A Co-Word and Co-Citation Analysis of Digital Marketing Research

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ABSTRACT

As one of the most recent forms of marketing, digital marketing has emerged as the fastest-growing sector of the industry. A large number of academic studies have been published on different aspects of this field. The main objectives of this paper are to illustrate the evolution of the marketing field, examine the research focuses, and identify the future trends of digital marketing research using a combined bibliometric approach of co-word and co-citation analysis. Using the Web of Science (WoS) database, a representative set of 254 academic publications was selected and analyzed by VOSviewer software. The co-citation results represent four main research clusters, including digital marketing and business performance, opportunities and challenges, digital marketing development and research methodology, and digital marketing and customer behaviour. Similarly, the results of the co-keyword analysis reveal six themes, including foundation, digital marketing implications, digital marketing channels, content marketing, business sectors, and emerging trends.

KEYWORDS

Bibliometric Analysis, Co-Citation, Co-Word, Digital Marketing, Web of Science

INTRODUCTION

Digital marketing has recently become one of the most widely developed fields. With the explosion of the digital sphere, businesses will inevitably focus on applying and implementing their marketing in this area. Research into digital marketing is useful for predicting market trends and gives businesses many advantages. Continuing to understand and learn about digital marketing will strengthen the business's competitive advantage. Digital marketing was simply defined as implementing marketing strategies and achieving organizational goals through digital devices and technologies (Chaffey et al., 2009). Choi (2021) further explained digital marketing as marketing strategies and promotional activities for products and services conducted on online platforms with large databases to promote customer consumption quickly and effectively. Yadav and Pavlou (2014) stated that digital marketing allows both customers and businesses to participate in building marketing strategies to satisfy users' current needs and develop future needs. In the corporate context, digital marketing is extensively applied and is ever-evolving (Singhvi & Srivastava, 2021). Digital marketing is a critical business process; it needs constant innovation, creativity, and development to support businesses and maximize revenue (Kannan, 2017; Lichtenthaler, 2021). The development of digital devices and technologies has led to the rise of digital marketing (Sawhney & Ahuja, 2021). In the academic context, the lines

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of research on digital marketing have diversified. Initially, digital marketing was approached in a way that involved the application of marketing strategies to digital marketing channels. It subsequently evolved into an umbrella term describing the process of using digital marketing on online platforms and developing a variety of marketing strategies used through these platforms (Kannan, 2017). The question arises of whether current understanding from the academic realm can help to explain the growing problems of digital marketing in practice. Researchers and marketers need to investigate the tension between digital marketing theories and practical activities to narrow the gap between the two (Vollrath & Villegas, 2021).

To help new researchers understand the evolution of knowledge in this field, various research topics have been undertaken by authors (Kannan, 2017; Khalifa et al., 2021; Kumar et al., 2016; Lamberton & Stephen, 2016; Leeflang et al., 2014). Additionally, to explore potential new research trends, a theoretical review is necessary. Low and MacMillan (1988) argued that it is helpful to stop occasionally, take an inventory of the work that has been done and identify new directions and challenges for the future. Even though traditional review methods have the advantage of in-depth and detailed explanations, these methods seem to be unsuitable for a large number of publications and subjective based on authors' perspectives. Therefore, the bias is ineludible. Besides the traditional review method, some authors use the bibliometric method (Kim, Kang & Lee, 2019; Marchiori et al., 2020; Verma, 2021). This research method produces more intuitive results than the traditional literature reviews seem to find impossible. However, the implementation of bibliometric in the literature review has not been updated, and the power of co-citation and co-keyword techniques has yet to be demonstrated clearly.

The objectives of this study include 1) presenting the descriptive statistic of digital marketing research; 2) identifying the research themes and topics of digital marketing by using co-citation analysis; 3) categorizing research trends based on keywords through co-keyword analysis and 4) providing potential as well as research directions for future. The rest of this paper is organized as follows. Section two covers the literature review, which includes a review of the definition of digital marketing and co-citation and co-word analysis. Section three contains a review of the bibliometric method. Section four describes the research methodology, explaining the method used to obtain data sources and the research process. Section five provides the results. Section six presents a discussion and conclusion, as well as the study limitations and areas for further study.

A REVIEW OF DIGITAL MARKETING STUDIES

Many efforts have been made to investigate digital marketing. Bala and Verma (2018) reviewed existing literature to classify the forms of digital marketing and traditional marketing to evaluate the effectiveness of these marketing forms based on quantitative analysis. Through the review, Desai (2019) identified the benefits of digital marketing for businesses and proposed a measurement methodology for digital marketing strategies to increase efficiency. A summary of the benefits disclosed the qualitative and quantitative measures taken to provide a bright future for the long-term sustainability of the product or service in the current technology marketplace. Kannan (2017) proposed a framework for digital marketing research that highlights touchpoints in digital marketing implementation in the corporate context. By carrying out a theoretical overview, the authors identified the growing problems of touchpoints and revealed questions to be addressed for future studies. With the rapid increase in the number of publications on digital marketing, the development of this topic will become easier to approach for future scholars. The bibliometric method was developed as a solution to the above issues.

Verma (2021) further used the bibliometric method to review 286 studies from 2010 to 2020. This study summarizes in detail the research topics relating to digital marketing. The contributions of this research are valuable, as they provide suggestions for future research. It is worth noting that this paper has used only the 20 most-cited publications while identifying the common themes via

the co-citation technique. The authors have left out articles with fewer citations than those that might contain interesting ideas that may reveal the current attention of the digital marketing theme. Using the same bibliometric approach, Marchiori et al. (2020) added a biographic coupling technique to explore the themes within digital marketing. Using all three techniques, including co-citation, co-keyword, and biographic coupling will lead to higher levels of trust for the clusters being generated. Therefore, the implementation for future researches is also more valuable. However, the data used within this study was from 1998 to 2017, so it requires a review to account for the changes of recent years. In addition, Kim et al. (2019) identified the fundamental themes of digital marketing based on data collected from 2004 - 2016 and used co-citation analysis to orient and guide scholars who are new to digital marketing research. The authors revealed the number of studies published per year on this topic, the research areas that digital marketing covers, and the most influential authors and journals in digital marketing. Finally, some proposals for future studies, through analysis of the connections on the co-citation map, were presented.

BIBLIOMETRIC ANALYSIS

The bibliometric method emphasized the physical aspect of research: counting the number of books, articles, publications, and citations and looking at any prominent statistical data about the information that was recorded, regardless of the specialized boundary (Leoni & Aria, 2021). Using bibliometrics and a combination of other tools, researchers can detect clusters of topics of interest to scientists in the field to predict research gaps. Tan Luc et al. (2020) stated that the bibliometric method, when used in conjunction with VOSviewer software, can analyze a large number of studies, help researchers quickly navigate the list of studies in the topic, and integrate a combination of different techniques.

There are many analytical techniques in bibliometrics, including co-citation analysis, bibliographic coupling, co-authorship analysis, and co-word analysis (van Eck & Waltman, 2010). For this study, the main two methods used are co-citation and co-keyword. Co-citation is defined as the number of occurrences of two articles cited by another third article (Zupic & Cater, 2015). There will likely be some correlation between these two articles when they are frequently cited concurrently (Benckendorff & Zehrer, 2013). By analyzing this relationship, co-citation clusters are formed to reveal insights to the researcher in their field of interest. The method for co-word analysis is quite similar to the process for co-citation analysis. It counts the number of occurrences of two keywords appearing together in an article (Whittaker, 1989). Links between keywords can then be represented by a visual map that allows the scholar to analyze the strength of the correlations (Su & Lee, 2010). The core values of an article expressed through these terms are the keywords. Therefore, the co-word technique allows scholars to investigate the research concepts, trends, and development regarding a particular research topic (Callon et al., 1991).

Bibliographic methods have been used to analyze scientific literature in fields such as medicine (Yeung, Goto & Leung, 2017), administration (Hallinger & Kovačević, 201912 and tourism (Koseoglu et al., 2016). In addition, bibliographic methods have been used to support historical assumptions about the development of fields of research (Raina & Gupta, 1998), identify the relationship between research expansion and policy changes (das Neves Machado, Vargas-Quesada, & Leta, 2016), and investigate the cooperative structure of an interdisciplinary field (Liu & Xia, 2015). Evidence suggests that collaboration can increase positive yields, effects, and citation rates (Larivière, Lozano, & Gingras, 2014), making them a major feature of bibliographic research.

The bibliometric method provides more contribution and implication than the traditional review methods (Hallinger & Kovačević, 2019). Therefore, this research continues to inherit the benefits of using two techniques, co-citation, and co-keyword, to provide insights into digital marketing and describe them using visual tools to simplify the approach for future researchers who wish to explore this topic. This study improves upon the work of previous bibliometric studies by addressing what they missed. For example, the study of Verma (2021) and Kim et al. (2019) use a co-citation analysis

technique related to bibliometrics to visualize insights and background knowledge related to digital marketing but ignore the identification of current research trends of the field through co-keywords analysis. Meanwhile, even though the study of Marchiori et al. (2020) uses a combination of co-citation, co-keywords techniques and biographic coupling techniques to describe the change in approaches of current studies, the data was limited in 2017 only. Therefore, this study was conducted to supplement the insights that three existing bibliometric studies have missed by using co-citation and co-keywords analysis techniques, updating and supplementing articles until the end of 2020, thereby expanding more scientific knowledge and research trends related to the field of digital marketing.

METHODOLOGY

To analyze the digital marketing research, the authors conducted a bibliometric analysis (co-word and co-citation analysis). This method was used to obtain knowledge regarding digital marketing and examine the evolution and development of the research topics (Tan Luc et al., 2020). The review process includes three stages, as presented in Figure 1.

Figure 1. The stage of research



Data Collection

All English publications related to digital marketing (articles, books, editorial material, book chapters, notes, and letters) were searched for in the WoS database. The phrase "digital marketing" was also searched for in the topic field (title/abstract/keyword). This study examined publications that were published between 1990–2020. The preliminary search returned 294 publications.

Data Screening

To prepare for the screening process, the authors conduct data cleaning. First, the authors will convert the collected data into excel files to synchronize data encoding errors with author names. Displaying the same author's name in different ways, such as "Behera, RK" and "Behera, K" has been uniformly

adjusted. In addition, keywords with the same concept but described differently in the "author's keyword" and "keyword plus" data fields were also synchronized during data cleaning. For example, keyword "user-generated content" or "usergenerated content," or "UGC" will all be converted to UGC. The authors remove duplicate studies based on the article title and DOI.

It is also necessary to explain that when collecting data by keywords on WoS, any scientific publications containing the term "digital marketing" will be displayed even if "digital marketing" is not the main topic of the publications. Therefore, to limit errors in the collection of scientific documents, the authors will carefully read the titles, keywords, and abstracts of the studies independently to identify the studies related to digital marketing and eliminate the unrelated publications. The different results will be discussed later to reach a common consensus. The final result was 254 studies relevant to the field of digital marketing that the majority of the authors agreed to use for the final step.

Data Analyzing

Before analyzing the data, a data cleaning process was conducted to ensure consistency. The authors manually checked and corrected any errors in spacing, initials, singular/plural, unified synonyms, and abbreviations. After data cleaning, a coding standard was created for further analysis. This data analysis stage consisted of three steps: descriptive, co-citation, and co-word analysis. First, the descriptive analysis presented the basic information from the 254 selected publications, including the trend regarding the number of publications per year, distribution by geography, highly cited journals, and researches in digital marketing. Second, the authors analyzed the co-citation networks and visualized the results using VOSviewer software (Leung, Sun, & Bai 2017). Then, the research themes were categorized to explore the foundation and structure of the digital marketing research. Finally, a co-word analysis was performed to classify all the keywords from the selected publications. The whole study period was divided into two sub-periods, 2009 - 2015 and 2016 - 2020, using the VOSviewer software. The keywords were then categorized into co-citation themes to present the evolution of digital marketing research and show potential research trends.

RESULTS

Descriptive Analysis

Figure 2 shows the number of publications per year from 2009 to 2020. The concept of digital marketing was first introduced in 2009; it slowly started to gain attention and then sharply increased from 2016. The average annual number of publications is 21.17, showing that digital marketing is increasingly attracting attention from the academic community.



Figure 2. Number of publications from 2009 to 2020

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Table 1 highlights the major geographical areas of the authors' affiliation. England and the USA were found to be the countries with the highest interest in digital marketing. The remaining countries on the list are mainly from Europe. Japan is the only country in Asia on the list. This could be a subject for future academic research, i.e., to look at where digital marketing is becoming more diverse.

Ranking	Country	Number of publications
1	England	87
2	USA	78
3	Netherlands	21
4	Switzerland	11
5	Japan	9
6	Spain	5

Table 1. Major countries where digital marketing research was conducted

Digital marketing is related to various areas, which is shown in table 2. From the 254 selected publications, business and economics is the leading research area with 134 publications, computer science has 27 publications, engineering has 22 publications, social sciences has 16 publications, and others. Based on the visible results of the data collected from WoS, a publication on digital marketing can cover many areas of research at the same time. Thus, although only 254 studies were collected, the statistical of research areas were totalled 374.

Rank	Research Areas	No. of publications	Rank	Research Areas	No. of publications
1	Business & Economics	134	11	Psychology	9
2	Computer Science	27	12	Education & Educational Research	6
3	Engineering	22	13	Health Care Sciences & Services	6
4	Social Sciences	16	14	Nutrition & Dietetics	5
5	Environmental Sciences & Ecology	15	15	Telecommunications	5
6	Information Science & Library Science	14	16	Sociology	4
7	Public, Environmental & Occupational Health	13	17	Pediatrics	4
8	Communication	12	18	Substance Abuse	3
9	Science & Technology	11	19	Public Administration	3
10	Operations Research & Management Science	10	20	Other topics	55

The distribution of publishing journals is critical when conducting a literature review, as it helps authors reduce search time and easily categorize research themes. Table 3 presents the journals that

have the largest number of publications. *Sustainability (10 articles)* is the journal that has the most digital marketing publications, followed by *Journal of Business Research (9 articles)*, *Journal of Retailing and Consumer Services (9 articles)*, *Fujitsu Scientific & Technical Journal (9 articles)*, and *European Journal of Marketing (8 articles)*.

Ranking	Journal	No. of publications
1	Sustainability	10
2	Journal of Business Research	9
3	Journal of Retailing and Consumer Services	9
4	Fujitsu Scientific & Technical Journal	9
5	European Journal of Marketing	8
6	Industrial Marketing Management	7
7	Journal of Interactive Marketing	7
8	Journal of Business & Industrial Marketing	5
9	Journal of Research in Interactive Marketing	5
10	Journal of the Academy of Marketing Science	5

Table 3. Distribution of publications

Co-Citation Analysis

Data gathered from WoS shows that the average number of citations per study was 14.6. Later, the cocitation network will be formed by constructing a cut-point (McCain, 1990). To date, no conclusions have been reached regarding the co-citation threshold. The threshold usually depends on the size of the data to be collected. If the co-citation threshold is too small, it will lead to an inaccurate description of the research topic (Sanguri, Bhuyan & Patra, 2020). On the other hand, if the co-citation threshold is too large, it will lead to the elimination of the newest research topics, which may be valuable but has not been enough time to increase the number of citations (Trujillo & Long, 2018). Therefore, the study will be based on the standard multidimensional proportional stress values proposed by Shiau et al. (2017) and Ng et al. (2018) as well as the elbow effect suggested by Sanguri et al. (2020) to set the optimal minimum co-citation threshold of four.

The process was conducted by reviewing the references and selecting articles that have been cocited at least four times. As a result, a set of 154 publications was found. Documents were displayed by the first author and publication year. A larger size of label and bubble represents the higher weight of that item, while a shorter line represents a stronger connection between two documents. The documents belonging to one cluster have the same color. Being in the same cluster illustrates that the two items are connected or connected with other items. Through careful analysis of the documents grouped, the authors would discuss and agree on the name of each cluster. The co-citation of digital marketing research is visualized in Figure 3. Table 4 sums up some key documents sorted in descending order by the number of co-citations and labels each one according to the topic discussed.

Cluster 1 is named "business performance." The articles in this cluster mainly focus on investigating and evaluating the impact of word of mouth (WOM) and communication content on business performance. These articles also show the impact of WOM activities or communication content on a customer's buying decision, thereby increasing sales. For example, Chevalier and Mayzlin (2006) used customer reviews and rankings data on online communication platforms Amazon and Barnes and Noble to measure the impact of these indexes on the websites' book sales. Kumar et al.

(2016) investigated the effects of three characteristics of firm-generated content, including valence, receptivity, and customer susceptibility, and confirmed that they have positively and significantly influenced customers' purchasing decisions. Berger and Milkman (2012) discovered that considering the specific emotions the content evokes helps companies maximize revenue. In another study, Trusov, Bucklin, and Pauwels (2009) considered the effectiveness of WOM in attracting new customers compared to traditional marketing. Fundamental theories, conceptual frameworks, and theoretical models that have been cited were discovered in this cluster as four key interactions in computer-mediated environments framework (Yadav & Pavlou, 2014), online content viral conceptual framework (Berger & Milkman, 2012); mere virtual presence (MVP) theoretical framework (Naylor, Lamberton & West, 2012); game theory (Dellarocas, 2003); Simultaneous Model of Click-Through, Conversion, CPC, and Rank; hierarchical Bayesian framework (Ghose & Yang, 2009). In general, the research models of the publications in this cluster were developed based on empirical studies: through observing, analyzing, or exploring data on an enterprise web platform.

Cluster 2 is named "opportunities and challenges." The articles in this cluster focus on understanding and analyzing the barriers when applying tools and strategies and media and advertising on digital platforms to develop business. Solutions to these problems are then proposed. The challenges include managing a large amount of customer data (big data) (Kannan, 2017), customer and user information security (Kaplan & Haenlein, 2010), training and operating expenses (Michaelidou, 2010), building the evaluation system, and handling the data effectively (Leeflang et al., 2014) and managing and processing online communication content (Hennig et al., 2010). In addition, this cluster also analyzes the environmental components and business processes to explore opportunities that drive the use of digital marketing or digital marketing tools to support business opportunities and new forms of attracting customers. The refinement of business (Kannan, 2017), marketing strategies, and the effective use of marketing tools (Mangold & Fauld, 2009), and communication on online platforms to meet the needs of stakeholders (Hennig-Thurau et al., 2010) are new opportunities that researchers should approach and develop.

Cluster 3 is related to "digital marketing development and research methodology." First, this cluster describes key insights into digital marketing developed from theoretical models, such as the theory of reasoned action (TRA), motivation theory, flow theory (Moon & Kim, 2001), unified theory of acceptance and use of technology (UTAUT), theory of planned behavior (TPB) (Venkatesh et al., 2003), technology acceptance model (TAM) (Davis, Bagozzi & Warshaw, 1989), customer potential motivation theory (Hennig-Thurau et al., 2004) and practice theory (Schau, Muñiz, & Arnould, 2009). Second, the main research methods for exploring digital marketing also found in this cluster include the structural equation model (Fornell & Larcker, 1981), multivariate data analysis (Hair et al., 2010), and content analysis (Smith et al., 2012). Finally, the data analysis methods that were detected include the common variance method (Podsakoff et al., 2003) and mediation analysis (Hayes, 2013).

Cluster 4 was named "customer behavior." The articles in this cluster mainly cover customer behavior related to the effects of digital marketing in different contexts, such as the microlending marketplace (Stephen, 2012), hypermedia computer-mediated environments (Hoffman & Novak, 1996), and food and beverages (Kelly et al., 2015; Montgomery et al., 2012; Lin et al., 2012). As young people are now more familiar with technology and digital applications, a large number of articles in this cluster investigate how digital marketing affects young people's behavior (Gordon et al., 2011; Smith & Foxcroft, 2009).

Through co-citation analysis, clusters of topics and commonly referenced maps related to digital marketing were formed. This allows the new researchers to appreciate the historical perspective of the digital marketing topic categories.

Cluster name	Documents in each cluster		
Cluster 1: digital marketing and business performance	Lamberton and Stephen (2016), Berger and Milkman (2012), Kumar et al. (2016), Naylor, Lamberton, and West (2012), Ghose and Yang (2009), Trusov et al. (2009),		
Cluster 2: opportunities and challenges	Kaplan and Haenlein (2010), Hennig-Thurau et al. (2010), Kannan (2017), Michaelidou et al. (2011), Mangold and Faulds (2009), Leeflang et al. (2014)		
Cluster 3: digital marketing development and research methodology	Fornell and Larcker (1981), Hayes (2013), Smith, Fischer and Yongjian (2012), Dwivedi et al. (2015), Hennig-Thurau et al. (2004), Shiau et al. (2017), Podsakoff et al. (2003), Davis (1989), Schau et al. (2009), Moon and Kim (2001), Venkatesh et al. (2003), Hair et al. (2010).		
Cluster 4: digital marketing and customer behavior	Stephen (2012), Hoffman and Novak (1996), Kelly et al. (2015), Gordon et al. (2011), Lin et al. (2012), Montgomery et al. (2012), Smith and Foxcroft (2009)		

Figure 3. Co-citation network



Co-Keyword Analysis

This study further explores the changing trends of digital marketing by conducting co-occurrence analysis. For this analysis, the keywords used are the author's keywords and keywords plus (or keywords provided by editors). When collecting scientific publications on the WoS database, some studies did not appear with the author's keywords or keywords plus (keywords provided by editor). This is due to the low availability of the author's keywords or keywords plus (keywords provided by editor) of WoS databases or to some of these publications themselves not having the author's keywords (Liu, 2021). Therefore, to provide sufficient data for co-keyword analysis, this study uses both author's keywords plus (keywords plus (keywords plus editor)).

Two keywords were required to be linked together at least three times (cut-point at least three times) to meet the criteria. In order to observe the development, authors divide the research timeline on the topic of digital marketing into two phases. Phase 1 is from 2009 to 2015, and phase 2 is from 2016 to 2020. The division of phases is based on the explosion in the amount of research related to digital marketing. Figures 4 and 5 show the results of the co-word network analysis in the two sub-

periods. Keywords are represented by bubbles. Different themes are illustrated with different colored bubbles, and themes will be named based on the relevance of the keywords in those themes, which are detailed in Table 5.

Furthermore, to ensure that the naming is not subjective, authors read all the articles in the period of 2009 - 2015 that contained keywords in each observation cluster to double-check whether the keywords are representative of the articles in that cluster. Next, the authors analyzed other components of the map, such as the size of the bubbles and the link between keywords. This examination was also be carried out for the 2016 - 2020 period. However, the number of publications in this period is relatively large, so authors only review those with high citation numbers. Next, the authors investigated the other items on the co-keyword map, such as the size of the bubbles and connections between keywords. The size of the bubbles shows the number of appearances of a keyword, which means that the larger the bubble, the more occurrences of that keyword in the period. The darkness of the color of the link shows the strength of the connection between two words, and a shorter distance between keywords shows a greater number of co-occurrences between keywords. By observing the keyword connections between clusters, a summary of the theme will be produced.

These	Keywords Frequency		
Themes	2009-2015	2016-2020	
Cluster 1: Foundation	digital marketing (11), social media (11), impact (4), word-of-mouth (3), internet (3)	digital marketing (83), social media (47), impact (37), internet (21), word-of-mouth (16), technology (12), innovation (7), ewom (7)	
Cluster 2: Digital marketing implication	market orientation (3), orientation (3), digital marketing strategy (3), strategy (3)	performance (11), usage (7), experience (7), social media marketing (6), adoption (6), loyalty (6), strategy (3)	
Cluster 3: Digital marketing channel	website (3)	Facebook (12), media (11), website (8), Twitter (5)	
Cluster 4: Content marketing		user-generated content (11), content marketing (6), reviews (6), consumer reviews (6), online reviews (5),	
Cluster 5: Organization sectors		e-commerce (9), food (6), tourism (3), commerce (3)	
Cluster 6: Emerging trend		big data (7), deep learning (3), social media analytics (3)	

Table 5. Co-keyword clusters in the two sub-periods

Co-Keyword Analysis Period 2009–2015

During the period 2009–2015, from a total of 40 articles, 33 articles with 208 keywords have the cut-point of three times and can be used for further analysis. Using the data from the co-occurrence analysis, Figure 4 shows that the keyword network was still sparse during this period, proving that, at this stage, digital marketing was relatively unknown and extremely interesting. The map shows three clusters: cluster 1 - foundation, cluster 2 - digital marketing implications, and cluster 3 - digital marketing channels. Five keywords appear in cluster 1: "digital marketing" appears the most, with 12 occurrences, followed by "social media" (11), "impact" (4), "word-of-mouth" (3), and "internet" (3) (based on the size of the red bubbles). The keywords in this cluster show that the development of digital marketing was based on theories and conceptual models related to "social media," "word of

mouth," "internet," and other theories. Additionally, the keyword "impact" (4) is strongly connected with all of the keywords in cluster 2. These impacts are related to "strategy" (3), "digital marketing strategy" (3), and "market orientation" (3), respectively, in cluster 2, which is represented by green bubbles. Cluster 3 has only one keyword, "website" (3), representing the channel that digital marketing used, represented by blue bubbles. This also illustrates that, when technology was undeveloped, technical tools and business tools still had many shortcomings, and human knowledge at that time was also limited. Therefore, the diversification of channels using digital marketing was still limited and only focused on websites.



Figure 4. Co-keyword analysis period of 2009 - 2015

Co-Keyword Analysis Period 2016–2020

In the period 2016–2020, research papers on digital marketing significantly increased (Figure 5). Among 214 articles in general, 161 articles with 1,000 keywords meet the conditions of the cut-point, much more than in the period 2009–2015. This proves that digital marketing has increasingly attracted the attention of theories on this, and related aspects have become more developed.

Cluster 1 in this period has five repeated keywords: "digital marketing" (83), "social media" (47), "impact" (37), "internet" (21), and "word-of-mouth" (16), and the occurrences of all five keywords have significantly increased. This shows that the theoretical model development of digital marketing based on the key insights of "social media," "internet," and "word-of-mouth" still received much attention from scholars. In addition, the keywords "impact" in this period is mainly related to B2B businesses. There are also three new keywords, "technology" (12), "innovation" (7), and "eWOM" (7), that are associated with the most other clusters. This shows that concepts and theories related to "innovation," "technology," and "eWOM" were added during this period to present key insights to develop digital marketing.

Cluster 2 shows that the implications of digital marketing have steadily expanded, and they have become more diverse in this period. Specifically, digital marketing was used to measure business

"performance" (11), investigate "usage" (7), behavior, measure "experience" (7) levels, develop "social media marketing" (7) and build customer "loyalty" (7).

In cluster 3, the channels featuring digital marketing have increased, with the addition of "Facebook" (12), "media" (11), and "Twitter" (5), compared with the previous period, which had only "website."

In cluster 4, the keywords related to content marketing. These keywords include "user-generated content" (11), "online reviews" (5), "reviews" (6), "content marketing" (6), and "consumer reviews" (6), which did not appear in the earlier period. This proves that research related to these keywords began to attract the attention of scholars in this period.

Cluster 5 represents the business sector that digital marketing affects. The observation contexts including "e-commerce" (9), "food" (6), "tourism" (3), and "commerce" (3) only appear after 2015. Although the degree of connection of keywords in this cluster to keywords in other clusters is relatively high, the size of the purple bubbles is very small, indicating that there is still little interest in this theme.

Cluster 6 was named "emerging trends." The links of the keywords, such as "big data" (7), "deep learning" (3), and "social media analytics" (3), are very rare compared to the links of keywords in other clusters. Furthermore, the bright blue bubbles are tiny, and the keywords in this phrase did not appear in the previous period. This shows that studies on these keywords have received very little attention.

Figure 5. Co-keyword analysis period of 2016 - 2020



DISCUSSION AND CONCLUSION

This study conducted bibliometric analysis on the WoS database to identify the development of digital marketing topics during the period 2009–2020. A total of 194 articles were found related to the topic of digital marketing in this period. The UK and the USA are the two countries with the most publications, 78 and 63, respectively, and the main area of research is business and economics. Some of the articles were found in popular journals, such as *Sustainability* (10 articles), *Journal of Business Research* (9 articles), *Journal of Retailing and Consumer Services* (9 articles), *Fujitsu Scientific & Technical Journal* (9 articles), and *European Journal of Marketing* (8 articles).

Co-citation analysis results showed four themes. These are named based on the significant contributions of the studies contained within those themes. Within cluster 1, "business performance," scholars should focus on developing communicative content and diversifying digital marketing strategies. Specifically, researchers can explore content management to measure engagement and evaluate marketing strategies and business performance. Scholars can also conduct assessments of the effectiveness of WOM in predicting the development of a digital marketing strategy in other specific business contexts or fields. In addition, a framework for measuring business performance concerning digital marketing adoption should be considered. It is important to note that future developments in business performance can re-implement the background theories used that have been listed in this cluster to reinforce the new theoretical model.

Cluster 2, "opportunities and challenges," should be expanded and considered further in the future. Is it possible to evaluate the effectiveness of online communication tools compared with the cost for investment decisions? Using digital marketing not only simplifies and maximizes business performance (Khan & Siddiqui, 2013), but digital marketing strategies must also deal with related requirements, such as being efficient in creating the non-financial benefits of customer loyalty and repeat business (Trusov et al. 2009). If these non-financial issues are not addressed, they can also be seen as a hindrance to marketers. Recent emerging marketing strategies, such as influencer marketing, celebrity endorsement, or viral marketing, can also be seen as development opportunities that should be considered academically. Identifying and analyzing these challenges for a digital marketing strategy can help the researcher propose the best solutions to develop digital marketing platforms.

Looking at cluster 3, "digital marketing development and research methodology," future scholars may further develop a conceptual framework or define a metric for digital marketing terms. Integrating different theoretical or conceptual models (such as TPB, TRA, TOE, and TAM) to build conceptual models for digital marketing needs more attention and research. A qualitative approach to explore the moderation role of research variables, such as social influence, knowledge sharing, and demographic factors, should be considered. As the world is in a digital transformation phase, industries and business sectors are increasingly evolving towards the digitalization of business, so the development of new concepts and research flow of digital marketing needs to focus more on review and evaluation to provide theoretical models to drive the vision for the business and develop business activities.

For cluster 4, "customer behavior," future research should expand the investigation of the impact of digital marketing on other customer-related factors, such as customer intention and customer attitudes, or discover the benefits generated by customers through digital marketing adoption.

Last but not least, in the process of forming these clusters, authors did not find any clusters describing the digital marketing implementation framework. Meanwhile, business trends have been shifting from B2B to B2C, but the understanding of digital marketing from customer perception has not received much attention from scholars, reflected in the fact that the authors found no clusters discussing this issue. The mentioned findings agree with Lagiewski & Kesgin (2017) and Gironda & Korgaonkar (2018). This shows that these findings are still in the development stage, and more efforts of future researchers are needed to contribute to the completion of the above conceptual structures.

To sum up, the results of the co-citation map allow the authors to identify the process by which the digital marketing topic was shaped through descriptions related to conceptual structure, applied theoretical models and the issues discussed. In addition, based on these subjective insights, this research proposes new developments to support the authors of this study and the researchers of this topic.

Co-word analysis was then conducted. The author divided these 254 articles into two periods based on their publication: phase 1 for 2009–2015 and phase 2 for 2016–2020. As a result, six themes were revealed, including foundation, digital marketing implication, digital marketing channels, content marketing, business sectors, and emerging trends. The clusters identified through co-keywords will help new digital marketing researchers adhere to the main research category.

First, theme 1, "foundation," describes the development of a conceptual model of digital marketing over its stages. The growth in the number of occurrences of the keyword "WOM" shows that research in the field of digital marketing still needs to focus more efforts on understanding WOM, and it is necessary to consider WOM as among the most critical foundational theories alongside other fundamental theories such as social interaction, social tie, and social influence. Moreover, the emergence of keywords "eWOM" shows the outstanding advantages of digital marketing over traditional marketing, so building eWOM's conceptual model as a research foundation needs to be implemented more (Fine, Gironda & Petrescu, 2017). Furthermore, issues related to customer engagement, customer characteristics, customer attitudes, and intentions towards eWOM still have many gaps to be explored in the future (Leonhardt, Pezzuti & Namkoong, 2020). Furthermore, the appearance of the keywords "innovation" and "technology" in the period 2016-2020 can be hints for new trends that need to be investigated in the future, such as innovation in marketing strategies and adopting technological advances that have the potential to improve business performance and sales (Eid, Abdelmoety & Agag, 2019). Building a conceptual model for these topics can open up many potential avenues for future scholars.

Many new keywords added in the 2016–2020 period of theme 2 show that building a digital marketing implication model was beginning to attract attention from scholars. Future research can continue to evolve by providing potential theoretical models such as task-technology fit, UTAUT, and media richness theory to explain the effects of digital marketing. Solving a research problem is not only based on a methodological perspective but also has to deal with specific practical problems. Future research can continue to evolve by providing potential theoretical models such as task-technology fit, UTAUT, or media richness theory to explain the effects of digital marketing on business performance. In addition, articles related to recruitment and training to develop digital marketing performance as well as longitudinal studies addressing competitive advantage from digital marketing adoption are also considered (Wang, 2020). Solving a research problem is based not only on a methodological perspective but also on solving specific practical problems.

For theme 3, future studies should expand the investigation of the diversity of digital marketing platforms and channels such as Youtube, Instagram, Tiktok, focusing on building feature models, functional benefits, and the sentiments of these digital marketing channels. Resonance theory, Social Cognitive Theory, Motivation theory, Information adoption theory, and social presence are suggestions that may be suitable for the above development directions.

In theme 4, "content marketing" should be investigated in various forms of marketing from text, images to video. The research on this topic has mostly focused on building theoretical models to investigate consumer reviews and feedback in text or images, ignoring content marketing as video. Therefore, building theoretical models for this form of content marketing may be a potential trend in the future (Hsiao, 2020). More specifically, the trend of re-sharing the user experience with videos can be a valuable tool for digital marketing, but issues related to the credibility and trust of the users have to be considered (Coates et al., 2019). The source credibility theory might be a good suggestion. Furthermore, content marketing types should be further focused on exploring the benefits of each type of content marketing. For example, comparing user-generated content with firm-generated content or marketer-generated content will help determine the effectiveness of each type of content marketing strategy or performance, thereby assisting in decision-making (Vieira et al., 2019).

The keywords related to institutional contexts in theme 5 show that digital marketing in specific contexts only got attention after 2016. Maybe at an earlier stage, the conceptual model related to digital marketing is used only as an overview term, which is universally applicable to all institutional contexts. Therefore, future studies can focus their investigation on extending the conceptual model of digital marketing to each context. In particular, the keyword "tourism" appears only three times, showing that digital marketing is only at the early stages of development in the tourism context; therefore, building a theoretical model to investigate the impact of digital marketing in this area should be carried out in the future. The topic of receiving and sharing digital marketing knowledge for tourism entrepreneurs through the application of technology-in-practice theory can be a potential topic (Alford & Jones, 2020).

Finally, in the co-keyword analysis, the keyword "big data" seems to be the most focused topic, with nine times occurrence. In the emerging trends, other keywords "deep learning" and "social media analysis" provide that social media analytics will no longer be limited to "single data sources." Instead, multiple digital marketing performances across social media platforms or input data for "deep learning" will be more diverse sources helping to provide greater generalizability and more efficiency for recommendation systems such as in the fields of e-commerce field, airline companies, or hospitality industry (Miklosik et al., 2019).

In conclusion, the results of the six themes of co-keyword analysis consist of two periods representing the development of research topics related to digital marketing. The three themes in phase one (2009–2015) and six themes in phase two (2016–2020) show that digital marketing is becoming more developed and gaining interest. However, the keywords in themes 4–6 appear only in stage two with modest numbers (expressed by the number of keywords and the size of the bubbles). Expanding the number of articles related to these topics will help to broaden and clarify the theory and its implications in the subjects related to digital marketing. Suggestions for future research have also been mentioned, hoping that they will be carried out and may be considered for literature reviews in other topics.

Limitations

In the above discussion, it can be seen that the bibliographic method not only helps refine the number of articles on a topic but can also assist researchers in generalizing the contents and relevance of studies on the digital marketing subject line, which are represented by the visualization maps. However, no matter how thorough an analytical method is, it still has limitations in a particular situation. In this study, the limitations mentioned are: (1) WoS is only based on one database, so the number of articles related to digital marketing is small. Future research should use more databases to increase the number of studies for a higher degree of generalization. (2) The classification and definition of keywords and naming topic clusters are based on the authors' subjective analysis, which leads to the possibility of bias. Future research may improve the classification method to increase the validity and reliability of research directions. Finally, future work should consider integrating bibliographic analysis with other analytical techniques, such as correspondence analysis.

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