference points in the field of digital marketing in SMEs.

Although some topics have been explored in many countries (e.g., electronic commerce in the United Kingdom, the United States, Indonesia, and China), some countries have a leading position in certain topics. For instance, India is the most productive in social media, and Indonesia in business growth.

Some terms, such as digital transformation and brand awareness, were used for the first time recently, while others, like electronic commerce and international, have been around for a long time.

The positioning of brands in web search engines, social networks (mainly Facebook) as means to do advertisement, internationalization, and big data management are increasingly important topics in studies of digital marketing in SMEs.

We identified five major research themes: electronic commerce, social media, specific social media, internationalization, and brand. Finally, we can say that social media, electronic commerce, internationalization, big data, web 2.0, Facebook, search engine optimization, and communication marketing are consolidated subjects in this field, and marketing strategies is a declining one. In turn, customer satisfaction, outsourcing, and entrepreneurial marketing are emerging topics. Future research should develop a wider range of research methods and longitudinal techniques and consider a wider range of industries and places. In addition, the adoption of digital marketing tools, platforms, techniques, and websites, as well as strategies to assess SMEs' internationalization, should be thoroughly investigated.

Despite the contributions of this study, future research should take into account its limitations as well. First, this analysis considered publications in one database only; thus, important discussions published in other journals could have been omitted. Second, since scientific literature is constantly evolving, the results need to be frequently updated. Third, gray literature (e.g., working papers, government documents, and white papers) was not included in the scope. Finally, future studies should examine the presence of homonyms, typos in names or bibliographic references, and abbreviations related to the same topic and classified into different categories.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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