Evolution of digital marketing communication: Bibliometric analysis and network visualization from key articles

Juran Kim[a],*, Seungmook Kang[b], Ki Hoon Lee[c]

[a] *Department of Business Administration, Jeonju University, 518 Research Bldg. 303 Cheonjamro, Wansangu, Jeonju, Jeonbuk 55069, South Korea*
[b] *Department of Game Contents, Jeonju University, Arts Hall Annex Room #303, 303 Cheonjamro, Wansangu, Jeonju, Jeonbuk 55069, South Korea*
[c] *Department of Business Administration, Jeonju University, 403 Research Bldg., 303 Cheonjamro, Wansangu, Jeonju, Jeonbuk 55069, South Korea*

ARTICLE INFO

ABSTRACT

Digital marketing is leading the way in offering new features to reach, inform, engage, offer, and sell products and services to customers, and is expected to continue to be at the forefront of the technological revolution. The purpose of this study is to identify influential cited works in digital marketing communication (DMC) research, to determine the current status of the research on DMC, and to indicate the extent to which influential works have shaped it. This bibliometric study assesses articles published over a 12-year period in core DMC-related journals. The analysis examines 5865 citations of 141 digital-related articles in the targeted journals in the given publications using both citation and co-citation analyses. After a broad disciplinary review of key cited DMC works, this study suggests thematic insights and implications for academics and practitioners that are promising avenues for creating effective DMC.

1. Introduction

Digital marketing offers new ways to reach, inform, and engage customers and to offer and sell them products and services. It does this very successfully and thus, digital marketing is expected to remain at the forefront of the technological revolution (Ko, 2019; Lamberton & Stephen, 2016; Martín-Consuegra, Faraoni, Díaz, & Ranfagni, 2018). Digital marketing via social and mobile media has rapidly become part of the daily life of millions of people, expanding into common social media activities, and often leading to the creation of customer relationships (Fujita, Harrigan, & Soutar, 2017; Han, Nguyen, & Nguyen, 2016; Kim, 2018; Woodside & Mir, 2019). Social engagement, diffusion, and interaction are keys to the digital marketing evolution, and have enhanced firms' ability to engage customers by reaching out, informing them about products and services, and ultimately selling these products and services to customers (Ko, 2019; Lamberton & Stephen, 2016; Martín-Consuegra et al., 2018).

Increasing numbers of marketing academics and practitioners have studied the rapid evolution of digital technology, social media, and mobile marketing, and the technological innovations this evolution has inspired. Digital marketing has evolved from marketing specific products and services to using digital channels for activities, institutions, and processes facilitated by digital technologies. Digital marketing refers to an adaptive, technology-enabled process by which firms collaborate with customers and partners to create, communicate, deliver, and sustain value for all stakeholders jointly (Guercini, Bernal, & Prentice, 2018; Lamberton & Stephen, 2016). Digital technologies allow for new adaptive processes and institutions in marketing communication. Institutions build foundational capabilities to create such value jointly for their customers and themselves, while processes create value through new customer experiences and interactions among customers in new digital environments.

Having been in existence for more than a decade, social media now integrates new information and communication tools, such as mobile connectivity, blogging, and photo/video sharing, which cater to the various interests of users (Fujita et al., 2017; Han et al., 2016; Kim, 2018). Social media has developed from limited technology developed for a few users to a tool that has become an integral part of everyday life for millions of consumers across the globe. Following social media, digital technology-driven marketing communication, such as artificial intelligence (AI) services, multi-channel networks, augmented reality (AR), and virtual reality (VR), now seem to shape the digital marketing communication (DMC) landscape, providing new directions for future research (Brodie & Juric, 2017; Guercini et al., 2018; Kim, Kang, & Taylor, 2018; Kim & Yang, 2018; Taylor, Cho, Anthony, & Smith, 2018; Zhang & Dholakia, 2018).

This study presents a broad disciplinary review of the contribution of academic work to this revolution. It tracks the changes in key works

* Corresponding author.
  E-mail address: jrkim@jj.ac.kr (J. Kim).

on DMC research cited by scholarly researchers over a 12-year period (2004–2016). In 2004, when Facebook was launched, businesses and consumers began to use social media on a massive scale, providing the impetus for the exponential growth of social media across the globe. Currently, the social media environment has become a communal channel for users around the world, who access it for multiple recreational and commercial purposes. Thus, citation and co-citation analysis on DMC from 2004 to the present as a social media-oriented age has a remarkable ability to update how social media has shaped and continues to shape the domain of DMC. Such analysis can also examine the effectiveness of various evaluation approaches, including new directions designed to capture meaningful insights and communication value in DMC. This study aims to establish the current status of research on DMC and to show how digital technology has shaped marketing communication assessments.

Evaluating DMC research from a historical perspective is important for measuring its current and future impacts (Cleveland, 2018; Johnson, 2019; Kim, Sun, Kim, & Kang, 2019; Sirgy, 2017; Taylor & Costello, 2017). Between 2004 and 2016, DMC research developed critical theoretical and methodological perspectives on the subject. By inspecting key articles, this study potentially defines a locus for the emerging DMC field that will enable scholars to evaluate its impact and address future research directions.

This exploration provides a conceptual and scholarly context for articles in the DMC domain, and reviews the latest scholarship on DMC to contextualize and highlight key works. The three main topics are addressed via the following research questions.

1. What are the influential cited works in DMC research? Who are the most cited authors? What are the most cited DMC articles?
2. What is the current status of DMC research? What are the emergent themes among the most cited works in DMC?
3. How have influential works shaped DMC? What are the co-citation networks that exist among influential cited works in DMC? What schools of thought exist among co-citation networks?

Based on the research questions, this bibliometric study contributes to the discovery that the elaboration likelihood model (ELM), interactivity, and electronic word-of-mouth (eWOM) marketing as a theoretical underpinning have shaped the domain of DMC in the social media era between 2004 and 2016. The assessments indicate three key findings and implications for DMC—eWOM, interactivity, and DMC effectiveness—which suggest thematic insights and implications for academics and practitioners who are pursuing ways for generating effective DMC. In particular, bibliometric visualization analysis enables the visualization of social networks among scholarly communications in the DMC as a discipline. Such visualization, which includes co-citation analysis, suggests that eWOM and interactivity provide the means for an "invisible college" or community of researchers to strongly influence DMC research as a school of thought. This potentially sets a baseline for the emerging field of DMC, which will enable scholars to evaluate its impact on brand experiences and DMC value.

2. Literature

Bibliometric analyses, including citation and co-citation analyses, are beneficial for delving into the patterns and characteristics of what has been published, thereby facilitating the exploration, organization, and articulation of work that has been undertaken in a specific discipline (Diodato, 1994; Ferreira, Santos, Almeida, & Reis, 2014). Bibliometric analyses have the potential to inform collection progress, describe institutional scholarship strengths and citation/co-citation patterns, and propose potential schools of thoughts in a discipline (Lewis & Alpi, 2017).

Bibliometrics are fully relevant to academic means of scholarly communication and the written record of scholarship (Ferreira et al.,

2014). Bibliometric analysis relies on citation and co-citation analyses for a quantitative investigation of written source documentation (e.g., academic journal articles and books) as an objective method for inspecting part or the entirety of a scholarly discipline (Diodato, 1994; Ferreira et al., 2014; Nerur, Rasheed, & Natarajan, 2008; Ramos-Rodriguez & Ruiz-Navarro, 2004; Shafique, 2013).

Bibliometric research reflecting citation and co-citation analyses contributes to discovering emerging themes and recent progress in a field (Shafique, 2013), the influence of leading scholars (Ferreira, 2011; Willett, 2007), and the impact of different journals (Baumgartner & Pieters, 2003) and schools of thought. It also reflects the intellectual structure of a field (Kim & McMillan, 2008; Ramos-Rodriguez & Ruiz-Navarro, 2004) in various research domains, such as the sociology of science (Crane, 1972), the humanities (Wiberley, 2003), marketing (Ferreira et al., 2014; Merigó, Mas-Tur, Roig-Tierno, & Ribeiro-Soriano, 2015), Internet marketing research (Bar-Ilan & Peritz, 2002), and marketing communications (Kim & McMillan, 2008; Lievrow, 1989; Pasadeos, Phelps, & Kim, 1998; Pasadeos, Renfro, & Hanily, 1999). Previous studies using bibliometric methods have highlighted the nature and course of development of a discipline, going beyond the merely counting and collating citations, to evaluating which authors and cited works represent value to other researchers (Bar-Ilan & Peritz, 2002; Crane, 1972; Ferreira et al., 2014; Kim & McMillan, 2008; Merigó et al., 2015; Pasadeos et al., 1998, 1999; Wiberley, 2003).

Citation analysis is a bibliometric method that reflects citations as the basic units of analysis (Kim & McMillan, 2008). Citations identify prior scholars, ideas, theories, methods, or findings presented when conducting the focal research (Ferreira et al., 2014). Citations indicate the use of a specific work by a citing scholar and reveal the value, importance, and influence of that work. Furthermore, citations in academic works can be specified based on assumptions (Smith, 1981). Researchers cite the greatest possible works, and a cited work is associated with the contents of the citing work.

In citation analysis, the most cited works can clarify key concepts, theoretical underpinnings, and critical emerging themes that drive a discipline. Furthermore, the most cited authors can inform research on who is shaping the field.

Co-citation analysis involves calculating the frequency of a selected pair of works that are cited together in published articles (White & McCain, 1998). Co-citation analysis identifies influential works and their interrelationships, and thus, enhances insight into the evolution of a domain of research (Kim & McMillan, 2008). Such analysis goes further than simply subjecting publications to an analysis of which authors and publications have value for other scholars (Pasadeos et al., 1998).

Co-citation interconnects articles if they have been cited together by a number of other works. The strength of co-citation relationships can be calculated according to how many researchers have cited two documents together (Ferreira et al., 2014; Tankard, Chang, & Tsang, 1984). Co-citation analysis delivers an overview of the intellectual structure of a domain of research as a discipline (Shafique, 2013), thereby leading to a better understanding of the most influential works, scholars, themes, and schools of thought (Nerur et al., 2008).

3. Methods

The authors obtained the data for this bibliometric analysis from citations in articles about DMC published in three core marketing communication journals: the *Journal of Advertising, Journal of Advertising Research*, and *International Journal of Advertising.*

This study focused on these three publications for several reasons. First, the Social Science Citation Index (SSCI) indicates that the *Journal of Advertising, Journal of Advertising Research*, and *International Journal of Advertising* are the core journals in the marketing communication discipline. According to the Journal Citation Reports (2016), these journals have high impact factors that allow researchers to evaluate the

Table 1
Most-cited authors.

	Author	Score of citation received	Number of citation		Author	Score of citation received	Number of citation
1	Petty, R.E.	150	56	21	Sundar, S.S.	56	20
2	Hoffman, D.L.	120	44	22	Rogers, E.M.	55	21
3	Mackenzie, S.B.	102	38	23	Fishbein, M.	54	20
4	Cho, C.H.	100	36	24	Kozinets, R.V.	53	18
5	Cacioppo, J.T.	92	42	25	Rust, R.T.	52	18
6	McMillan, S.J.	92	37	26	Danaher, P.J.	51	18
7	Li, H.	88	36	27	Shrum, L.J.	51	23
8	Novak, T.P.	86	41	28	Coyle, J.R.	49	18
9	Lutz, R.J.	82	41	29	Deighton, J.	49	19
10	Liu, Y.	74	25	30	Edwards, S.M.	49	19
11	Ha, L.	65	22	31	Hennig-Thurau, T.	48	16
12	Nelson, M.R.	64	22	32	Stewart, D.W.	48	19
13	Rodgers, S.	64	23	33	Zaichkowsky, J.L.	48	16
14	Bagozzi, R.P.	63	25	34	Ducoffe, R.H.	47	17
15	Lee, M.R.	63	23	35	Thorson, E.	47	23
16	Meyers-Levy, J.	61	21	36	Chaiken, S.	45	19
17	Leckenby, J.D.	60	25	37	Dou, W.	45	19
18	Okazaki, S.	57	19	38	Holbrook, M.B.	45	17
19	Ajzen, I.	56	22	39	Park, C.W.	45	17
20	Batra, R.	56	22				

most frequently cited journals, those with high impact, and leading journals in a field. Second, most previous bibliometric studies have concentrated on the core journals in a field (Kim & McMillan, 2008; Pasadeos et al., 1998). It can be argued that these journals are leading U.S.-based academic journals devoted primarily to marketing communication (Barry & Howard, 1990; Kim & McMillan, 2008).

This bibliometric study searched for articles related to DMC that were published in any of these core journals over a 12-year period (2004–2016). The analysis includes all digital-related articles from these sources. The search returned 141 articles for the analysis: 26 in the *Journal of Advertising*, 81 in the *Journal of Advertising Research*, and 34 in the *International Journal of Advertising*. For each article, the authors coded information about all the items that appeared in the 5865 citations. A coefficient of reliability is not appropriate for a bibliometric study such as this, because the data collection did not require judgment coding (Kim & McMillan, 2008). However, accurate data collection is crucial owing to the huge volume of the dataset. The authors classified and recorded the dataset and double-checked the entire set of 5865 citations.

In 2004, with the launch of Facebook, social media exploded into the public consciousness. As many businesses and consumers began to use social media, advertising academics and practitioners began to examine its potential as an advertising medium. Having been in operation for more than a decade, social media has now integrated new information and communication tools, such as mobile connectivity, blogging, and photo/video sharing, which allow users to express a broad range of interests in their ongoing communications. Social media has developed from a relatively limited technology with a few users to a communication tool used by consumers worldwide.

Thus, over a 12-year period (2004–2016), this study aimed to provide a broad disciplinary review of key works in digital advertising research and examined the effectiveness of various evaluation approaches, including new metrics designed to capture meaningful brand experiences and advertising value. The review establishes the current status of research evaluating digital technology and shows how digital technology has shaped advertising evaluations.

The authors analyzed all citations in each publication using both citation and co-citation analyses. Citation analysis is a method of tracing publishing patterns under the assumption that many scholars in a discipline consider a comprehensively cited author, article, or book as relevant and important. To address research questions 1 and 2, citation analysis sought to clarify the most cited authors and works in the field of DMC. Specifically, citations were coded as recoding all the authors'

names in the cited works, the order of multiple authors, the title of the cited works, year of the cited works, and all citations. Citation analysis was coded for first, second, and third authorship too. First authors received a score of three for that citation, second authors received a score of two, and third authors received a score of one. The system coding for first, second, and third authorship was used in the analysis of most cited authors and the analysis of the most cited works to suggest more clearly the impact the authors and works had on other researchers (Kim & McMillan, 2008).

Co-citation analysis offers data visualization of document pairing that measures the number of documents citing any given pair of documents using Gephi software. Co-citation visualization enabled us to determine the frequency of co-citations and their networks in addressing research question 3.

Co-citation analysis is a critical method for identifying the structure and evolution path of a specific domain. Co-citation analysis, as a kind of citation network analysis technique, selects the most cited works as the object of analysis, and employs the network analysis method to dissect these most cited articles into several clusters that illustrate the research themes. In this way, the co-citation analysis of this study was able to obtain the structure and traits of the DMC domain.

For the co-citation analysis, the study used Gephi, an open-source software for graph and network analysis (Bastian, Heymann, & Jacomy, 2009). Gephi's flexible and multi-task design can be employed to exhibit large networks in real time and to expedite the assessment, bringing new opportunities to use multifaceted big datasets and create invaluable visual outcomes (Bastian et al., 2009; Liao et al., 2018). Key features of Gephi allow comprehensive access to network data and enable spatializing, filtering, navigating, clustering, and highlighting of crucial aspects of dynamic network visualization (Bastian et al., 2009; Liao et al., 2018). Visualization is beneficial for leveraging perceptual aptitudes to find features in the co-citation network structure (Liao et al., 2018).

4. Most cited authors and works

To address research question 1, we analyzed the most cited authors and the most cited works identified in articles about DMC in the target publications (see Tables 1 and 2). The most cited authors and most cited works evidently present some overlaps between the two lists of most cited authors and most cited works. For example, Petty is the most cited author in Table 1, and his 1983 article with Cacioppo and Schumann is ranked fifth in Table 2. Petty, Cacioppo, and Schumann (1983) work,

Table 2
Most-cited works in digital marketing communication articles.

	Citations received	Authors	Year	Title
1	20	Hoffman, D.L. & Novak, T.P.	1996	Marketing in hypermedia computer mediated environments: conceptual foundations.
2	14	Hennig-Thurau, T., Gwinner, K.P., Walsh, G., & Gremler, D.D.	2004	Electronic word-of-mouth via consumer-opinion platforms: what motivates consumers to articulate themselves on the internet?
3	14	MacKenzie, S.B. & Lutz, R.J.	1989	An empirical examination of the structural antecedents of attitude toward the ad in an advertising pretest context.
4	14	Steuer, J.	1992	Defining virtual reality: Dimensions determining telepresence
5	13	Petty, R.E., Cacioppo, J.T., & Schumann, D.	1983	Central and peripheral routes to advertising effectiveness: the moderating role of involvement.
6	12	Liu, Y. & Shrum, L.J.	2002	What is interactivity and is it always such a good thing? Implications of definition, person, and situation for the influence of interactivity on advertising effectiveness.
7	11	Coyle, J.R. & Thorson, E.	2001	The Effects of progressive levels of interactivity and vividness in Web marketing sites
8	11	McMillan, S.J. & Hwang, J.S.	2002	Measures of perceived interactivity: An exploration of the role of direction of communication, user control, and time in shaping perceptions of interactivity
9	11	Rogers, E.M.	1983	Diffusion of innovations, 3th ed.
10	10	Brown, J.J. & Reingen, P.H.	1987	Social ties and word-of-mouth referral behavior
11	10	Ducoffe, R.H.	1996	Advertising value and advertising on the Web
12	10	Friestad, M. & Wright, P.	1994	The persuasion knowledge model: how people cope with persuasion attempts
13	10	MacKenzie, S.B., Lutz, R.J., & Belch, G.E.	1986	The role of attitude toward the ad as a mediator of advertising effectiveness: A test of competing explanations
14	9	Fishbein, M. & Ajzen, I.	1975	Belief, attitude, intention, and behavior: An introduction to theory and research
15	9	Ghose, S. & Dou, W.	1998	Interactive functions and their impacts on the appeal of internet presence sites.
16	8	Chen, Q. & Wells, W.D.	1999	Attitude Toward the Site
17	8	Edwards, S.M., Li, H., & Lee, J.H.	2002	Forced exposure and psychological reactance: antecedents and consequences of the perceived intrusiveness of pop-up ads
18	8	Granovetter, M.S.	1973	The strength of weak ties
19	8	Phelps, J.E., Lewis, R., Mobilio, L., Perry, D., & Raman, N.	2004	Viral marketing or electronic word of mouth advertising: examining consumer responses and motivations to pass along e-mail
20	8	Rodgers, S. & Thorson, E.	2000	The interactive advertising model: how people perceive and process interactive ads.
21	8	Zaichkowsky, J.L.	1985	Measuring the involvement construct
22	8	Zaichkowsky, J.L.	1994	The personal involvement inventory: Reduction, revision and application to advertising
23	7	Ariely, D.	2000	Controlling the information flow: effects on consumers' decision making and preferences.
24	7	Barwise, P. & Strong, C.	2002	Permission-based mobile advertising.
25	7	Bezjian-Avery, A., Calder, B., & Iacobucci, D.	1998	New media interactive advertising Vs. Traditional advertising
26	7	Chandon, J.L., Chtourou, M.S., & Fortin, D.R.	2003	Effects of configuration and exposure levels on response to web advertisements
27	7	Godes, D. & Mayzlin, D.	2004	Using online conversations to study word-of-mouth communication
28	7	Ha, L. & James, E.L.	1998	Interactivity reexamined: A baseline analysis of early business web sites
29	7	Ha, L. & McCann, K.	2008	An integrated model of advertising clutter in offline and online media.
30	7	Herr, P.M., Kardes, F.R., & Kim, J.	1991	Effects of Word of Mouth and Product-Attribute Information on Persuasion: An accessibility-diagnosticity perspective
31	7	Holbrook, M.B. & Batra, R.	1987	Assessing the role of emotions as mediators of consumer response to advertising
32	7	Katz, E. & Lazarsfeld, P.F.	1955	Personal influence: The part played by people in the flow of mass communication.
33	7	Lang, A.	2000	The limited capacity model of mediated message processing.
34	7	Lee, M.R. & Youn, S.M.	2009	Electronic word of mouth (eWOM) – how eWOM platforms influence consumer product judgment.
35	7	Li, H., Edwards, S.M., & Lee, J.H.	2002	Measuring the intrusiveness of advertisements: scale development and validation.
36	7	MacInnis, D.J. & Jaworski, B.J.	1989	Information processing from advertisements: toward an integrative framework
37	7	Moore, R.S., Stammerjohan, C.A., & Coulter, R.A.	2005	Banner advertiser - web site context congruity and color effects on attention and attitudes.
38	7	Nelson, M.R., Yaros, R.A., & Keum, H.J.	2006	Examining the influence of telepresence in spectator and player processing of real and fictitious brands in a computer game
39	7	Robinson, H., Wysocka, A., & Hand, C.	2007	Internet advertising effectiveness – the effect of design on click-through rates for banner ads.
40	7	Sicilia, M., Ruiz, S., & Munuera, J.L.	2005	Effects of interactivity in a website: the moderating effect of need for cognition
41	7	Trusov, M., Bucklin, R.E., & Pauwels, K.	2009	Effects of word-of-mouth versus traditional marketing: findings from an internet social networking site
42	7	Trappey, R.J. & Woodside, A.G.	2005	Consumer responses to interactive advertising campaigns coupling short-message-service direct marketing and TV commercials
43	6	Batra, R. & Ray, M.L.	1986	Situational effects of advertising repetition: the moderating influence of motivation, ability, and opportunity to respond.
44	6	Cho, C.H.	1999	How advertising works on the World Wide Web: modified elaboration likelihood model.
45	6	Cho, C.H., Lee, J.G., & Tharp, M.	2001	Different forced exposure levels to banner advertisements.
46	6	Chu, S.C. & Kim, Y. J.	2011	Determinants of consumer engagement in electronic word-of-mouth (eWOM) in social networking sites.
47	6	De Bruyn, A. & Lilien, G.L.	2008	A multi-stage model of word-of-mouth influence through viral marketing.
48	6	Dholakia, U.M., Bagozzi, R.P., & Pearo, L.K.	2004	A social influence model of consumer participation in network- and small-group-based virtual communities.
49	6	Drèze, X. & Hussherr, F.X.	2003	Internet Advertising: Is Anybody Watching?
50	6	Eighmey, J. & McCord, L.	1998	Adding value in the information age: uses and gratifications of sites on the World Wide Web.
51	6	Korgaonkar, P.K. & Wolin, L.D.	1999	A multivariate analysis of web usage
52	6	Lohtia, R., Donthu, N., & Hershberger, E.K.	2003	The impact of content and design elements on banner ad click-through rates
53	6	Novak, T.P., Hoffman, D.L., & Yung, Y.F.	2000	Measuring the customer experience in online environments: a structural modeling approach
54	6	Petty, R.E. & Cacioppo, J.T.	1986	Communication and persuasion: central and peripheral routes to attitude change.
55	6	Riegner, C.	2007	Word of mouth on the web: the impact of Web 2.0 on consumer purchase decisions.
56	6	Schlosser, A.E., Shavitt, S., & Kanfer, A.	1999	Survey of Internet users' attitude toward internet advertising

Table 2 (*continued*)

	Citations received	Authors	Year	Title
57	6	Song, J.H. & Zinkhan, G.M.	2008	Determinants of perceived website interactivity.

Note: Numbers of citation received are for the single article identified. Self-citation has been excluded.

which reflects the ELM, still influences the DMC domain as a theoretical underpinning. Hoffman is the second most cited author in Table 1, and her 1996 article with Novak tops Table 2. Hoffman and Novak's initial work (Hoffman & Novak, 1996) on online marketing still seems to influence the DMC field. These two lists in Tables 1 and 2 deliver constant discernment regarding how the most cited authors and research works are shaping the DMC field.

MacKenzie is the third most cited author in Table 1, and his 1989 article with Lutz (MacKenzie & Lutz, 1989) is ranked as the third most cited work; his 1986 article with Lutz and Belch (MacKenzie, Lutz, & Belch, 1986) is ranked as the 13th most cited work. Consequently, Lutz is the ninth most cited author in Table 1.

McMillan appears as a vital influencer. Her work on perceived interactivity has contributed to this influential role. Cho has contributed to multiple articles in the areas of interactivity and DMC. Hennig-Thurau emerges as a key influencer on eWOM research. Hennig-Thurau, Gwinner, Walsh, and Gremler (2004) work on eWOM is ranked the second most cited work. Li is the seventh most cited author in Table 1, with multiple articles. Liu is the tenth most cited author in Table 1. Her 2002 article with Liu and Shrum (2002), which focuses on interactivity, appears as the sixth most cited work. Overall, most of the authors who appear in both Tables 1 and 2 have strongly shaped the field of DMC as a discipline.

The most cited works in Table 2 reveal 57 articles that were cited six or more times. Those most cited articles appeared in influential journals. The most frequently cited journal was the *Journal of Advertising Research*, with 11 articles listed in Table 2. The *Journal of Advertising Research* addresses mainly key topics, such as eWOM (Phelps, Lewis, Mobilio, Perry, & Raman, 2004; Riegner, 2007), interactivity (Bezjian-Avery, Calder, & Iacobucci, 1998; Ghose & Dou, 1998), attitude (Chen & Wells, 1999) and the effectiveness of DMC (Chandon, Chtourou, & Fortin, 2003; Cho, Lee, & Tharp, 2001; Ducoffe, 1996; Korgaonkar & Wolin, 1999; Lohtia, Donthu, & Hershberger, 2003; Trappey & Woodside, 2005).

The second most frequently cited journals are the *Journal of Advertising* and the *Journal of Consumer Research*, with eight articles listed in Table 2. The *Journal of Advertising* articles primarily cover interactivity issues (Coyle & Thorson, 2001; Liu & Shrum, 2002; McMillan & Hwang, 2002; Sicilia, Ruiz, & Munuera, 2005) and effectiveness of DMC (Edwards, Li, & Lee, 2002; Moore, Stammerjohan, & Coulter, 2005; Nelson, Yaros, & Keum, 2006, Zaichkowsky, 1994). Eight articles are listed as appearing in the *Journal of Advertising,* showing that it has played an important role in influencing the DMC domain.

The articles in the *Journal of Consumer Research* show a different pattern to those in the *Journal of Advertising Research* and the *Journal of Advertising*. The *Journal of Consumer Research* addresses relatively early works and theoretical underpinnings of DMC research. For example, Petty et al. (1983) clarified the ELM. Brown and Reingen (1987) and Herr, Kardes, and Kim (1991) addressed the theoretical underpinnings of word of mouth. Other articles have investigated persuasion theory (Friestad & Wright, 1994), involvement (Zaichkowsky, 1985), and advertising responses (Batra & Ray, 1986; Holbrook & Batra, 1987).

The third most frequently cited journal is the *Journal of Marketing*, with six separate articles listed in Table 2. The *Journal of Marketing* shows one early article that focuses on digital marketing (Hoffman & Novak, 1996) and one that deals with eWOM (Trusov, Bucklin, & Pauwels, 2009), one with extensive coverage of information processing (MacInnis & Jaworski, 1989), one that includes attitude (MacKenzie & Lutz, 1989), one that covers intrusiveness (Li, Edwards, & Lee, 2009), and one that investigates interactivity (Song & Zinkhan, 2008).

The fourth most frequently cited journals are the *International Journal of Advertising* and the *Journal of Interactive Marketing*, with four separate articles listed in Table 2. The *International Journal of Advertising* addresses influential eWOM-related works (Chu & Kim, 2011; Lee & Youn, 2009) and effectiveness (Ha & McCann, 2008; Robinson, Wysocka, & Hand, 2007). The *Journal of Interactive Marketing* also deals with the influential work of eWOM (Hennig-Thurau et al., 2004) and effectiveness of DMC (Barwise & Strong, 2002; Drèze & Hussherr, 2003; Schlosser, Shavitt, & Kanfer, 1999).

Three additional journals appear twice in Table 2. *Marketing Science* has one article specific to eWOM (Godes & Mayzlin, 2004) and one that focuses on customer expertise (Novak & Hoffman, 2000). The *International Journal of Research in Marketing* has articles that focus on eWOM (De Bruyn & Lilien, 2008; Dholakia, Bagozzi, & Pearo, 2004). The *Journal of Communication* has one article with dimensions of interactivity (Steuer, 1992) and one specific to information processing (Lang, 2000).

Finally, additional journals, such as the *Journal of Business Research* (Eighmey & McCord, 1998), the *American Journal of Sociology* (Granovetter, 1973), *Journal of Broadcasting and Electronic Media* (Ha & James, 1998), *Journal of Marketing Research* (MacKenzie et al., 1986), *Journal of Current Issues & Research in Advertising* (Cho, 1999), and *Journal of Interactive Advertising* (Rogers & Thorson, 2000) appear once in Table 2.

5. Themes in the most cited works

While grouping the most cited articles by journals provides some information on citation patterns, it is also useful to examine thematic patterns in the 141 articles, particularly within those that specifically address DMC. In answer to research question 2, this study evaluated emergent themes among the most cited works on DMC. Five primary themes emerged: eWOM, interactivity, DMC effectiveness, how marketing communication works, and attitudes.

As the first theme identified in the co-citation analysis, eWOM is a key element of DMC investigated by marketing communication scholars. While many articles discuss word of mouth (WOM), some specifically address eWOM in DMC (Chu & Kim, 2011; De Bruyn & Lilien, 2008; Godes & Mayzlin, 2004; Hennig-Thurau et al., 2004; Lee & Youn, 2009; Phelps et al., 2004; Riegner, 2007; Trusov et al., 2009) and WOM (Brown & Reingen, 1987; Granovetter, 1973; Herr et al., 1991).

eWOM refers to any positive or negative statement a customer makes about a company's products that is visible to any number of people and institutions via online channels (e.g., blogs, emails, consumer review websites, and forums), virtual consumer communities, and social networking services (Chu & Kim, 2011; Hennig-Thurau et al., 2004; Phelps et al., 2004; Trusov et al., 2009). Most of the cited works on eWOM (Chu & Kim, 2011; Hennig-Thurau et al., 2004; Phelps et al., 2004; Trusov et al., 2009) indicate different types of eWOM and point to different types of marketing performance that can be differentiated from WOM in traditional marketing. For example, Trusov et al. (2009) concentrated on online WOM that occurs when referring a friend, and found the acquisition of potential new customers as eWOM outcomes. Trusov et al. (2009) compared online WOM with traditional marketing, including media, PR, and offline events, such as non-WOM drivers of customer acquisition. Trusov et al. (2009) showed that the long-term

effects of online WOM referrals on customer acquisition are greater than those of traditional marketing activities.

Interactivity is the second main element of DMC explored by marketing communication scholars. Many of the most cited articles focus on interactivity, either from a theoretical perspective or as a critical variable in the context of DMC (Bezjian-Avery, Calder, & Iacobucci, 1998; Coyle & Thorson, 2001; Ghose & Dou, 1998; Ha & James, 1998; Liu & Shrum, 2002; McMillan & Hwang, 2002; Sicilia et al., 2005; Song & Zinkhan, 2008; Steuer, 1992; Trappey & Woodside, 2005).

Interactivity refers to the degree to which communication parties can act on each other, the medium, and the messages, as well as the extent to which such influences are synchronized. Interactivity has been defined in multiple ways, such as functional features, actions, and/or processes, and perceptions of interactivity (Kim, Spielmann, & McMillan, 2012). First, research on interactivity as a function focuses on clarifying manifest features (Bezjian-Avery, Calder, & Iacobucci, 1998; Coyle & Thorson, 2001; Ghose & Dou, 1998). Second, interactive processes focus on the real actions that go into making something interactive, such as two-way communication, exchange of information, and responsiveness (Sicilia et al., 2005). The third research stream focuses on what individuals perceive to be interactive (Liu & Shrum, 2002; McMillan & Hwang, 2002; Song & Zinkhan, 2008).

The third theme is DMC effectiveness. While many articles consider effectiveness, few specifically address DMC effectiveness (Cho et al., 2001; Eighmey & McCord, 1998; Robinson et al., 2007). These articles also cover a range of negative effectiveness issues in DMC, such as intrusiveness, avoidance, and clutter (Drèze & Hussherr, 2003; Ha & McCann, 2008; Li, Edwards, & Lee, 2002).

The fourth theme addresses issues of how marketing communication works, and focuses on the persuasion process (Batra & Ray, 1986; Cho, 1999; Friestad & Wright, 1995; Holbrook & Batra, 1987; Katz & Lazarsfeld, 1955; Nelson et al., 2006; Petty & Cacioppo, 1986; Petty et al., 1983; Zaichkowsky, 1985, 1994). Among the articles that feature this theme, some focus on how DMC works directly in the online environment and computer game context (Nelson et al., 2006).

The fifth theme focuses on the key concept of attitude. While many articles at least tangentially address attitude, a few focus specifically on this construct. Most are classical works that discuss attitudes toward advertisements and the brand (Fishbein & Ajzen, 1975; MacKenzie & Lutz, 1989; MacKenzie et al., 1986). The other articles on this theme relate directly to DMC, such as attitudes toward a website (Chen & Wells, 1999; Schlosser et al., 1999).

6. Co-citation network analysis

This study analyzed co-citation pairs among the most cited works, with four or more citations from the 141 research articles on DMC. In answer to research question 3, this study evaluated co-citation networks among the influential cited works in DMC and the schools of thought that exist among these networks. To obtain the co-citation frequencies and co-citation networks, this study analyzed all works that cited any given pair of documents. In the co-citation network, this study constructed a co-citation connection by drawing a line between two documents if several other works cite them together. Co-citation networks help to examine cumulative practice and reference disciplines and to gain an understanding of various schools of thought, in this case, on DMC.

This study shows 24 articles from the most cited works in the examination set cited together in four or more of the examined articles. The co-citations were sorted into those with four, five, six, and seven or more co-citation pairs in the targeted journals (Table 3, Fig. 1). The analysis excludes co-citation pairs that occur fewer than four times, because such co-citations are not meaningful (Kim & McMillan, 2008; Pasadeos et al., 1998). The co-citation networks suggest visual representations of schools of thought, disciplinary paradigms, and/or research streams (Kim & McMillan, 2008; Pasadeos et al., 1998).

Table 3
Link Weights of Co-Citation Networks.

Weight	Paper1	Paper2
7	Brown & Reingen, 1987	Hennig-Thurau et al., 2004
7	Coyle & Thorson, 2001	Hoffman & Novak, 1996
7	Coyle & Thorson, 2001	Steuer, 1992
7	McMillan & Hwang, 2002	Steuer, 1992
6	Bezjian-Avery et al., 1998	Liu & Shrum, 2002
6	Brown & Reingen, 1987	Granovetter, 1973
6	Hoffman & Novak, 1996	Liu & Shrum, 2002
6	Hoffman & Novak, 1996	McMillan & Hwang, 2002
6	Hoffman & Novak, 1996	Steuer, 1992
6	Liu & Shrum, 2002	McMillan & Hwang, 2002
5	Chen & Wells, 1999	Hoffman & Novak, 1996
5	Coyle & Thorson, 2001	Liu & Shrum, 2002
5	Fishbein & Ajzen, 1975	Mackenzie & Lutz, 1989
5	Granovetter, 1973	Hennig-Thurau et al., 2004
5	Hennig-Thurau et al., 2004	Lee & Youn, 2009
5	Hoffman & Novak, 1996	MacKenzie et al., 1986
5	Liu & Shrum, 2002	Steuer, 1992
4	Brown & Reingen, 1987	Lee & Youn, 2009
4	Brown & Reingen, 1987	Phelps et al., 2004
4	Coyle & Thorson, 2001	McMillan & Hwang, 2002
4	Granovetter, 1973	Rogers, 1983
4	Hennig-Thurau et al., 2004	Phelps et al., 2004
4	Hoffman & Novak, 1996	Rogers & Thorson, 2000
4	Liu & Shrum, 2002	Liu & Shrum, 2009
4	McMillan & Hwang, 2002	Rogers, 1983
4	McMillan & Hwang, 2002	Song & Zinkhan, 2008

In the prominent body of the co-citation network, a sub-cluster addresses eWOM issues in DMC (Hennig-Thurau et al., 2004; Lee & Youn, 2009; Phelps et al., 2004; Trusov et al., 2009) and WOM (Brown & Reingen, 1987; Granovetter, 1973). This cluster also has strong interconnections with Hennig-Thurau et al. (2004), as well as Brown and Reingen (1987), who examined effectiveness by discussing WOM in terms of social ties and referent behavior, with seven co-citation pairs. Granovetter (1973), who discussed weak social ties, is related to Brown and Reingen (1987), who examined six co-citation pairs. Granovetter (1973) work is also related to that of Hennig-Thurau et al. (2004) and Lee and Youn (2009).

After social media appeared in the public consciousness, eWOM became a key research area in DMC. The co-citation network among these works (Hennig-Thurau et al., 2004; Lee & Youn, 2009; Phelps et al., 2004; Trusov et al., 2009) shows inter-connections and highlights the centrality of eWOM research as a main school of thought in DMC.

Many of the articles in this interactivity cluster also link directly to McMillan and Hwang (2002), who offered perceived interactivity research that is both the most cited work in Table 1 and a central cluster in the co-citation network. McMillan and Hwang (2002) are interconnected with Coyle and Thorson (2001), Liu and Shrum (2002), and Song and Zinkhan (2008), who focused on interactivity as a central research stream. Co-citation networks present another set of a strong interconnection between McMillan and Hwang (2002) and Steuer (1992) who discussed dimensions of interactivity. Then, Steuer (1992) is interconnected with Hoffman and Novak (1996) who offer a baseline of interactivity research. Hoffman and Novak (1996) are linked to Rogers and Thorson (2000), and Chen and Wells (1999). The co-citation network among those works (Coyle & Thorson, 2001; Liu & Shrum, 2002; McMillan & Hwang, 2002; Song & Zinkhan, 2008) shows interconnections and highlights the centrality of interactivity research as one school of thought in the field of DMC.

Overall, the main cluster in the co-citation network shows interactivity with eWOM as the main research stream in the DMC discipline. The main co-citation network among Hennig-Thurau et al. (2004), Lee and Youn (2009), Phelps et al. (2004), and Trusov et al. (2009) focuses on eWOM in DMC. This co-citation network suggests that these authors and articles are influential in the domain of eWOM. The network
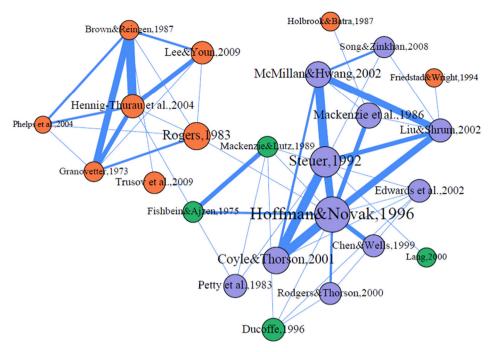
Fig. 1. Co-citation network.

proposes interactivity and eWOM as central schools of thought among influential works in DMC.

7. Central nodes analysis in co-citation networks

Co-citation network analysis based on Gephi reveals the core knowledge influencers of scholarly communities under the primary themes by examining the network linking the contributions (Table 4, Fig. 1). The Gephi-driven analysis is fit for identifying clusters of cited works that bridge boundaries, linking disconnected communities of research and influencing different disciplinary domains (Marion & McCain, 2001). The analysis generates a network structure that emphasizes the strongest relationship between the units of analysis (Schvaneveldt, 1990). The network stems from proximities between pairs of bodies, where co-citations represent proximities, and articles are bodies. The Gephi-analyzed nodes are linked together on the basis of co-citation patterns (Nerur et al., 2008). The proximity between

Table 4
Top node centrality of the cited works.

	Cited work	Node Centrality
1	Hoffman & Novak,1996	1.0000
2	Steuer, 1992	0.8233
3	Rogers, 1983	0.7129
4	Coyle & Thorson, 2001	0.6953
5	McMillan & Hwang, 2002	0.6563
6	MacKenzie et al., 1986	0.6431
7	Hennig-Thurau et al., 2004	0.5747
8	Liu & Shrum, 2002	0.5687
9	Petty et al., 1983	0.5687
10	Ducoffe, 1996	0.5519
11	Edwards et al., 2002	0.5515
12	Lee & Youn, 2009	0.5481
13	Chen & Wells, 1999	0.5319
14	Rogers & Thorson, 2000	0.5279
15	Trusov et al., 2009	0.5173
16	Song & Zinkhan, 2008	0.4982
17	Fishbein & Ajzen, 1975	0.4900
18	MacInnis & Jaworski, 1989	0.4807
19	Sicilia et al., 2005	0.4800
20	Mackenzie & Lutz, 1989	0.4800

articles is displayed by the existence of a link between them and not by spatial proximity on the map.

The networks are depicted by one boundary bridging cited work that connects different research clusters and has an impact across different disciplinary domains (Burt, 2005; Di Stefano, Gambardella, & Verona, 2012; Nerur et al., 2008). The bridging cited work delivers a conceptual bridge across the main clusters that are detached from each other. An article sets together an intense cluster of articles that directly link to it and establishes the focal hub of the network, which is placed between the other two key discernable clusters (Di Stefano et al., 2012). A high degree of centrality represents a very high number of direct ties compared to other works in the co-citation networks. A high degree of centrality indicates the potential for boosting a strong and combined cluster of knowledge focused on a specified thought domain (Burt, 2005).

Hoffman and Novak (1996) work displays high centrality scores of 1.0000. Their work is positioned between the other two core visible clusters of interactivity and DMC effectiveness and that derived from attitude. The article is highly conspicuous and influential in the domain of interactivity, DMC effectiveness, and attitude. As Hoffman and Novak (1996) suggest, it is noteworthy to generate the formation of three main clusters of interactivity, DMC effectives, and attitude in co-citation networks.

The first cluster, which is more closely linked to Hoffman and Novak (1996), consists of the body of cited works in the domain of interactivity that deals with function, process, and perception of interactivity. This cluster emphasizes interactivity as a function (Coyle & Thorson, 2001), process (Rogers & Thorson, 2000), and perception (Liu & Shrum, 2002; McMillan & Hwang, 2002; Song & Zinkhan, 2008) in the DMC context. This main cluster highlights interactivity as the key concept of DMC. Steuer (1992), with high centrality scores of 0.8233, also plays a central role, particularly connecting to the cluster of interactivity as a discipline.

As much as Hoffman and Novak (1996) link to the domain of interactivity, the article directly connects to the second cluster of DMC effectiveness with a specific focus on negative effectiveness issues in DMC, such as intrusiveness, avoidance, and clutter (Li et al., 2002).

Hoffman and Novak (1996) also connect to a third cluster devoted to classical works that clarify attitudes toward advertisements and

brand (MacKenzie et al., 1986; MacKenzie & Lutz, 1989) and attitude in the DMC context (e.g., attitudes toward a website) (Chen & Wells, 1999).

Hoffman and Novak (1996) work represents a highly influential central node bridge between interactivity, DMC effectives, and attitude in co-citation networks. The work plays a crucial brokering role in Gephi-driven co-citation networks generated in key marketing communication journals.

Rogers (1983) exhibits a high degree of centrality with scores of 0.7129, thereby indicating the presence of a strongly interconnected cluster of contributions. Rogers (1983) facilitates the vital bridging contribution positioned between Hoffman and Novak (1996) and Hennig-Thurau et al. (2004).

Hennig-Thurau et al. (2004), who show high degree of centrality with scores of 0.5747, play a key role in forming a cluster of eWOM as a body of knowledge. eWOM is a main facet of DMC as a scholarly discipline. Hennig-Thurau et al. (2004) strongly interconnect to eWOM in DMC (Lee & Youn, 2009; Phelps et al., 2004; Trusov et al., 2009) and WOM (Brown & Reingen, 1987; Granovetter, 1973).

8. Discussion

8.1. New insights for the DMC domain by comparison with the bibliometric literature

This study analyzed citations and co-citation analysis of current research on DMC and showed how digital technology shaped digital marketing evaluations between 2004 and 2016. Bibliometric studies of DMC between 1994 and 2003 (Kim & McMillan, 2008) focused on the online context. Similarities and differences between previous and current bibliometric studies can offer new insights for the domain of DMC. Although the purpose of the current study is not to make direct comparisons with the early stage of DMC, analysis of similarities and differences covered by previous works can offer insights for current DMC.

Between 1994 and 2003, Internet marketing communication developed essential theoretical and methodological perspectives in the domain of digital advertising (Kim & McMillan, 2008). Previous Internet-focused DMC studies focused on interactivity and DMC effectiveness as the main themes. In the online era, interactivity was a key feature of online DMC in the context of the Internet. The most cited works mainly discussed interactivity as a conceptual perspective and as a central variable in the context of the Internet (Kim & McMillan, 2008). In online-based DMC, the co-citation network (Kim & McMillan, 2008) showed strong interconnections among the works of Coyle and Thorson (2001), Heeter (1989, 2000), Rafaeli and Sudweeks (1997), and Steuer (1992), and indirect links to Ghose and Dou (1998) through Hoffman and Novak (1996), which emphasized interactivity as a dominant research stream.

In the early stage of DMC, key cited articles also discussed the issue of the effectiveness of DMC in the Internet context, including user perceptions and click-through applications (Kim & McMillan, 2008). Previous co-citation networks in the Internet context reported strong interconnections among Berthon, Pitt, and Watson (1996), Briggs and Hollis (1997), Ducoffe (1996), Eighmey (1997), Hoffman and Novak (1996), and Korgaonkar and Wolin, who discussed the effectiveness of Internet advertising. In works between 1994 and 2003, the main themes of the most cited works and co-citation network proposed influential works in the domain of DMC in the Internet era, and interactivity and effectiveness research as central invisible colleges and/or schools of thought.

In 2004, when Facebook was launched, social media exploded into the public consciousness. As many businesses and consumers began to use social media, marketing academics and practitioners began to examine its potential as a marketing communication medium. Now operating for more than a decade, social media has integrated new information and communication tools, such as mobile connectivity,

blogging, and photo/video sharing, which allow users to express extensive interests. Social media has moved from its beginnings as a limited technology among a few users to a tool used broadly by consumers worldwide. Thus, citation and co-citation analysis of DMC from 2004 to the present as a social media-oriented phenomenon is noteworthy for informing us how social media has shaped the domain of DMC.

This study assessed the most cited authors and most cited works in articles about DMC in three core journals over a 12-year period (2004–2016) to deal with research question 1. The most cited authors and most cited works clearly depict certain overlaps between the two lists of most cited authors and most cited works.

Petty is the most cited author in Table 1, and his work on ELM is ranked in Table 2. McMillan is the sixth most cited author in Table 1. Her article on perceived interactivity appears as the eighth most cited work. Liu is also the tenth most cited author in Table 1. Her article on interactivity is shown as the sixth most cited work. Hennig-Thurau appears to be a key influencer on eWOM research. For instance, his 2004 study with co-authors on eWOM is ranked as the third most cited work.

Most of the authors who emerge in both Tables 1 and 2 have strongly shaped the field of DMC as a discipline that offers theoretical implications. Petty et al. (1983) work indicates that the ELM still influenced the DMC domain as a theoretical underpinning in the social media era between 2004 and 2015. McMillan's (2002) work and Liu's (2002) article on interactivity indicate that interactivity as a theoretical underpinning still shapes the field of DMC as a discipline in the social media and online media age. Hennig-Thurau et al. (2004) work on eWOM, which focuses on eWOM as a theoretical underpinning, strongly shaped the DMC field in the social media era between 2004 and 2015. The study shows that ELM, interactivity, and eWOM as theoretical underpinnings have shaped the domain of DMC in the social media era between 2004 and 2016.

To address research question 2, the current study conducted citation and co-citation analysis of papers related to DMC that appeared in the target journals between 2004 and 2016. All the DMC-related articles found in these journals were incorporated in the evaluation. The current review identified the major themes that have emerged in DMC research: eWOM, interactivity, and DMC effectiveness. The evaluations indicated the same three key findings and implications for DMC: eWOM, interactivity, and DMC effectiveness. The results of this analysis suggest thematic insights and implications for academics and practitioners, which are promising avenues for creating effective DMC.

To discuss research question 3, bibliometric visualization analysis involved co-citation analysis, which enabled the visualization of social networks among scholarly communications in the DMC field. This assessment highlighted the value of visualizing co-citation networks using Gephi. This data visualization analysis was addressed by evaluating various existing techniques alongside a new technique employing Gephi, which draws insights on how best to visualize network data grouped into comprehensive co-citation network sets. Co-citation networks that reflect influential works in a discipline clearly show clusters that refer to invisible colleges as schools of thought in the field of DMC.

As one school of thought, eWOM represents an invisible college that strongly influences DMC research. Co-citation networks present a set of strong interconnections among others (Hennig-Thurau et al., 2004; Lee & Youn, 2009; Phelps et al., 2004; Trusov et al., 2009) and WOM (Brown & Reingen, 1987; Granovetter, 1973), highlighting eWOM as a central research stream in DMC. In terms of its theoretical implications, eWOM works for DMC in the social media age, and its theoretical underpinnings and influence are highlighted in studies by Hennig-Thurau et al., 2004; Lee & Youn, 2009; Phelps et al., 2004; Trusov et al., 2009.

Interactivity is a school of thought that appears to have a clear impact on DMC research. The co-citation network shows strong interconnections among the works of Coyle and Thorson (2001), Liu and Shrum (2002), McMillan and Hwang (2002), and Song and Zinkhan

(2008), who focus on interactivity as a dominant research stream. The co-citation network suggests that the research streams on eWOM and interactivity are central and influential schools of thought in the DMC domain.

It is noteworthy that the theoretical underpinnings of interactivity have primarily shaped the domain of DMC, both in the online age between 1994 and 2003 and in the social media age between 2004 and 2016. In particular, interactivity as a function (Coyle & Thorson, 2001), interactivity as a process (Rogers & Thorson, 2000; Sicilia et al., 2005), and interactivity as perception (Liu & Shrum, 2002; McMillan & Hwang, 2002; Song & Zinkhan, 2008) have shaped the DMC field in a way that offers new insights for future research directions.

8.2. Future research directions

Evaluating DMC research from a historical perspective is important for measuring the current and future impacts of DMC. By scrutinizing key articles, this study potentially sets a baseline for the emerging field of DMC that will enable future scholars to evaluate the impact of DMC on brand experiences and DMC value.

Future research could consider how the latest technology drives the marketing field by utilizing interactivity and eWOM as key theoretical underpinnings in the domain of DMC. Interactivity that shaped DMC between 1994 and 2003 concentrated on the online context, while between 2004 and 2016, it focused on the social media context. Interactivity is noteworthy for assessing the manner in which it shapes the domain of DMC in the new technology-driven context.

Currently, AI technology as a discipline may be at the tipping point of bringing a totally different paradigm shift in the marketing field. Revolutionizing AI at a critical point in its evolution would facilitate the implementation of new and innovative ways of conducting business with its applicability in the marketing field. It is important to assess citation analysis and co-citation analysis to uncover how AI-driven technology transforms the marketing field into AI-proficient spheres in terms of eWOM, interactivity, and effectiveness. In particular, an AI recommendation system enables differentiation between AI-driven interactivity and digital marketing, thereby transforming the domain of marketing.

8.2.1. Future research directions for AI-driven interactivity as a function

Research focusing on functional aspects has emphasized the importance of identifying the characteristics of interactivity within a website. Most studies have started from the conceptual definition of interactivity proposed by Heeter (1989), whose studies analyzed the interactive functions available to users (Ha & James, 1998; McMillan, Hwang, & Lee, 2003).

In the future, the research direction could focus especially on the interactivity of an AI-driven recommendation system among the factors that influence consumers' choices. Technology companies, such as Amazon, Google, and Apple, are competitively launching intelligent personal assistants to expand their services and platforms. For example, Amazon has introduced Echo based on Alexa; Google has produced Google Home with Google OK; Apple has announced Apple Homepod with Siri and the Apple Music service; and Facebook has developed the intelligent private secretary, M (Pasiformlli & Wohl, 2017; Sloane, 2016). They are similar in form to software apps and AI speaker hardware devices, but each company seeks to maximize revenue by linking its core business with AI speakers as intelligent personal assistants. A new market similar to the mobile app market is being formed, since third-party companies have added new features to AI speakers.

Amazon focuses on shopping and the cloud service with the Alexa-based Echo AI speaker series and pays attention to the potential home market with diversified Alexa devices. Google is concentrating on online search, mobile operating systems, and advertising with Google Home AI speakers based on Google OK. Google is also targeting the mobile market in addition to Google's Action Home. Facebook is

focusing on linking with its own next-generation devices, such as messenger bot, social media chatbot, VR/AR devices, and wearable devices, which are all based on M (Yang & Kim, 2017). Facebook is developing a new messenger scheme that provides information with images when users ask M about restaurants, gifts, resorts, etc., and users can make reservations and make purchases within one messenger system without running other apps.

The interactivity of AI speakers is now expanding to search advertising, shopping, cloud services, mobile communication, social communication, VR/AR apps, and wearable devices. AI speakers can be extended to consumers' sharing and engagement, including interactions between highly personalized company-to-customer searches, referrals, personalized ads, and shopping. In interacting with consumers, these AI speakers employ components of the company, and it is possible for consumers to lead selection and sharing. Therefore, it is necessary to study interactivity as a function of AI speakers from this new perspective.

8.2.2. Future research directions for AI-driven interactivity as a process

Future research directions could focus on the process of interactive engagement, including two-way communication, exchange of information, user control, and responsiveness (Bezjian-Avery et al., 1998). Specifically, product type, based on personal information and consumers' choices, could affect interactive behavior and the extent to which consumers use these products (Bearden & Etzel, 1982; Childers & Rao, 1992; King & Balasubramanian, 1994). Types of products can be classified as having a search or experience quality (Nelson, 1974; Senecal & Nantel, 2004). Search quality refers to what a consumer decides as a result of searching before purchasing. Experience products, whose quality is difficult or impossible to assess prior to purchase, depend more on recommendations than search products do. For example, consumers are more likely to incorporate consumer evaluations or product recommendations into their decision-making processes for experience products (e.g., movies and games) than for search products (e.g., cameras) (King & Balasubramanian, 1994; Senecal & Nantel, 2004). Product types, such as search and experience products, may influence consumer choices and AI-driven interaction processes. Therefore, for future research directions, it is necessary to clarify AI-driven interactive processes reflected by the effect of product type: search product versus experience product.

8.2.3. Future research directions for AI-driven interactivity as perception

Future research directions that focus on the perception that individuals are interacting could investigate the roles of timeliness and engagement in such interactions (McMillan & Hwang, 2002; Liu & Shrum, 2002). Although research has been conducted on interactivity in the contexts of online and social media, research on completely new AI-driven interactivity should be studied further. AI-driven interactive personalized relationships between consumers and companies are increasing. Managers of company brands and advertising activities need to pay attention to opportunities to create personalized and valuable communication activities by focusing on the micro-moments of AI speakers. Indeed, AI speakers are evolving steadily toward DMC strategies as well as brand communication based on consumers' personalized searches and selectable activities. It is necessary to study the influence of AI-driven interactivity by paying attention to the personalized DMC of AI speakers.

8.3. Conclusion and limitations

Citation and co-citation analyses have the potential to inform collection development, describe institutional scholarship strengths and citation patterns, and suggest visible co-citation networks of schools of thought. The current study focused on only the top three journals of DMC-indexed SSCI as the most influential journals. Future research should expand to other journals related to the DMC field, such as the

Journal of Interactive Marketing, Journal of Business Research, Journal of Research in Interactive Marketing, and *Journal of Interactive Advertising*. For additional assessments of expanded citations in the extended journals, identifying DMC research categorized by different types of digital communication channels is suggested.

This study is limited to a bibliometric study of the DMC field. Citation analysis and visualization of co-citation networks present a depiction of invisible colleges within the DMC field. Because an academic analysis of overall digital marketing embraces too broad an area to aggregate citation patterns over time, this study focused on DMC to evaluate citation and co-citation assessments. However, future studies on cumulative citation and co-citation networks should be pursued in the overall marketing area to offer a bigger picture in the domain of marketing. Further studies on citation and co-citation analyses should be conducted to show paradigm changes in the domain of marketing over time to suggest a starting point for future research directions.

Declaration of Competing Interest

None.

References

Ariely, D. (2000). Controlling the information flow: Effects on consumers' decision making and preferences. *Journal of Consumer Research, 27*(2), 233–248.

Bar-Ilan, J., & Peritz, B. C. (2002). Infometric theories and methods for exploring the internet: An analytical survey of recent research literature. *Library Trends, 50*(3), 371–392.

Barry, T. E., & Howard, D. J. (1990). A review and critique of the hierarchy of effects in advertising. *International Journal of Advertising, 9*(2), 121–135.

Barwise, P., & Strong, C. (2002). Permission-based mobile advertising. *Journal of Interactive Marketing, 16*(1), 14–24.

Bastian, M., Heymann, S., & Jacomy, M. (2009). Gephi: An open source software for exploring and manipulating networks. *Proceedings of the Third International ICWSM Conference* (pp. 361–362). .

Batra, R., & Ray, M. L. (1986). Situational effects of advertising repetition: The moderating influence of motivation, ability, and opportunity to respond. *Journal of Consumer Research, 12*(4), 432–445.

Baumgartner, H., & Pieters, R. (2003). The structural influence of marketing journals: A citation analysis of the discipline and its subareas over time. *Journal of Marketing, 67*(2), 123–139.

Bearden, W. O., & Etzel, M. J. (1982). Reference group influence on product and brand purchase decisions. *Journal of Consumer Research, 9*(2), 183–194.

Berthon, P., Pitt, L. F., & Watson, R. T. (1996). The World Wide Web as an advertising medium. *Journal of Advertising Research, 36*(1), 43–54.

Bezjian-Avery, A., Calder, B., & Iacobucci, D. (1998). New media interactive advertising vs. traditional advertising. *Journal of Advertising Research, 38*(4), 23–32.

Briggs, R., & Hollis, N. (1997). Advertising on the Web: Is there response before click-through? *Journal of Advertising Research, 37*(2), 33–45.

Brodie, R. J., & Juric, B. (2017). Customer engagement: Developing an innovative research that has scholarly impact. *Journal of Global Scholars of Marketing Science, 28*(3), 291–303.

Brown, J. J., & Reingen, P. H. (1987). Social ties and word-of-mouth referral behavior. *Journal of Consumer Research, 14*(3), 350–362.

Burt, R. S. (2005). *Brokerage and closure: An introduction to social capital.* New York: Oxford University Press.

Chandon, J. L., Chtourou, M. S., & Fortin, D. R. (2003). Effects of configuration and exposure levels on response to web advertisements. *Journal of Advertising Research, 43*(2), 217–229.

Chen, Q., & Wells, W. D. (1999). Attitude toward the Site. *Journal of Advertising Research, 39*(5), 27–37.

Childers, T. L., & Rao, A. R. (1992). The influence of familial and peer-based reference groups on consumer decisions. *Journal of Consumer Research, 19*(2), 198–211.

Cho, C. H. (1999). How advertising works on the WWW: Modified elaboration likelihood model. *Journal of Current Issues & Research in Advertising, 21*(1), 34–50.

Cho, C. H., Lee, J. G., & Tharp, M. (2001). Different forced exposure levels to banner advertisements. *Journal of Advertising Research, 41*(4), 45–56.

Chu, S. C., & Kim, Y. J. (2011). Determinants of consumer engagement in electronic word-of-mouth (eWOM) in social networking sites. *International Journal of Advertising, 30*(1), 47–75.

Cleveland, M. (2018). Acculturation to the global consumer culture: Ten years after and agenda for the next decade. *Journal of Global Scholars of Marketing Science, 28*(3), 257–271.

Coyle, J. R., & Thorson, E. (2001). The effects of progressive levels of interactivity and vividness in web marketing sites. *Journal of Advertising, 30*(3), 65–77.

Crane, D. (1972). *Invisible Colleges: Diffusion of Information in Scientific Communities.* Chicago: University of Chicago Press.

De Bruyn, A., & Lilien, G. L. (2008). A multi-stage model of word-of-mouth influence through viral marketing. *International Journal of Research in Marketing, 25*(3), 151–163.

Dholakia, U. M., Bagozzi, R. P., & Pearo, L. K. (2004). A social influence model of consumer participation in network- and small-group-based virtual communities. *International Journal of Research in Marketing, 21*(3), 241–263.

Di Stefano, G., Gambardella, A., & Verona, G. (2012). Technology push and demand pull perspectives in innovation studies: Current findings and future research directions. *Research Policy, 41*(8), 1283–1295.

Diodato, V. (1994). *Dictionary of bibliometrics.* Binghamton: Haworth Press.

Drèze, X., & Hussherr, F. X. (2003). Internet advertising: Is anybody watching? *Journal of Interactive Marketing, 17*(4), 8–23.

Ducoffe, R. H. (1996). Advertising value and advertising on the web. *Journal of Advertising Research, 36*(5), 21–35.

Edwards, S. M., Li, H., & Lee, J. H. (2002). Forced exposure and psychological reactance: Antecedents and consequences of the perceived intrusiveness of pop-up ads. *Journal of Advertising, 31*(3), 83–95.

Eighmey, J. (1997). Profiling user responses to commercial Web sites. *Journal of Advertising Research, 37*(3), 59–66.

Eighmey, J., & McCord, L. (1998). Adding value in the information age: Uses and gratifications of sites on the World Wide Web. *Journal of Business Research, 41*(3), 187–194.

Ferreira, M. P., Santos, J. C., Almeida, M. I. R., & Reis, N. R. (2014). Mergers & acquisitions research: A bibliometric study of top strategy and international business journals, 1980–2010. *Journal of Business Research, 67*, 2550–2558.

Fishbein, M. A., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research.* Reading, MA: Addison-Wesley.

Friestad, M., & Wright, P. (1994). The persuasion knowledge model: How people cope with persuasion attempts. *Journal of Consumer Research, 21*(1), 1–31.

Friestad, M., & Wright, P. (1995). Persuasion knowledge: Lay people's and researchers' beliefs about the psychology of advertising. *Journal of Consumer Research, 22*(1), 62–74.

Fujita, M., Harrigan, P., & Soutar, G. (2017). A netnography of a university's social media brand community: Exploring collaborative co-creation tactics. *Journal of Global Scholars of Marketing Science, 27*(2), 148–164.

Ghose, S., & Dou, W. (1998). Interactive functions and their impacts on the appeal of internet presence sites. *Journal of Advertising Research, 38*(2), 29–43.

Godes, D., & Mayzlin, D. (2004). Using online conversations to study word-of-mouth communication. *Marketing Science, 23*(4), 469–631.

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology, 78*(6), 1360–1380.

Guercini, S., Bernal, P. M., & Prentice, C. (2018). New marketing in fashion e commerce. *Journal of Global Fashion Marketing, 9*(1), 1–8.

Ha, L., & James, E. L. (1998). Interactivity reexamined: A baseline analysis of early business web sites. *Journal of Broadcasting and Electronic Media, 42*(4), 457–474.

Ha, L., & McCann, K. (2008). An integrated model of advertising clutter in offline and online media. *International Journal of Advertising, 27*(4), 569–592.

Han, S.-L., Nguyen, T. P. T., & Nguyen, V. A. (2016). Antecedents of intention and usage toward customers' mobile commerce: Evidence in Vietnam. *Journal of Global Scholars of Marketing Science, 26*(2), 129–151.

Heeter, C. (1989). Implications of new interactive technologies for conceptualizing communication. In J. Salvaggio, & J. Bryant (Eds.). *Media use in the information age: Emerging patterns of adoption and consumer use* (pp. 217–235). NJ: Lawrence Erlbaum Associates.

Heeter, C. (2000). Interactivity in the context of designed experiences. *Journal of Interactive Advertising, 1*(1), 3–14.

Hennig-Thurau, T., Gwinner, K. P., Walsh, G., & Gremler, D. D. (2004). Electronic word-of mouth via consumer-opinion platforms: What motivates consumers to articulate themselves on the internet? *Journal of Interactive Marketing, 18*(1), 38–52.

Herr, P. M., Kardes, F. R., & Kim, J. (1991). Effects of word-of-mouth and product-attribute information on persuasion: An accessibility-diagnosticity perspective. *Journal of Consumer Research, 17*(4), 454–462.

Hoffman, D. L., & Novak, T. P. (1996). Marketing in hypermedia computer mediated environments: Conceptual foundations. *Journal of Marketing, 60*(3), 50–68.

Holbrook, M. B., & Batra, R. (1987). Assessing the role of emotions as mediators of consumer response to advertising. *Journal of Consumer Research, 14*(3), 404–420.

Johnson, K. P. (2019). Factors underlying frequently cited journal articles: A retrospective commentary. *Journal of Global Fashion Marketing, 10*(2), 210–217.

Katz, E., & Lazarsfeld, P. F. (1955). *Personal influence: The part played by people in the flow of mass communication.* New York, NY: Free Press.

Kim, E. Y., & Yang, K. (2018). Self-service technologies (SSTs) streamlining consumer experience in the fashion retail stores: The role of perceived interactivity. *Journal of Global Fashion Marketing, 9*(4), 287–304.

Kim, J. (2018). Social dimension of sustainability: From community to social capital. *Journal of Global Scholars of Marketing Science, 28*(2), 175181.

Kim, J., Kang, S., & Taylor, C. R. (2018). Technology driven experiences from mobile direct to virtual reality. *Journal of Global Scholars of Marketing Science, 28*(1), 96–102.

Kim, J., & McMillan, S. J. (2008). Evaluation of internet advertising research: A bibliometric analysis of citations from key sources. *Journal of Advertising, 37*(1), 99–112.

Kim, J., Spielmann, N., & McMillan, S. J. (2012). Experience effects on interactivity: Functions, processes, and perceptions. *Journal of Business Research, 65*(11), 1543–1550.

Kim, J., Sun, Y., Kim, K. H., & Kang, S. (2019). Sustainability and customer equity: Evaluation of citing networks and contributions. *Journal of Global Fashion Marketing, 10*(3), 267–274.

King, M. F., & Balasubramanian, S. K. (1994). The effects of expertise, end goal, and product type on adoption of preference formation strategy. *Journal of the Academy of Marketing Science, 22*(2), 146–159.

Ko, E. (2019). Bridging Asia and the world: Global platform for the Interface between marketing and management. *Journal of Business Research, 99*(3), 350–353.

Korgaonkar, P. K., & Wolin, L. D. (1999). A multivariate analysis of web usage. *Journal of Advertising Research, 39*(2), 53–68.

Lamberton, C., & Stephen, A. T. (2016). A Thematic exploration of digital, social media, and mobile marketing: Research evolution from 2000 to 2015 and an agenda for future inquiry. *Journal of Marketing, 80*(November), 146–172.

Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication, 50*(1), 46–70.

Lee, M., & Youn, S. (2009). Electronic word of mouth (eWOM) – How eWOM platforms influence consumer product judgement. *International Journal of Advertising, 28*(3), 473–499.

Lewis, D. M., & Alpi, K. M. (2017). Bibliometric network analysis and visualization for serials librarians: An introduction to Sci2. *Serials Review, 4*(3–4), 239–245.

Li, H., Edwards, S. M., & Lee, J. H. (2002). Measuring the intrusiveness of advertisements: Scale development and validation. *Journal of Marketing, 31*(2), 37–47.

Liao, H., Tang, M., Luo, L., Li, C., Chiclana, F., & Zeng, X.-J. (2018). A bibliometric analysis and visualization of medical big data research. *Sustainability, 10*(166), 1–18.

Lievrouw, L. A. (1989). The invisible college reconsidered: Bibliometrics and the development of scientific communication theory. *Communication Research, 16*(5), 615–628.

Liu, Y., & Shrum, L. J. (2002). What is interactivity and is it always such a good thing? Implications of definition, person, and situation for the influence of interactivity on advertising effectiveness. *Journal of Advertising, 31*(4), 53–64.

Liu, Y., & Shrum, L. J. (2009). A dual-process model of interactivity effects. *Journal of Advertising, 38*(2), 53–68.

Lohtia, R., Donthu, N., & Hershberger, E. K. (2003). The impact of content and design elements on banner ad click-through rates. *Journal of Advertising Research, 43*(4), 410–418.

MacInnis, D. J., & Jaworski, B. J. (1989). Information processing from advertisements: Toward an integrative framework. *Journal of Marketing, 53*(4), 1–23.

MacKenzie, S. B., & Lutz, R. J. (1989). An empirical examination of the structural antecedents of attitude toward the ad in an advertising pretest context. *Journal of Marketing, 53*(2), 48–65.

MacKenzie, S. B., Lutz, R. J., & Belch, G. E. (1986). The role of attitude toward the ad as a mediator of advertising effectiveness: A test of competing explanations. *Journal of Marketing Research, 23*(2), 130–143.

Marion, L., & McCain, K. W. (2001). Contrasting views of software engineering journals: Author co-citation choices and indexer vocabulary assignments. *Journal of the American Society for Information Science and Technology, 52*(4), 297–308.

Martin-Consuegra, D., Faraoni, M., Díaz, E., & Ranfagni, S. (2018). Exploring relationships among brand credibility, purchase intention and social media for fashion brands: A conditional mediation model. *Journal of Global Fashion Marketing, 9*(3), 237–251.

McMillan, S. J., & Hwang, J. S. (2002). Measures of perceived interactivity: An exploration of the role of direction of communication, user control, and time in shaping perceptions of interactivity. *Journal of Advertising, 31*(3), 29–42.

Merigó, J. M., Mas-Tur, A., Roig-Tierno, N., & Ribeiro-Soriano, D. (2015). A bibliometric overview of the Journal of Business Research between 1973 and 2014. *Journal of Business Research, 68*(12), 2645–2653.

Moore, R. S., Stammerjohan, C. A., & Coulter, R. A. (2005). Banner advertiser-web site context congruity and color effects on attention and attitudes. *Journal of Advertising, 34*(2), 71–84.

Nelson, P. (1974). Advertising as information. *Journal of Political Economy, 82*(4), 729–754.

Nelson, M. R., Yaros, R. A., & Keum, H. (2006). Examining the influence of telepresence on spectator and player processing of real and fictitious brands in a computer game. *Journal of Advertising, 35*(4), 87–99.

Nerur, S., Rasheed, A., & Natarajan, V. (2008). The intellectual structure of the strategic management field: An author co-citation analysis. *Strategic Management Journal, 29*(3), 319–336.

Novak, T. P., Hoffman, D. L., & Yung, Y. F. (2000). Measuring the customer experience in online environments: A structural modeling approach. *Marketing Science, 19*(1), 22–42.

Pasadeos, Y., Phelps, J., & Kim, B. (1998). Disciplinary of advertising scholars: Temporal comparisons of influent authors, works and research networks. *Journal of Advertising, 27*(4), 53–70.

Pasadeos, Y., Renfro, R. B., & Hanily, M. L. (1999). Influential authors and works of the public relations scholarly literature: A network of recent research. *Journal of Public Relations Research, 11*(1), 29–52.

Pasquarelli, A., & Wohl, J. (2017). *Why marketers are betting on bots*. Ad Age.

Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change*. New York, NY: Springer Verlag.

Petty, R. E., Cacioppo, J. T., & Schumann, D. (1983). Central and peripheral routes to advertising effectiveness: The moderating role of involvement. *Journal of Consumer Research, 10*(2), 135–146.

Phelps, J. E., Lewis, R., Mobilio, L., Perry, D., & Raman, N. (2004). Viral marketing or electronic word-of-mouth advertising: Examining consumer responses and motivations to pass along email. *Journal of Advertising Research, 44*(4), 333–348.

Rafaeli, S., & Sudweeks, F. (1997). Networked interactivity. *Journal of Computer-Mediated Communication, 2*(4).

Ramos-Rodriguez, A., & Ruiz-Navarro, J. (2004). Changes in the intellectual structure of strategic management research: A bibliometric study of the Strategic Management Journal, 1980–2000. *Strategic Management Journal, 25*(10), 981–1004.

Riegner, C. (2007). Word of mouth on the web: The impact of web 2.0 on consumer purchase decisions. *Journal of Advertising Research, 47*(4), 436–447.

Robinson, H., Wysocka, A., & Hand, C. (2007). Internet advertising effectiveness – The effect of design on click-through rates for banner ads. *International Journal of Advertising, 26*(4), 527–541.

Rogers, E. M. (1983). *Diffusion of innovations* (3rd ed.). New York, NY: Free Press.

Rogers, S., & Thorson, E. (2000). The interactive advertising model: How people perceive and process interactive ads. *The Journal of Interactive Advertising, 1*(1), 42–61.

Schlosser, A. E., Shavitt, S., & Kanfer, A. (1999). Survey of internet users' attitudes toward internet advertising. *Journal of Interactive Marketing, 13*(3), 34–54.

Schvaneveldt, R. W. (1990). *Pathfinder associative networks: Studies in knowledge organization*. Norwood, NJ: Ablex.

Senecal, S., & Nantel, J. (2004). The Influence of online product recommendations on consumers' online choices. *Journal of Retailing, 80*, 159–169.

Shafique, M. (2013). Thinking inside the box? Intellectual structure of the knowledge base of innovation research (1988–2008). *Strategic Management Journal, 34*(1), 62–93.

Sicilia, M., Ruiz, S., & Munuera, J. L. (2005). Effects of interactivity in a web site: The moderating effect of need for cognition. *Journal of Advertising, 34*(3), 31–44.

Sirgy, M. J. (2017). Self-congruity theory in consumer behavior: A little history. *Journal of Global Scholars of Marketing Science, 28*(2), 197–207.

Sloane, G. (2016). *Siri vs. Alexa vs. Cortana vs. Google assistant: It's battle of the AI systems*. Ad Age.

Smith, L. (1981). Citation analysis. *Library Trends, 30*(1), 83–106.

Song, J. H., & Zinkhan, G. M. (2008). Determinants of perceived website interactivity. *Journal of Marketing, 72*(2), 99–113.

Steuer, J. (1992). Defining virtual reality: Dimensions determining telepresence. *Journal of Communication, 42*(4), 73–93.

Tankard, J. W., Chang, T.-K., & Tsang, K.-J. (1984). Citation networks as indicators of journalism research activity. *Journalism Quarterly, 61*(124), 89–96.

Taylor, C. R., Cho, Y.-N., Anthony, C. M., & Smith, D. B. (2018). Photoshopping of models in advertising: A review of the literature and future research agenda. *Journal of Global Fashion Marketing, 9*(4), 379–398.

Taylor, C. R., & Costello, J. P. (2017). What do we know about fashion advertising? A review of the literature and suggested research directions. *Journal of Global Fashion Marketing, 8*(1), 1–20.

Trappey, R. J., III, & Woodside, A. G. (2005). Consumer responses to interactive advertising campaigns coupling short-message-service direct marketing and TV commercials. *Journal of Advertising Research, 45*(4), 382–401.

Trusov, M., Bucklin, R. E., & Pauwels, K. (2009). Effects of word-of-mouth versus traditional marketing: Findings from an internet social networking site. *Journal of Marketing, 73*(5), 90–102.

White, D., & McCain, K. (1998). Visualizing a discipline: An author co-citation analysis of information science, 1972–1995. *Journal of the American Society for Information Science, 49*(4), 327–355.

Willett, P. (2007). A bibliometric analysis of the Journal of Molecular Graphics and Modelling. *Journal of Molecular Graphics and Modelling, 26*(3), 602–606.

Wiberley, S. E., Jr. (2003). A methodological approach to developing bibliometric models of types of humanities scholarship. *Library Quarterly, 73*(2), 121–159.

Woodside, A. G., & Mir, P. M. (2019). Clicks and purchase effects of an embedded, social-media, platform endorsement in internet advertising. *Journal of Global Scholars of Marketing Science, 29*(3), 343–357.

Yang, H., & Kim, D. (2017). *Intelligent personal secretary market trend and domestic industry influence forecast (Science & Technology Policy No. 35)*. Ny: Science and Technology Policy Institute.

Zaichkowsky, J. L. (1985). Measuring the involvement construct. *Journal of Consumer Research, 12*(3), 341–352.

Zaichkowsky, J. L. (1994). The personal involvement inventory: Reduction, revision, and application to advertising. *Journal of Advertising, 23*(4), 59–70.

Zhang, M., & Dholakia, N. (2018). Conceptual framing of virtuality and virtual consumption research. *Journal of Global Scholars of Marketing Science, 28*(4), 305–319.

Further reading

Andrews, J. C. (1989). The dimensionality of beliefs toward advertising in general. *Journal of Advertising, 18*(1), 26–35.

Brown, G. J., Pitts, M. G., & Wetherbe, J. C. (2007). Cognitive stopping rules for terminating information search in online tasks. *MIS Quarterly, 31*(1), 89–104.

Bruner, G. C., & Kumar, A. (2000). Web commercials and advertising hierarchy-of-effects. *Journal of Advertising Research, 40*(1), 35–42.

Hung, K. H., & Li, S. Y. (2007). The influence of eWOM on virtual consumer communities: Social capital, consumer learning, and behavioral outcomes. *Journal of Advertising Research, 47*(4), 485–495.

Ko, H., Cho, C. H., & Roberts, M. S. (2005). Internet uses and gratifications: A structural equation model of interactive advertising. *Journal of Advertising, 34*(2), 57–70.

Kozinets, R. V. (1999). E-Tribalized marketing? The strategic implications of virtual communities of consumption. *European Management Journal, 17*(3), 252–264.

Stanaland, A. J. S., & Tan, J. (2010). The impact of surfer/seeker mode on the effectiveness of website characteristics. *International Journal of Advertising, 29*(4), 569–595.

Taylor, D. G., Lewin, J. E., & Strutton, D. (2011). Friends, fans and followers: Does advertising work on social networks? *Journal of Advertising Research, 51*(1), 258–275.