Journal of Scientometric Research, 2024; 13(2):589-603.
https://www.jscires.org

Research Article

Drawing a Scientific Map of the Field of Marketing and Identifying its Historical Origin with a Spectroscopic Approach

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ABSTRACT

The purpose of this study is to draw a scientific map of the field of marketing and identify its historical origins with spectroscopic approach. The research is applied in terms of purpose and survey-analytical in terms of methodology with a bibliometrics approach. Web of Science database was used to collect data. A review of 113,500 marketing documents was conducted between 1920 and 2020. The collected data were categorized based on bibliometrics indicators and analyzed using VOS-Viewer, CiteSpace and CRExplorer softwares. Findings showed that the growth trend of articles in the field of marketing has been upward. The citations received by marketing articles by year (Over a hundred years), with the help of CRExplorer software, showed 5 historical mutations in 1969, 1976, 1989, 2000 and 2004. The largest mutation was in 2000, with more than 18,000 citations. The results of co-authorship analysis also showed; at the countries level, the United States, the United Kingdom and Australia; at the university and scientific institute level, the universities of Michigan, Wisconsin, Minnesota, and Ohio have had the most scholarly collaboration at the level of authors, Kumar, Ocass, and Sargent. Regarding influential and highly cited and quality magazines in the field of marketing, Journal of marketing, Journal of marketing research and Journal of Consumer Research attract attention. In general, by looking at the various bibliometrics indicators as well as reflecting on the illustrated results of the research data; the most important point was the existence of differences in the quantity and quality of factors involved in the production of scientific articles (including authors, journals, etc.). Therefore, it can be said that by using each of the bibliometrics indicators, the results can be analyzed from a new perspective.

Keywords: Markrting, Bibliometrics, Science, Bibliometrics Softwares, Co-authorship, Burstiness, Citation.

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Received: 08-01-2024;
Revised: 07-02-2024;
Accepted: 07-03-2024.

INTRODUCTION

Today, the analysis of scientific and non-scientific content at different levels, including websites, authors, journals, etc., are Reviewed with standard indicators.[1] One of the criteria for determining the scientific status of different countries, universities and subject areas is the scientific documents published by researchers.[2] Every year, many scientific documents are published by researchers and faculty members of universities and scientific institutes, among which bibliometrics is the most common method for analyzing scientific publications. Ackerman believes that bibliometrics is the quantitative analysis of scientific texts based on the amount of publication and citation.[3] In other words, using bibliometrics analysis, researchers, institutions, countries and different subject areas can be identified and their relationships can be determined and depicted.[4] Romanell state that bibliometric analysis is a tool to determine the status of research conducted in a journal, a specific subject area, institution or country, and its purpose is to identify possible trends and gaps in knowledge, that Finally, its results play an important role in management and decision making in science and technology.[5] Researchers have in the past mostly used simple bibliometrics techniques to analyze scientific evidence in journals, various subject areas, countries and universities. In recent years, a combination of bibliometrics and visualization has been used to better present the analysis. It seems that simple and traditional bibliometrics analyzes alone are not enough and researchers should use a combination of bibliometrics and visualization to evaluate scientific publications. On the other hand, the process of analyzing scientific productions, in addition to scientometric indicators, are also discussed from the point of view of scientific social networks, which are called Altermetrics, which due to the increase in the penetration of (scientific) social networks in

DOI: 10.5530/jscires.13.2.46

all aspects of people's (writers') lives, it has been given a lot of attention.[6]

Nowadays, in addition to citation databases, numerous softwares have been designed and provided to researchers in this field to facilitate the analysis process. The emergence of visualization can be considered a new approach in bibliometrics studies. Milojevic argues that this subfield of bibliometrics can be called content visualization or data visualization.[7]

In the structure of science, some communications and phenomena are abstractly comprehensible to the mind. While these relationships are not physically tangible to the eye, Visualization tries to find the invisible relationships and phenomena in the structure of science and to draw in graphic language in a multidimensional way and in the form of scientific maps. In visualization, importance is usually shown by using the size symbol (zooming in and out) or color (bold colors for important categories and light colors for lower categories).[8] In another approach, visualization usually uses a citation threshold (for example, 50 authors with the highest citations) to determine which categories and how many authors appear in the output maps.[9] Also, with the occurrence of advances in the field of bibliometrics and visualization indicators, we are witnessing the emergence of more accurate and new indicators. One of the new indicators in this field is the Burstiness index, which is often discussed in relation to authors. In fact, the index of prosperity in writers, including writers with the strongest and highest explosion (citation peak) in a certain period of time, is raised.

In other words, the Burstiness or citation peak determines whether the presented frequency is statistically significant over a period of time. The Burstiness Index makes it possible to find articles that have received a great deal of attention from the relevant scientific community at one point in time. It should also be noted that a research cluster containing a certain number of articles with high citations (in a specific period) can be considered as a new research field.[10] In this way, as specified prior, bibliometrics and illustrative analyzes can be used to evaluate scientific productions published in a specific subject area. Given that each subject area has specific goals, thus the past and present situation should be examined and monitored to identify the strengths and weaknesses of the future path for researchers in that area. In the interim, the subject area of marketing and published scientific texts about it as one of the interdisciplinary subject areas and due to its growing importance in management, economics and global trade is exceptionally welcome.

In fact, specialized disciplines alone cannot answer scientific questions and problems. Meanwhile, interdisciplinary fields such as marketing, which are created from the combination or use of several academic disciplines, with a unifying approach to knowledge, lead to integration, proper communication between sciences and answering scientific questions.[11] In general, conducting a comprehensive bibliometrics research in the field of marketing can be fruitful to discover the existing paths in this field, identify authors and core journals, etc.

On the other hand, by introducing recently discovered in this field, there is an opportunity for interested researchers and students to strengthen their capabilities by recognizing quality writings in this field and also identify common areas, thematic shortcomings and gaps and come up with ideas in national and international research. On the other hand, since marketing is used in most fields, professions and occupations as a tool to commercialize products, perhaps the results of this research can indirectly facilitate the marketing process in production units (whether creating products or thoughts).

Accordingly, in the present study, we draw a scientific map of scientific products in the field of marketing and identify its historical origin with a spectroscopic approach. Therefore, the following objectives can be considered for the present article:

What is the process of producing articles in the field of marketing and other related fields?

What are the thematic areas related to marketing?

What is the trend of citation mutation in marketing?

What is the collaboration maps of countries, universities and institutions, authors (prolific writers, authors with highly cited articles, and authors with high h-index)?

What are the top marketing journals in terms of bibliometrics indicators?

What is the co-occurrence of specialized vocabulary in marketing articles?

What is the distribution of the Burstiness index among marketing field writers?

LITERATURE REVIEW

In this section, we assess the most relevant research backgrounds in the field of marketing and its related topics.

Research by Saleem, *et al*. investigated keywords and sub-thematic fields in the field of green marketing. The results showed that in the last decade, the most keywords used in compiling researches in the field of green marketing included the following: sustainability, sustainable development, environment marketing and sustainable marketing.[12] In another study, Donthu, *et al*. investigated the scientific productions of two fields of psychology and marketing. The results showed that between 1984 and 2020, research in this common field has increased 71.9 times. It also shows the growth of citations to these articles by 150.8 times and the number of authors and researchers from the beginning to the end of the investigated time period more than 82 times. On the other hand, 8 common areas of research were also discovered

among the articles in the field of psychology and marketing, which are: aesthetics and consumer impressions; celebrity endorsement; conspicuous consumption and hedonic adaptation; climate change; choice likelihood; consumer engagement; consumer psychology; marketing communication; sensory marketing; sharing economy; and social media marketing.[13]

In another research, Faruk, Rahman, and Hasan investigated the scientific productions of the subject area of digital marketing in the Scopus citation database. The results showed an average of 2.18 authors per article. The top countries in producing articles in this field were the United States, India, and the United Kingdom, respectively. Also, the main thematic areas considered by the authors according to the keywords used included the following: strategic planning with digital marketing, mobile marketing with apps development and, dealing with demographic profiles of customers.[14] In a research, Nicholas *et al*. investigated important keywords used in marketing research between 1990 and 2017 in a bibliometrics approach. The results showed that the keywords advertising, consumer behavior, trust, innovation, and customer satisfaction were the most used keywords in marketing articles.[15]

Sabah and *et al*. in a bibliometric study, analyzed the category of purchase. The United States and the United Kingdom were the most influential countries in the field of scientific production in this field. 3 Important clusters with VOSViewer software showed topics (vendor and content produced, customer and information capital). Among the journals, the journal of Consumer Culture has the highest rank in the field.[16]

Landström, Harirchi and Aström in a study surveyed the field of entrepreneurship with a bibliometric approach. The results show that this field of science has been growing since the 1980s. In this research, the top authors in this field and the specialized fields of each of them (considering the interdisciplinary field of entrepreneurship) were considered. The results also showed the most thematic relationship between entrepreneurship and business and management.[17]

As a conclusion can be expressed in reviewing the mentioned backgrounds, which tried to select the most relevant cases, they witnessed the review of scientific productions in various thematic fields or the review of scientific productions of universities and scientific institutes, and so on. Each of the studies used specific indicators of scientometrics to analyze scientific productions, which included surveys at the level of active countries, authors, core journals, co-occurrence of words, and so on. In the present study, while using the vast majority of scientometric indicators and utilizing various software in this field, as well as previous studies, an attempt was made to study and analyze a kind of marketing field on a global scale based on the WoS citation database. Therefore, analyzes were examined at different levels such as active countries, authors (different divisions), citation behavior study, co-occurrence of words, determining the extent of authors' brustiness.

METHODOLOGY

This research is applied in terms of purpose and from a methodological point of view has been done using bibliometrics and visualization techniques. The WoS database was used to collect data. To search for documents related to the field of marketing with the highest comprehensiveness, the search for the keyword "Marketing" in the search fields of title, abstract and keywords was used. Given that it is assumed that the search for the keyword "Marketing" in the search fields of the title, abstract and keywords that are the main fields in the process of any search; while preventing false drops and looking for irrelevant results, it also largely achieves recall. Also, this search was performed in all WoS citation database indexes, including SCI, SSCI, A and HCL, CPCI, etc. in the period 1920 to 2019.

The total number of records retrieved was about 113,500 documents. To provide descriptive statistics, all articles were presented based on the year of publication and in the form of a table (50 years), which included 71,680 articles. To analyze the retrieved documents based on bibliometrics indicators, specialized soft wares in this field was used, including VOS-Viewer software to draw scientific maps in the field of marketing based on authors, countries, universities and scientific institutes, vocabulary occurrence; SiteSpace software to map the brustiness and citation prevalence of scientific documents and CRExplorer software to map citation mutations over time.

Due to the fact that in bibliometrics studies, especially with the approach of visualization documents, they are often selected with a certain amount of citations, and on the other hand, this amount of citations does not follow a specific standard in selecting documents for analysis, based on software capacity in data input as well as obtaining results that, while having sufficient comprehensiveness to show effective articles, authors, journals, countries, etc. (based on citations), the number of reviewed articles (samples) at each stage of the analysis were determined. Accordingly, using the trial-and-error method, different outputs were downloaded from the WoS database based on the citation rate of each article. Finally, articles with at least 18 citations included about 20,000 articles that were selected as input data for bibliometrics soft wares. Of course, to check the bibliometrics of articles at the level of authors, the software input was changed according to the number of scientific productions of each author, and in this study, having at least 5 documents was the criterion for entering the analysis stage. Also, to get the number of historical mutations in the amount of citations with maximum comprehensiveness, the input of CRExplorer software included all the documents from 1920 to 2019.

Table 1: Production trend of scientific articles in the last fifty years in the field of marketing.

Rank	Year	No. Articles	Percent
1	2019	7015	9.78
2	2018	6753	9.42
3	2017	6343	8.84
4	2016	5586	7.79
5	2015	5241	7.31
6	2014	3046	4.24
7	2013	2992	4.17
8	2012	2783	3.88
9	2011	2942	4.1
10	2010	2624	3.66
11	2009	2520	3.51
12	2008	2204	3.07
13	2007	1720	2.46
14	2006	1458	2.03
15	2005	1482	2.06
16	2004	1277	1.78
17	2003	1172	1.63
18	2002	1120	1.56
19	2001	1145	1.59
20	2000	1120	1.56
21	1999	1095	1.52
22	1998	923	1.38
23	1997	868	1.21
24	1996	823	1.14
25	1995	832	1.16
26	1994	706	0.98
27	1993	628	0.87
28	1992	585	0.81
29	1991	425	0.59
30	1990	243	0.33
31	1989	205	0.28
32	1988	198	0.27
33	1987	242	0.33
34	1986	244	0.34
35	1985	250	0.34
36	1984	256	0.35
37	1983	242	0.33
38	1982	235	0.32
39	1981	218	0.30
40	1980	228	0.31
41	1979	230	0.32

Rank	Year	No. Articles	Percent
42	1978	232	0.32
43	1977	263	0.46
44	1976	157	0.21
45	1975	136	0.18
46	1974	181	0.25
47	1973	119	0.16
48	1972	120	0.16
49	1971	121	0.16
50	1970	132	0.18
Total		71680	100

Table 2: Ranking of thematic areas related to marketing based on the number of articles.

Rank	Subject fields	No. Articles	percent
1	Business	19435	27.11
2	Management	9578	13.36
3	Economics	4133	5.76
4	Hospitality leisure sport tourism	3605	5.02
5	Public environmental occupational health	3226	4.50
6	Pharmacology pharmacy	2810	3.92
7	Food science technology	2712	3.78
8	Operations research management science	2390	3.33
9	Information science library science	1747	2.43
10	Agricultural economics policy	1715	2.39

Finding

In this section, the findings are presented in the order of research questions:

What is the process of producing articles in the field of marketing and other related fields?

According to Table 1, a total of 71680 articles have been published in the field of marketing over the past 50 years. Scientific productions in this field can be divided into three periods. The first period, 1970 to 1991, saw an almost identical trend in the rate of article production. From 1992 to 2014, the uptrend is more tangible than the previous period, and from 2015 to 2019, the uptrend has intensified. So that in the last five years, more than 55% of articles (39759) have been produced.

What are the thematic areas related to marketing?

Given that the subject area of marketing has a very wide interdisciplinary relationship with other independent subject areas, and in other words it can be said that marketing is inevitable for the commercialization of any product or service, in the search conducted on the WoS database in this study, based on the extracted data, about 100 diverse subject areas related to marketing were identified. Table 2 shows the subject areas of marketing in relation to other subject areas (10 subject areas with the most scientific articles produced). Accordingly, the field of business, management and economics have the most relationship in the production of scientific articles with the field of marketing.

What is the trend of citation mutation in marketing?

Figure 1. shows the trend of citations received by marketing articles by year, by CRExplorer software from the beginning of 1920 to 2020. The output data from the WoS database was entered into the software in plain text format. The blue lines show the number of citations and the red lines show the average deviation of the number of citations in 5 years. In general, the citation chart has an upward trend. From 1950 to 1968, this trend had an upward but gradual trend. The number of historical mutations shows 5 mutations in 1969, 1976, 1989, 2000 and 2004. The largest mutation dates back to 2000, with more than 18,000 citations. However, in the first half of the twentieth century, articles did not show any mutation in citation.

What is the Co-authored maps of countries, universities and institutions, authors (prolific writers, authors with highly cited articles, and authors with high h-index)?

Co-authored maps of countries

Table 3 Shows the top 10 countries in attracting the most international cooperation. Figure 2 also shows a co-authored map of 56 of the 91 marketing countries in the VOS-Viewer software (note that some countries with no international cooperation or low level of cooperation have been excluded from the software output). The size of the circles indicates the number of articles in each country and the thickness of the lines indicates the amount of co-authorship of the countries. The distance and proximity of the nodes indicate how the countries relate to each other. The United States, the United Kingdom, and Australia rank first to third with 8837, 2376, and 1487, respectively, in international cooperation.

Co-authorship map of top universities and scientific institutes

Figure 3 shows the co-authored map of the top 100 universities and scientific institutes in the field of marketing (it should be noted that universities and scientific institutes were excluded from the analysis process without scientific cooperation with other institutions or universities). A total of 5 main clusters with different colors were separated. In the map, each color represents a cluster. According to the map, the Red Cluster is the most important cluster, comprising 30 partner institutions and universities, of which the Universities of Michigan, Wisconsin, Minnesota, and Ohio are the most important. In the yellow cluster with 14 institutions, the universities of North Carolina, Pittsburgh, Louis and Toronto are the most attracted to other universities and institutions. In the green cluster with a total of 23 nodes, the universities of Pennsylvania, Harvard, California, Los Angeles, Chicago and Connecticut played a major role in

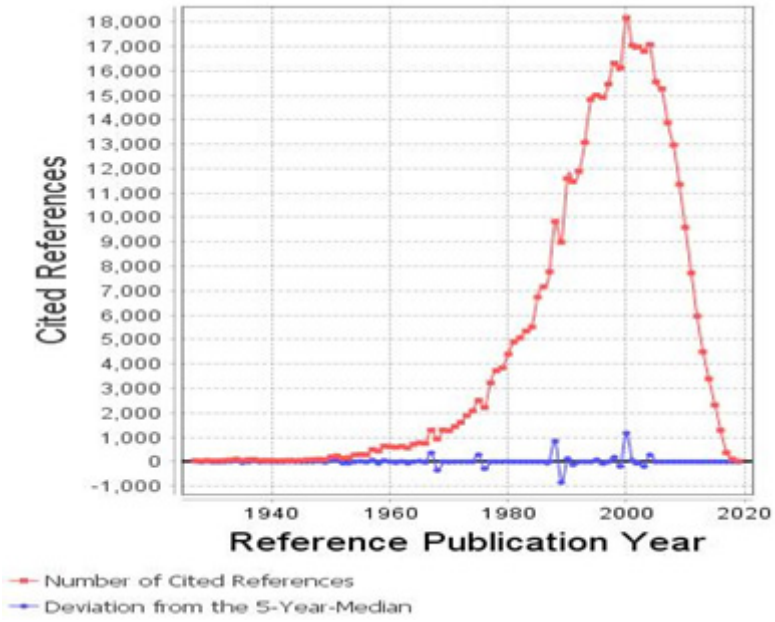

Figure 1: Historical trend of citations received by marketing articles.

Table 3: Co-authored map of countries producing articles in the field of marketing.

Rank	Country	No. Article	Citation	Mean of Citation per article
1	Usa	8837	748284	84.6
2	England	2376	142813	60.1
3	Uustralia	1487	90382	60.7
4	Canada	1009	63887	63.3
5	Germany	910	66907	73.52
6	People r china	874	50449	57.7
7	Netherlands	795	66977	84.24
8	France	679	42331	62.34
9	Spain	605	32418	53.5
10	Italy	582	29427	50.5

the co-authorship. In the blue cluster, out of 21 institutes, the universities of Sydney, Queensland, Griffith and Leeds are the top three universities in the co-authorship index, and in the purple cluster, where there are a total of 12 academic institutions, Erasmus, Georgia, Washington and Tilburg universities are at the center of cluster.

Co-authorship map of prolific writers

Figure 4 Shows the Co-authorship map of marketing writers. To draw a map, 922 top authors (having at least 5 documents required to enter the analysis) were selected and entered into VOSViewer software. Clusters of seven distinct colors were identified. Authors who were in the same cluster have the most collaboration. In other words, these people have collaborated the most with other writers. Kumar has the highest level of collaboration in articles in the large red cluster. Similarly, Ocass in green cluster, Sargent in purple cluster, Verhoeff in bold blue cluster, Palmatier in orange cluster, Leonidou in yellow cluster and Kelly Birjet in light blue cluster had the highest number of co-authors in their respective clusters. Table 4 shows the 20 most prolific authors (in terms of number of articles) along with the amount of citations.

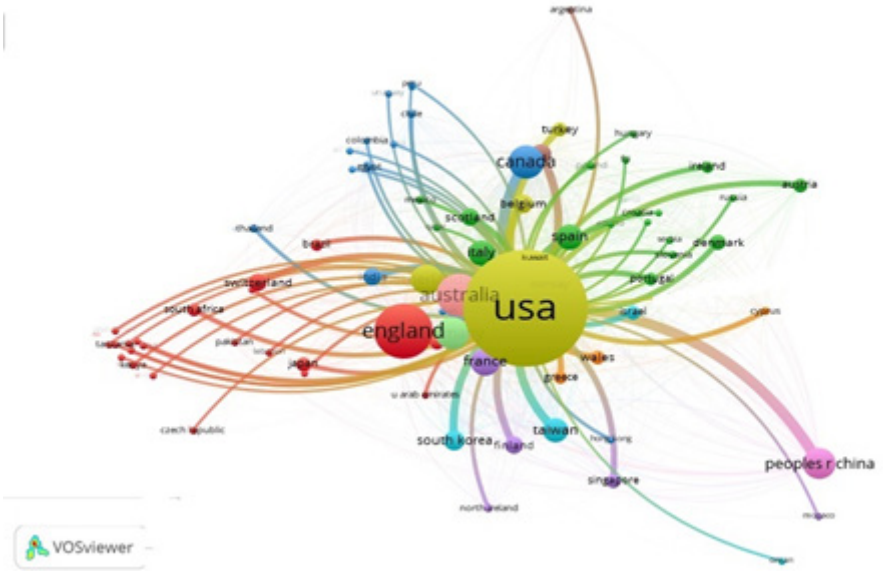

Figure 2: Co-authored map of countries producing articles in the field of marketing.

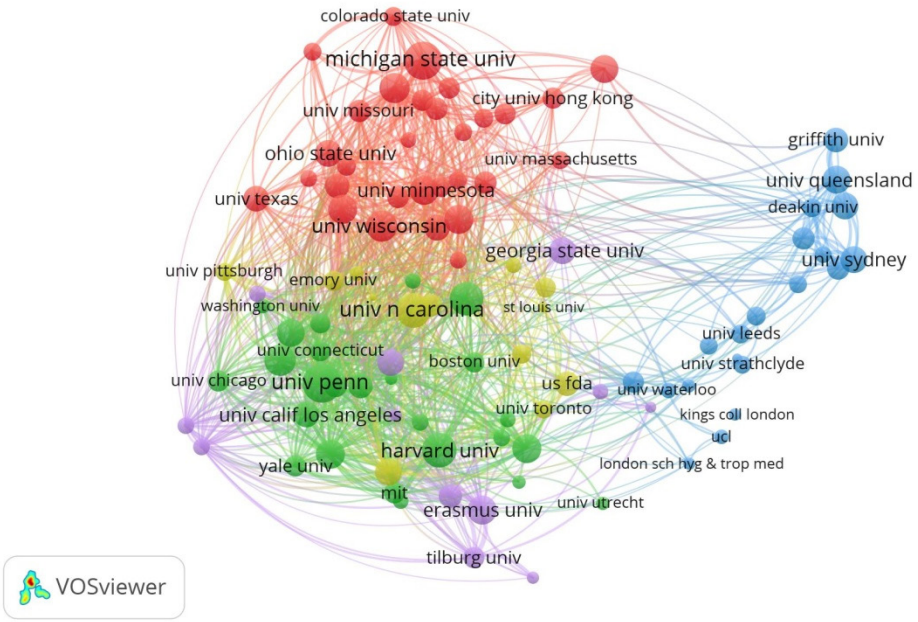

Figure 3: Co-authorship map of 100 top universities and scientific institutes in the field of marketing.

Table 4: **Twenty prolific authors in the production of articles in the field of marketing.**

Rank	Authors	No. Articles	Citations
1	Kumar, v	41	3194
2	Ocass, aron	27	1388
3	Sargent, james, d	25	975
4	Verhoef, peter c	24	3193
5	Kelly, bridget	23	1004
5	Song, xm	23	2415
5	Graffith, david a	23	1331
5	Souder, we	23	2123
5	Palmatier, Robert w	23	3548
5	Law, rob	23	2156
6	Vargo, staphen	22	6570
6	Chintagunta, pk	22	1619
7	Harrs, Jennifer	21	1269
7	Lusch, Robert f	21	6305
7	Cavusgil, st	21	3869
8	Hult, g. tomas m	20	1258
8	Homburg, christian	20	1374
8	Vitell, sj	20	1553
8	Hunt, sd	20	10364
9	Leonidou, Leonidas c	19	1156

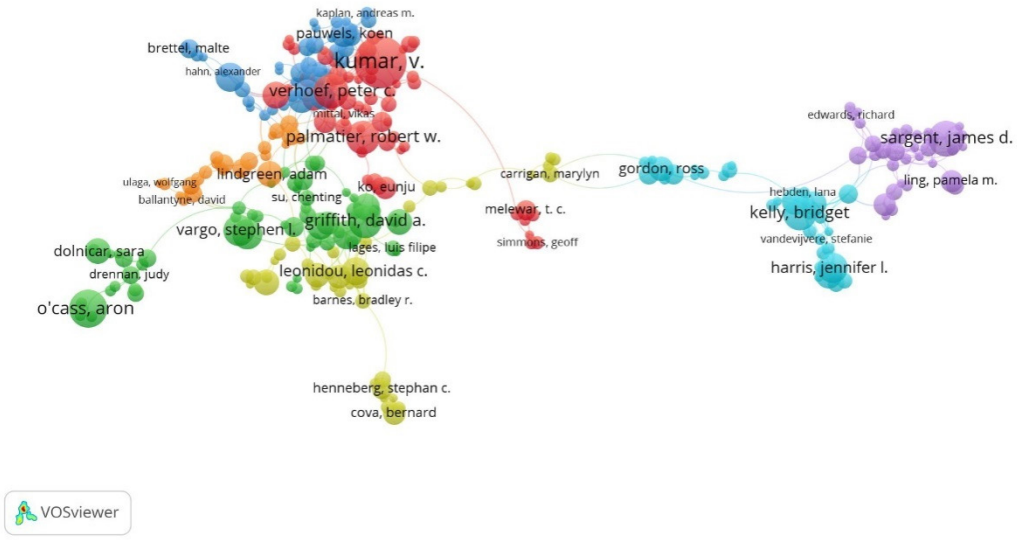

Figure 4: Co-authorship map of prolific marketing writers with at least 5 articles.

Table 5: Twenty highly cited articles in the field of marketing.

Rank	Titles	Authors	Jounal	Year	Citations	Quartile
1	User Acceptance of Information Technology: Toward a Unified View	Venkatesh, v	MIS quarterly	2003	9241	Q1
2	Relationship marketing in the era of network competition	Morgan, Rm	Marketing management	1994	7744	Q1
3	A Paradigm for Developing Better Measures of Marketing Constructs	Churchill, Ga	Journal of marketing research	1979	6715	Q1
4	Evolving to a New Dominant Logic for Marketing	Vargo, sl	Journal of marketing	2004	5300	Q1
5	Conceptualizing, Measuring, and Managing Customer-Based Brand Equity	Kellerm, kl	Journal of marketing	1993	4468	Q1
6	Whence Consumer Loyalty? Journal of Marketing, 63, 33-44.	Oliver, rl	Journal of marketing	1999	3053	Q1
7	The Use of Partial Least Squares Path Modeling in International Marketing	Henseler, j	New Challenges to International Marketing	2009	2802	Q1
8	Consumers and Their Brands: Developing Relationship Theory in Consumer Research	Fournier, s	Journal of consumer research	1998	2699	Q1
9	Determinants of Long-Term Orientation in Buyer-Seller Relationships	Ganesanm, s	Journal of marketing	1994	2570	Q1
10	On value and value co-creation: A service systems and service logic perspective	Vargo, sl	European management journal	2008	2500	Q1

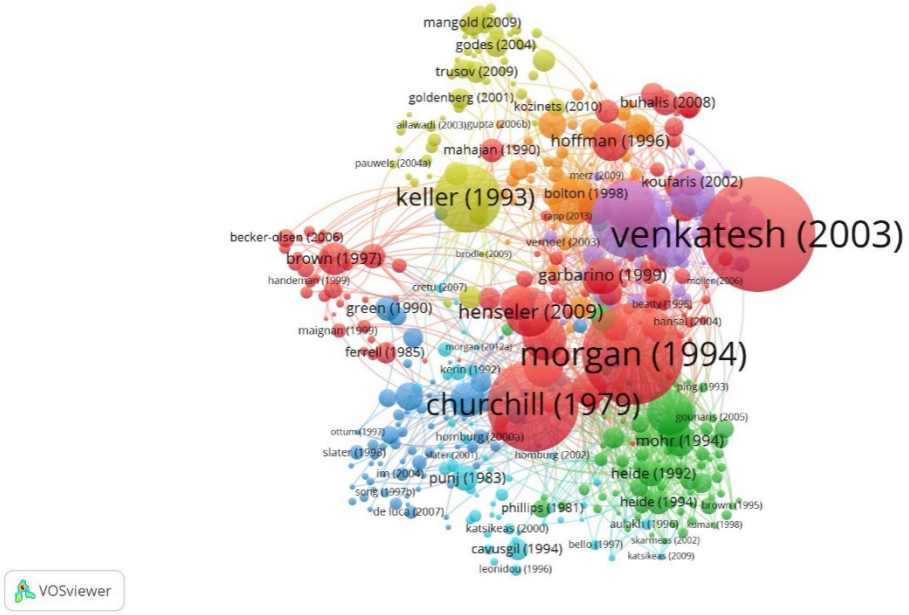

Figure 5: Co-authored map of authors with the highest citations article

Highly cited articles

Figure 5 Shows the authors' articles with the highest citations. Venkatesh in 2003, Morgan in 1994, and Churchill in 1979 have the top three article with the most citations. Table 5 shows the top twenty articles in terms of citations. As the data in the table show, all the highly cited articles have been published in high quality (Quartile 1) journals.

Map co-authored by top authors based on h-index

Figure 6 Shows the top authors in the field of marketing based on the h-index in six clusters. Due to the fact that the h-index is calculated based on the citation rate, so the authors with high h-index entered the software for analysis. The top three authors are: Hunt with 10,364 citations and 20 article and *h*-index 41, Ringel with 9,361 citations and 15 articles and h-index 34 and Sarstad with 7874 citations and 18 articles and h-index 33.

What are the top marketing journals in terms of bibliometrics indicators?

Cite Space software was used to monitor the top journals in the field of marketing and determine the amount of co-authorship and cooperation between their authors. The period from 1920 to 2019 was also examined. Figure 6 shows the highly cited journals in the field of marketing. The density of this network is / 0048, which means that the journals network does not have the same compaction in different parts of the graph (Figure 7). This result can be seen by looking at the top 20 journals in Table 7, as 90% of these journals are in the United States and the United Kingdom, which means that the density of the chart, which also depicts a kind of citation network in Many areas (purple parts of the chart)

Table 6: Ranking of scientific products of the top twenty authors in terms of h-index.

Rank	Authors	No. Articles	Citations	*h*-index
1	Hunt, sd	20	10364	41
2	Ringle, chris	15	9361	34
3	Sarstedt, marko	18	7874	33
4	Vargo, s	22	6570	34
5	Lusch, rf	7	6501	39
6	Lusch, robert	21	6305	31
7	Heide, jb	10	5206	26
8	Keller, kl	6	5073	46
9	Deshpande, r	7	4739	69
10	Steenkamp, j	14	4656	59

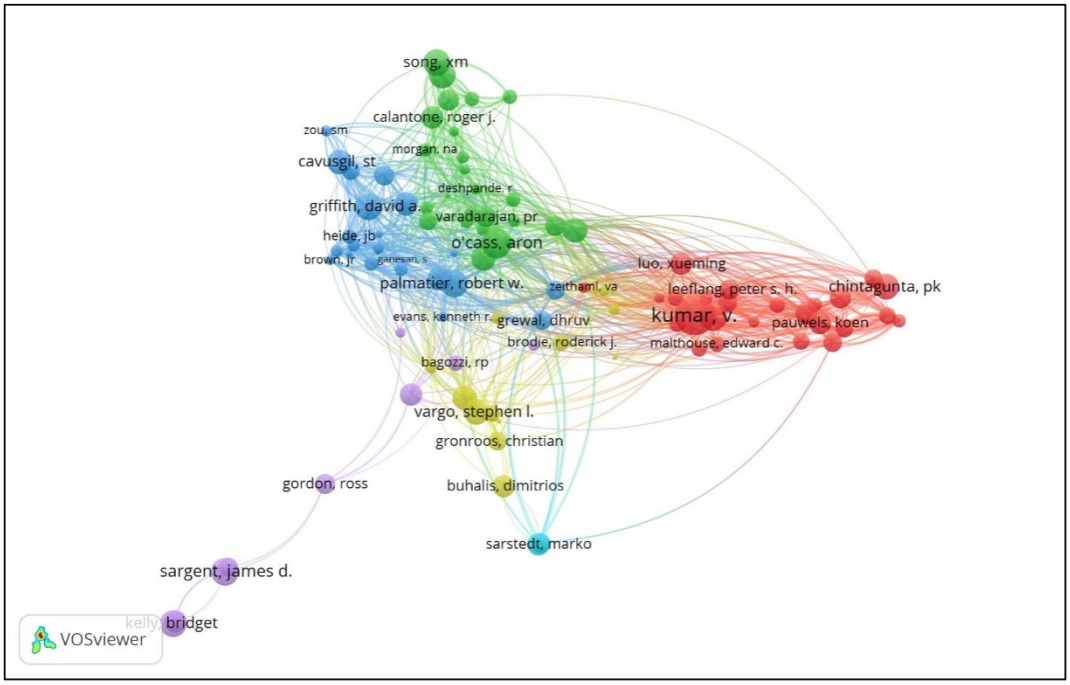

Figure 6: Map co-authored by top authors based on h-index.

are not very dense but the yellow part, which includes most of the United States and the United Kingdom, Due to the large number of authors' articles and thus increase national or international collaboration, It has increased the amount of citations received and high density of the Figure. Therefore, purple nodes have fewer links in the diagram and no significant correlations are observed, but the opposite is true for yellow nodes. Table 7 shows the names of the top 20 journals in terms of publishing the largest number of articles in the field of marketing. Journal of Marketing (1940) with 5305 citations, Journal of Marketing Research (1966) and 4601 citations, Journal of Consumer Research (1979) with 3173 citations and Business Research (1978) with 2844 citations were in the first to fourth ranks of the field.

What is the co-occurrence of specialized vocabulary in marketing articles?

Figure 8 shows all the co-occurrence vocabulary based on the frequency of occurrence in the articles. The dimensions of each circle represent the frequency of that word in the co-occurrence network. In this study, words that have been repeated at least 50 and more than 50 times in the articles were included in the map. As shown in the diagram, there are 5 clusters. The yellow cluster consists of terms such as performance, firms, innovation, market orientation, dynamic capabilities, dynamic, which is the best title for this cluster "Strategy ". The green cluster consists of terms such as safety, policy, patterns, health, and advertising. The best title for this cluster would be "policy making (in Marketing)". The blue cluster consists of terms such as Model, trust, antecedents, satisfaction and switching costs, and the best title for this cluster is "Relationship Marketing ". The red cluster consists of terms such as tourism, impact, adoption, social media, purchase, brand responses, consumer and internet marketing, and the best title for this cluster is " Digital Marketing." And the purple cluster consists of terms such as competition, demand, strategies, uncertainty, decisions, marketing, and the best title for this cluster is "Environmental analysis." It is worth mentioning

Table 7: Top twenty journals in publishing articles in the field of marketing.

Rank	Journal	documents	country	Cite Score (2018)	Quartile	year	Count of citations
1	J Marketing	777	United States	15.10	Q1	1940	5305
2	J Marketing RES	598	United States	8.90	Q1	1966	4601
3	J Consum RES	160	United Kingdom	8.50	Q1	1979	3173
4	J Bus Res	1283	Netherlands	8.90	Q1	1978	2844
5	J Acad Market SCI	430	United States	16.80	Q1	1988	2652
6	Harvard Bus Rev	207	United States	1.90	Q2	1931	2504
7	Manage SCI	331	United States	7	Q1	1963	2265
8	EUR J Marketing	873	United Kingdom	3.60	Q2	1977	1975
9	Market SCI	502	United States	6	Q1	1983	1939
10	J Retailing	214	United Kingdom	8.69	Q1	1967	1826

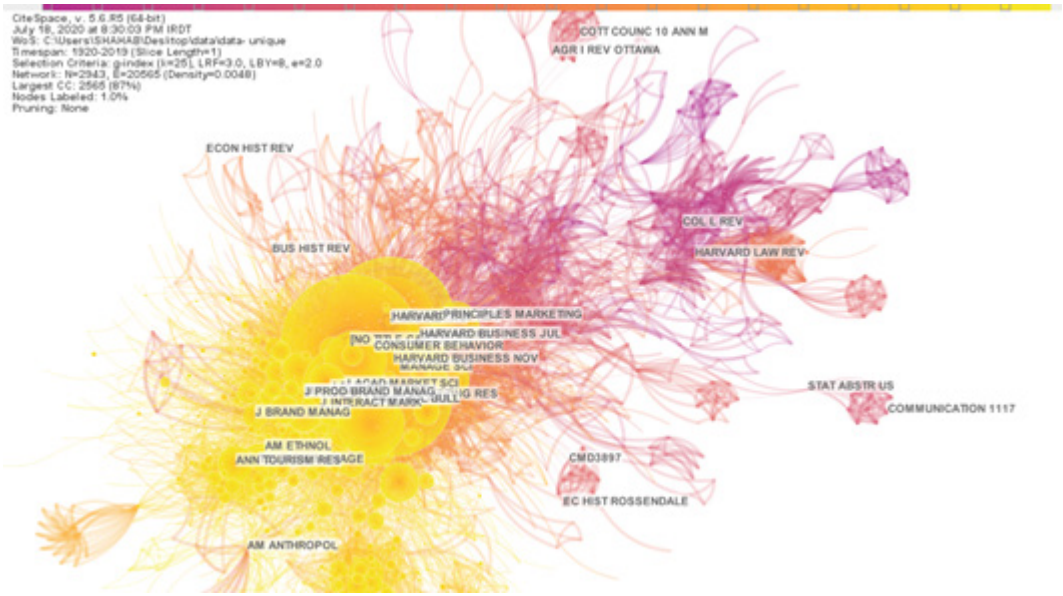

Figure 7: Scheme of top journals in field of marketing

that the opinions of experts (20 experts) in this field were used to name the clusters, which are considered as a kind of sub-domains of marketing. The Delphi method was used to summarize the opinions of experts, so that in several stages, the opinions of experts on the naming of clusters were collected and the results in each stage were presented to experts as feedback. After obtaining the same opinions of experts in this regard, the clusters were named.

Table 8: Frequency of keywords in marketing articles.

Rank	Keywords	Frequency
1	Model	1751
2	Performance	1429
3	Impact	1424
4	Behavior	1283
5	Marketing	981
6	Management	910
7	Information	873
8	Quality	844
9	Satisfaction	780
10	Trust	730

What is the distribution of the Burstiness index among marketing field writers?

Figure 8 Shows top 30 authors in terms of bursting index and have the strongest explosion in citations over a period of time. The Burstiness or peak of the citation determines whether the presented frequency is statistically significant over a short period of time or not. The bursting index makes it possible to find articles that are of particular interest to the relevant scientific community in a particular period of time. It should be noted that a research cluster containing a certain number of articles with high citations (at a specific time) can be considered as a new research field.

With a strength of 9.97, Porter had the highest Burstiness or citation peak compared to other authors, and the number of citations to this document is significant over time. The next places are occupied by Bagozzi with 9.90 and Anderson with 7.97. In other words, in terms of the year of the event and the magnitude of the impact (which is the same as the strength), Porter, Bagozzi, and Anderson are the top authors with the most intense citations.

DISCUSSION

The aim of this study was to draw a scientific map of scientific products in the field of marketing and identify its historical origin with a spectroscopic approach. Research data were obtained from WoS database. To search for articles in the field of marketing with maximum recall and at the same time precision (relevance), the

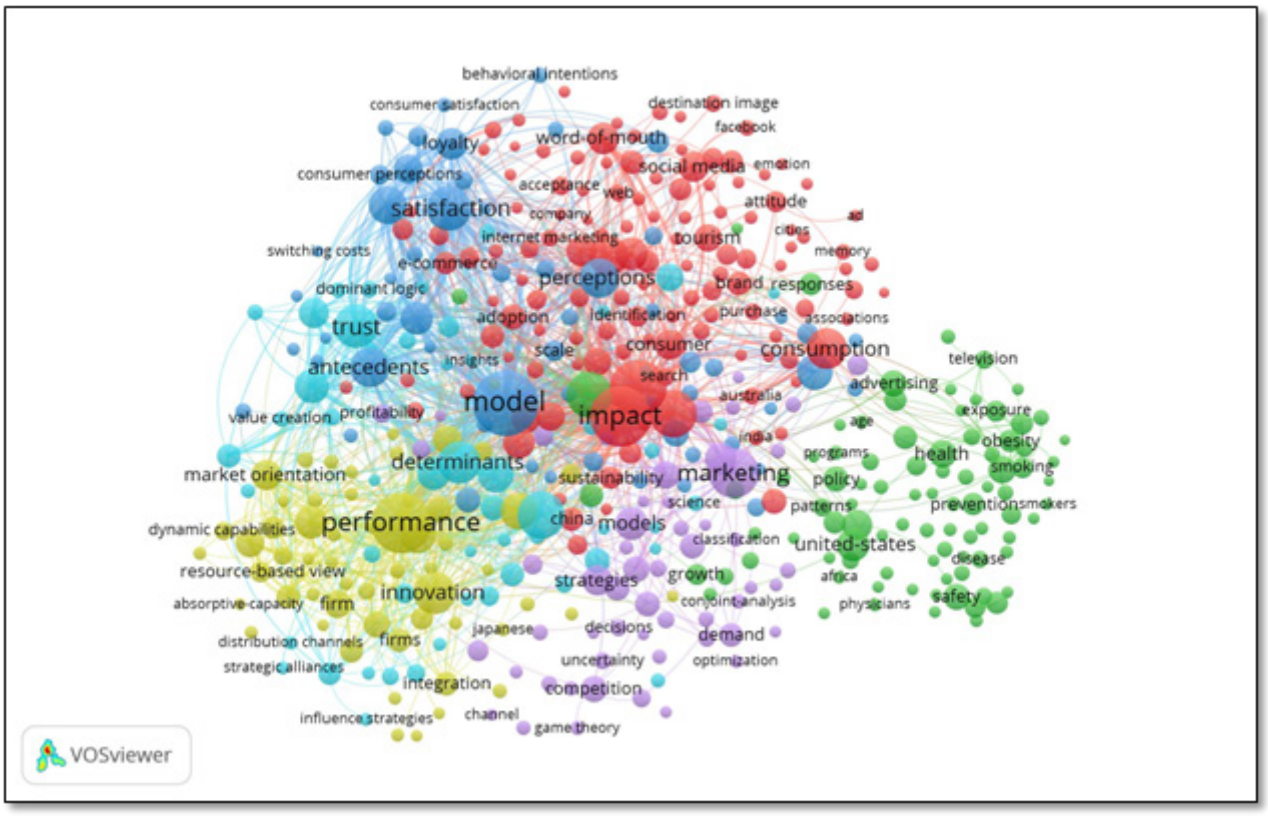

Figure 8: Clustering of keywords in marketing articles

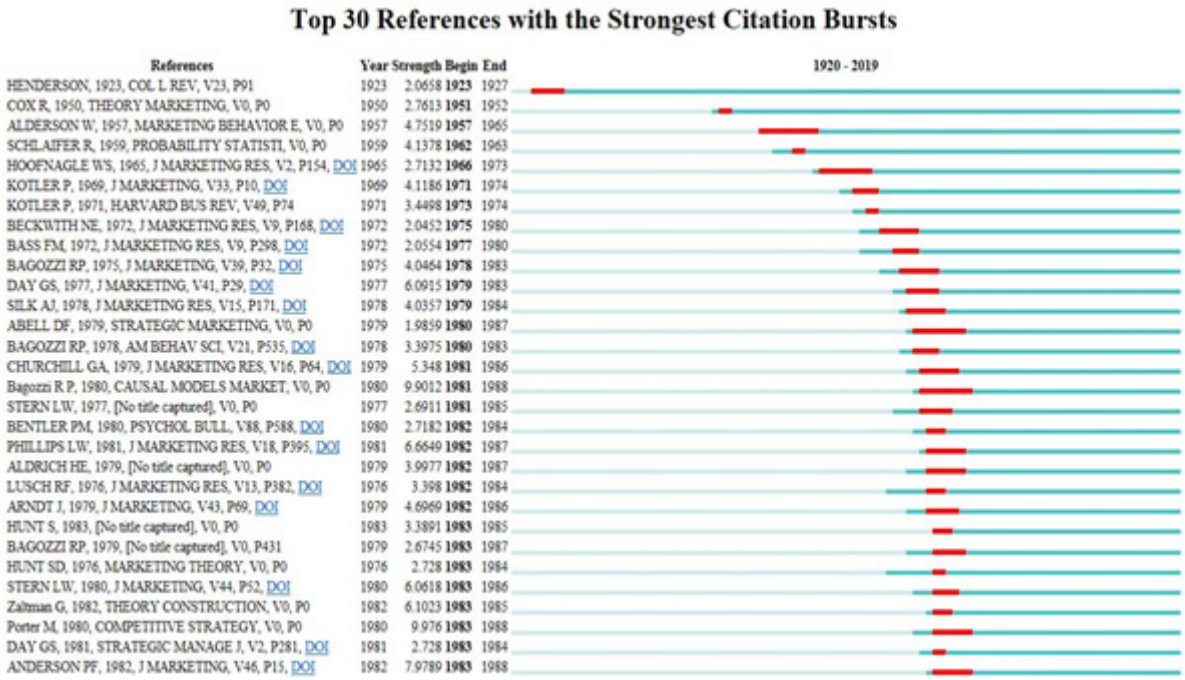

Figure 9: Top 30 Authors in field of Marketing Based on Bursting Index.

keyword "Marketing" was searched in the search fields of title, abstract and keywords of articles. The study period ranged from 1920 to 2019. Therefore, it can be said that this period is sufficiently comprehensive and gives a complete vision of the status of products in the field of marketing. According to the indicators, in the present study, specialized softwares in this field (VOS-Viewer, Cite space and CRExplorer) was used. In other words, according to the objectives, it was tried to use tools (scientometrics softwares) that in addition to providing quantitative information to illustrate the results. Therefore, by using these tools, relationships that are not physically tangible to the eye, are drawn in the form of three-dimensional and visualized structures. According to the research findings, the trend of producing scientific articles in the field of marketing has an upward trend over a period of time. The more we move towards the present, the upward trend becomes steeper so that in the last 5 years more than 55% of all articles it has been produced in this field. Also, by observing the number of citation mutations, it was found that the trend of increasing citations to articles in this field has a similar and ascending trend (although with some significant mutations in some years). Of course, according to Bornmann, Wray, and Haunschild, the root of intellectual influences in a subject area is not revealed only in scientific productions (articles, etc.), but experts in that field determine the exact contribution of scientific productions in the development of that subject area.[18]

The largest mutation in citations dates back to 2000, with more than 18,000 citations. However, in the first half of the twentieth century, articles did not show any mutation in citation. Perhaps according to Biranvand, Khasseh, because the industrial and technological revolution began in the second half of the 20th century and previous research has not received much citation. In these mutation, important and influential effects in the field of marketing have emerged.[19] Of course, the reasons for the jump and citation of the works of the same years should be examined in a separate study. Given that obtaining citations is a time-consuming process and it takes at least a few years to cite documents, it is possible that citations to articles in later years may also increase. By assessing previous studies at the level of subject areas and universities and scientific institutes, the upward trend of scientific productions is quite evident, as the studies of Sabah and *et al*.[17] in the study of scientific productions. The thematic areas of "purchasing" entrepreneurship and linguistics also confirm the upward trend of scientific productions. Regarding the related subject areas, the results show that due to the interdisciplinary nature of the marketing field, the subject areas mixed with the marketing field have a wide range. Carefully in the twenty subject areas mixed with the field of marketing with the most scientific products in Table 2, various topics such as business, economics, health and medicine and ergonomics are considered. The results of this part of the study are consistent with the results of studies of Landström, Åström, and Harirchi,[17] In these studies, the thematic areas (meteorology, entrepreneurship and welding) were significantly mixed with various thematic areas.

Regarding the results of co-authorship of scientific products in the field of marketing, analyzes at different levels such as countries, authors, universities and scientific institutes were assessed. The results showed that the level of scientific collaboration at the level of countries, the United States, the United Kingdom and Australia were at the top of the countries with the most international collaboration. Also in the top twenty are countries such as

Canada, Germany, China and France. It seems that the reason for the repetition of the results can be justified from two aspects. First, the countries mentioned are among the most advanced countries in the world in terms of science and wealth production, which will naturally have the most scientific production. Secondly, the collaboration of authors from other lesser-known countries with developed countries can be examined from two other aspects. First, collaboration with authors from other countries will increase the visibility and citation of articles produced, and secondly, addressing research topics having a suitable platform in developed countries is also more desirable and easier for writers from other countries.

Regarding co-authorship at the level of universities and scientific institutes, the results showed that attracting collaboration in universities and scientific institutes of the above-mentioned countries is also true in this part of the findings. If in 5 clusters in Figure 3, the vast majority of universities in the United States, Australia and Canada are the main nodes in the clusters.

The co-authorship of marketing scientific products for writers was done at three levels. First, the authors' co-authored map with at least 5 documents regardless of the amount of citations in the WoS database, then the authors' co-authorship at the level of single influential articles (highly cited articles) and finally the authors' co-authored map with high h-index were assessed. Based on this, the authors can be assessed and compared in terms of quantity and quality, and changes in the rankings of authors in each of the above studies can be observed.

In the first part, which required authors to have at least 5 documents, the results showed that Kumar with 41 articles and 3194 citations, Ocass Aaron with 27 articles and 1388 citations and Sargent with 25 articles and 975 citations are in the top 20 authors (Table 4).

Figure 5 also shows a map in the form of large and small clusters. Obviously, smaller and less colorful clusters belong to low-ranking authors. Also, by assessing the authors based on their influential articles, it showed different results from the previous results. So that among the first 20 authors in the previous analysis (authors based on the number of articles produced) only one author with two influential and highly cited articles (Vargo with 5300 and 2500 articles) is shared with the first 20 authors based on highly cited articles. The analysis of 5 clusters in Figure 5 also shows a huge difference between the names of the authors. In the third level, the network of writers in the field of marketing was assessed using the h-index. The results showed that high-index authors such as Brown, Bagozzi, and Deshpande, with only 6, 11, and 7 articles, respectively, had a much higher h-index than authors with a large number of articles. Therefore, by simultaneously assessing the analyzes with different indicators on the authors, we can see the difference in the quantity and quality of the articles, if 4 authors with high H-index are among the 20 authors with influential articles, which indicates a relatively high rate. Undoubtedly, examining authors at quantitative and qualitative levels and introducing them in their own category is a good way to introduce scientific products and the subject areas they study in more detail. For example, it may be possible to express the authors' articles with the largest number of articles, literature, and general introduction to the subject area under study, and their content is used more (but not always) for general acquaintance with the subject area. While highly cited articles or authors with high h-index have introduced more specialized aspects of the subject area that has been recognized as a reference among other authors and has increased the amount of citations. Therefore, this point can be used to categorize (filter) search results in databases for users.

In the co-occurrence of words in the field of marketing, keywords with a frequency of more than 50 were entered into the software. A total of 5 clusters were visible, which were named with the help of experts. These areas include Strategy, policy making, Relationship Marketing, and Digital Marketing and Environmental analysis. Also, by paying attention to the color of the clusters (bright colors, high emission rate and low color, low emission rate), we can understand the importance and amount of article publication in those clusters. Looking at Figure 6, it was found that marketing articles have a great variety of topics and cover all aspects of the topic (which has been discovered so far). Also, if we refer again to the results of the sub-thematic domains mixed with the marketing domain that we analyzed in the above lines, the interdisciplinary nature of the marketing domain will appear again. In the review of marketing journals, by looking at Table 7 and Figure 6, journals can be analyzed in terms of link networks, which in fact originates in a kind of collaboration of the authors of the articles in these journals. Given that 90% of the top journals in this field are published in the United States and the United Kingdom, two communication networks were drawn in the CiteSpace software. One of the networks was related to the above countries and the rest was for other countries. As mentioned in the results analysis section of the co-authors at the level of countries, universities and scientific institutes, most of the scientific products in this field are published in developed countries, which can also justify the results of this section. Regarding the keywords and sub-topics used in scientific productions in the field of marketing, twenty frequent keywords that have been used at least 500 times in the articles can be seen in Table 8 and Figure 8. Keywords such as Model-Performance-Behavior-Satisfaction-Trust-Innovation-Consumption... are placed at the top of these keywords. Of course, if we ignore keywords such as information-impac t-internet-knowledge and perhaps the marketing key itself (as the main keyword) which can be used as general keywords in most scientific articles, it can be said that other keywords are the center of gravity of sub-topics in the field of marketing, which somehow show the scientific front in this field. The results of this section are

consistent with the research results of Saleem, *et al*.,[12] Donthu, *et al*.,[13] Faruk, Rahman, and Hasan,[14] Nicholas *et al*.[15]

Regarding the analysis of the results of the bursting index and the definition of it presented in the present study, it can be said that this index is a kind of complement to other indicators such as citation index. As mentioned, the ranking of authors with different indicators showed completely different results from each other, which showed the difference in the quantity and quality of authors' articles. In the bursting index, only 2 authors overlapped with the top authors in the previous indexes (Bagozzi and Hoffman). According to the definition of burstiness, which is based on the amount of citations in a certain period of time, it can be said that authors with different scientific productions will have different effects on users and article seekers, if prolific authors (with a large number of articles) produce Most of the literature is in a specific subject area, or authors with high-cited or hot articles present a specific topic among users in a very limited time, but in the index of the burstiness of the article or authors' articles in a longer period of time (more than high cited articles) are the basis of research for user. In other words, the higher the strength score in the bursting index, which is actually the result of three indicators (more citations, longer time to use and receive citations and shorter time from the moment the article is published to the citation peak), the more Researchers have used the topics discussed in the article or articles. In the present study, Porter with a strength score of 9.97 shows the most consistent use of an article published in the journal Competitive Strategy in 1980 (Figure 7). In addition, the time it takes for the article to reach the citation peak is 3 years.

CONCLUSION

In this research, the scientific products of the subject field of marketing were assessed using scientometric indicators in the WoS citation database. While introducing countries, journals, writers and the historical trend of scientific productions in this field, by observing different thematic fields that were closely related to the field of marketing, the extent and interdisciplinary of this field became more apparent. It seems that the integration of marketing into other seemingly different areas is likely to continue in the future. The current research was conducted with the aim of investigating scientific metrics in marketing subject area of marketing. Considering that the subject area of marketing is an interdisciplinary field, the research process, especially in the stages of information gathering, creates limitations and difficulties that can be mentioned as follows: 1- Considering the interdisciplinary and The vastness of the subject field of marketing, the process of searching and retrieving completely related scientific products based on keyword search in databases (in this research, WoS) increases false drop or retrieval of unwanted information. Although, by using search strategies, the amount of unwanted information recovery is controlled to a large extent. This increases the duration of the research in the stage of data collection and editing for analysis. 2- The subject area of marketing, due to its wide scope and the recovery of a large number of scientific products, causes problems in information processing in scientific software. This causes some limitations in entering data into the software.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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Cite this article: Doulani A, Charghleh KR. Drawing a Scientific Map of the Field of Marketing and Identifying its Historical Origin with a Spectroscopic Approach. J Scientometric Res. 2024;13(2):589-603.