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Article

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Cogent Business & Management

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Suggested Citation: Cai, Wen-xi; Xiang, Bo (2024) : Visualization analysis of the research status, hotspots, and trends of legitimacy recognition of comparative advertising (1993–2023), Cogent Business & Management, ISSN 2331-1975, Taylor & Francis, Abingdon, Vol. 11, Iss. 1, pp. 1-25, <https://doi.org/10.1080/23311975.2024.2332501>

This Version is available at:

<https://hdl.handle.net/10419/326182>

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To cite this article: Wen-xi Cai & Bo Xiang (2024) Visualization analysis of the research status, hotspots, and trends of legitimacy recognition of comparative advertising (1993–2023), Cogent Business & Management, 11:1, 2332501, DOI: [10.1080/23311975.2024.2332501](https://doi.org/10.1080/23311975.2024.2332501)

To link to this article: <https://doi.org/10.1080/23311975.2024.2332501>



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Visualization analysis of the research status, hotspots, and trends of legitimacy recognition of comparative advertising (1993–2023)

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ABSTRACT

The legitimacy recognition of comparative advertising is closely related to the production enthusiasm of operators and the protection of the rights and interests of consumers, and thus become an important factor that may affect market competition fairness and social sustainable development. However, few researches have summarized the existing study of comparative advertising, while it is significant to review the changes and explore the future development trend, so as to improve relevant legislation. In this study, to summarize its research status, hotspots, and trends, CiteSpace 6.2.R4 was used to analyze 856 WoS core collection articles and 20 CSSCI articles related to comparative advertising dated 1993–2023, which presents an overview of the study of comparative advertising and relevant legitimacy recognition in China and other countries. Based on the analysis including co-occurrence, co-citation, and reference cluster, this paper looked at the research status and built up the knowledge mapping, which reveals scholars and research teams from universities from eight countries play a more important role in promoting comparative advertising research. It shows scholars mainly studying its concept and characteristics, its impact on different market players, its role on players of different ages, and its coping strategies. The study of its legitimacy recognition has also been included mainly focusing on the fairness of market competition, protection of consumers' interests, etc., but ignoring the issue of social sustainable development. According to its bibliometric research findings, this study also suggests some topics for future research to provide direction and guidance on related topics.

ARTICLE HISTORY

Received 17 October 2023

Revised 10 March 2024

Accepted 14 March 2024

KEYWORDS

Visualization analysis; comparative advertising; legitimacy recognition; hotspots and trends; CiteSpace

REVIEWING EDITOR

Len Tiu Wright, De Montfort University Faculty of Business and Law, United Kingdom of Great Britain and Northern Ireland

SUBJECTS

Media Law; Advertising Studies; Advertising; Media Communication; Media and Communications; Communication Research Methods; Entertainment, Sports and Media Law; Business, Management and Accounting; Advertising Media; Advertising Industry

1. Introduction

The United Nations Sustainable Development Goals 2015–2030 (SDG) proposed seventeen sustainable development goals. One of the main goals (Goal 12) stressed 'ensure sustainable consumption and production patterns' (Rieckmann, 2017). For this purpose, academics, politics, and industries explored sustainable methods from different aspects including alternative energy, changing traditional ways of consumption, saving resources, and so on. In fact, the study of legitimacy recognition of comparative advertising is also an important issue that helps people improve the awareness of roles, rights, and duties of different actors in production and consumption (media and advertising, enterprises, municipalities, legislation, consumers, etc.). It can also promote the effective implementation and completion of Sustainable Development Goal 12.

With the development of the market economy and the renewal of the media, advertising, as a market tool linking production and consumption, has become a market competition strategy that businessmen cannot abandon with its vivid promotion methods. Comparative advertising is one of the types of advertisement. Statement of Policy Regarding Comparative Advertising declared by the U.S. FTC defines comparative advertising as advertising that compares alternative brands on objectively measurable attributes

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or price and identifies the alternative brand by name, illustration, or other distinctive information ("Code of Federal Regulations," 1979). Today, it has been widely used by virtue of its unique form of publicity (Fang & Shen, 1997), which not only makes businesses benefit a lot in the market competition but also plays a role in helping consumers make purchase decisions.

On the one hand, for producers and businessmen, comparative advertising as a means of promotion, not only can highlight their products' advantages more directly but also can capture consumers' attention by emphasizing the differences between products (Cao, 1999). Consumers, in turn, benefit from comparative advertising as it enables them to discern differences more readily among numerous products with similar functionalities, facilitating more informed and rational purchase decisions (Zhou et al., 2018). But on the other hand, the improper use of comparative advertising will also lead to unfair competition. In advertising campaigns, operators are often prone to highlight their own advantages at the expense of denigrating competitors in terms of product quality, appearance, function, etc., which makes the advertisements easily have an obvious tendency to belittle other similar products in contents or forms, and thus causing infringement on the legal rights and interests of other businessmen (Wang, 2011). Such actions may also impede consumers' ability to freely exercise their choice and achieve their consumption objectives. It may eventually lead to blind consumption, obstacles to market competition, and prevention from sustainable development (Wu, 2007).

Obviously, comparative advertising, in which explicit or implicit comparisons are drawn between the advertised brand and its competitors, has become a common practice in today's market. While holding the promise of helping consumers make more informed choices among brands, it can inadvertently lead to the opposite effect by misleading consumers regarding the relative merits of competing brands (Li & Dai, 2018). Eventually, this will not only lead to blind consumption and resource wastage but also cannot ensure the sustainability of daily life production. Fortunately, the Sustainable Development Goals (SDGs) have received high attention worldwide for their good results in health, environment, sustainability, quality of life, and economic development. Many countries have made various explorations and studies on the normative use and governmental supervision of comparative advertising and established relevant legal norms and supervision systems in line with their national conditions. It is of great significance to review the change in attitudes towards the use of comparative advertising regulation in different countries and regions, analyze and summarize the reasons for the change, and explore the future development trend, so as to improve relevant legislation and guide people to adopt sustainable production and consumption pattern. Further, it is the proper meaning of economic sustainable development to strengthen the management of this kind of propaganda form with distinct contrast, good and bad, so as to give full play to its positive role while reducing its negative impact as much as possible.

Based on this point, CiteSpace 6.2.R4 was used to visually analyze the literature related to the legitimacy recognition of comparative advertising in the past 30 years from the perspectives of co-occurrence, co-citation, and reference cluster to build up the knowledge mapping and find out the academic hotspots and development trends. In the 1990s, with the rapid development of economic in the world, comparative advertising is more widely used in commercial promotion. The Anti Unfair Competition Law of the People's Republic of China was published in 1993 in China, and the Advertisement Law of the People's Republic of China was published in 1994. Therefore, there has been more academic research in the field of comparative advertising and its legitimacy recognition since then in China. These are the reasons why the number of relevant literature from SSCI and CSSCI increased around 1993, and why literature reviews and visualization analysis were selected from 1993 to 2023.

2. Literature review

2.1. Traditional literature review

Comparative advertising and its legitimacy recognition, as an important factor that may impact fair market competition, consumer rights protection, and sustainable economic and social development, has always been the focus of attention in the academic, political, and industrial sectors across nations worldwide. Early research primarily focused on adopting regulatory experiences from developed nations and summarizing the prevailing discussions in these countries. However, as research progressed in depth and scope, the research perspective and methods of comparative advertising have some changes, which can be summarized into the following three aspects.

Firstly, from the perspective of research methodology, while the comparative research method is commonly utilized, there is a gradual increase in the application of methods like case studies, historical analysis, and empirical analysis to the study of comparative advertising.

On the one hand, many scholars advocate learning towards exploring the best application method of comparative advertising by comparing the regulatory approaches of different countries. Taking China as an example, available literature indicates that although the term ‘comparative advertising’ has been in use for some time, it wasn’t until the 1990s that domestic scholars gradually directed attention to related issues in this field. China has long been devoted to poverty alleviation and achieving moderate prosperity. Despite having lifted millions out of poverty and attaining a moderately prosperous society, it has become the world’s second-largest economy. However, ensuring sustainable consumption and production remains a significant challenge. Compared with developed countries, such as Britain and the United States, China’s research on comparative advertising started relatively late and has consequently not formed a unified regulation. Therefore, early attention from scholars has been on integrating and comparing the legitimacy regulations and regulatory pathways present in other countries. Yang (2016) reviewed the existing regulatory experiences in the European Union and the United States, pointing out that both allow the publication of truthful, non-misleading comparative advertising. However, the European Union pays more attention to protecting the interests of trademark owners and imposes strict restrictions on the use of comparative advertising, which is more suitable for the early development of comparative advertising. In contrast, the United States encourages free competition and consumer welfare maximization, thus holding a more open attitude that better aligns with market development needs, representing a future legislative trend. Xu and Deng (2005) indicated that both the European Union and the United States recognize the legitimacy of comparative advertising and explained the differences between them. Zhou (2008) and Fang and Shen (1997) divided the regulatory methods of different countries into ‘negative model’ and ‘restrictive model’, and put forward the view that ‘the advantages of comparative advertising outweigh its disadvantages, and it is more in line with the development law of market economy to adopt restrictive legislation rather than completely negating comparative advertising’.

On the other hand, introducing practical case studies for discussion and validating viewpoints through survey data has gradually become an important approach for some scholars. To emphasize the importance of a unified approach to regulating comparative advertising, Liu (2014) pointed out the negative impact of the lack of unified regulation on judicial order and authority by discussing the case ‘Wong Lo Kat vs. JDB Group’. To explore the reasons leading to different attitudes of people in various countries towards comparative advertising and non-comparative advertising, Kim et al. (2018) collected and analyzed the different reactions of people in Korean and American when exposed to both types of advertisements, comparing and analyzing the cultural values of individualism prevalent in the US and collectivism in South Korea. Similarly, Byun and Jang (2018) designed comparative and non-comparative advertisement ‘comparative advertising for destinations’ to collect public opinions. Ultimately, they found that tourists had more positive reactions to comparative advertisements than non-comparative advertisements and had more positive reactions to well-known places than non-well-known places. Some scholars have noticed the influence of consumers’ emotions when exposed to different types of advertisements. Wu and Wen (2019) divided advertisements into two forms: ‘positive comparison’ and ‘negative comparison’, based on whether the advertisements highlighted product advantages over competitors or showcased competitors’ disadvantages. They discovered that when consumers are exposed to negative comparative advertisements, they will have negative emotions and react more negatively to the information conveyed by the advertisements. Yucel-Aybat and Kramer (2018) pointed out that although operators would try to make consumers recognize their own advantages by describing consumers’ negative experiences with competitors’ products, different consumers’ responses to such advertising content may not always be positive. Empirical analysis found that brands with higher quality were more likely to benefit from advertising than those with negative comparisons.

Secondly, from the perspective of research content, the classification, the advantages and disadvantages of comparative advertising are topics that almost every scholar will be involved in the discussion. Moreover, contents on how to coordinate the relationship between advertising and sustainable development have become more popular topics in recent years.

According to different criteria, scholars, such as Sun (2008) believe that comparative advertising can generally be divided into four categories. Firstly, based on the attitudes towards other competitors,

comparative advertising can be divided into critical comparative advertising and associative comparative advertising. Secondly, according to the nature of the comparative content, it can be divided into objective and subjective comparative advertising. Thirdly, based on the different objects compared in the advertisement, it can be categorized as comparative advertising focusing on the personal characteristics of competitors or comparative product features. Lastly, according to whether the names of competitors are mentioned, comparative advertising can be classified into direct comparative advertising and indirect comparative advertising. Friede (1979) proposed that the distinction can be made according to the principle of 'the number of competitors in the market'. Even if the operator only vaguely compares with 'other competitors in the same industry', it should also be considered as direct comparative advertising if there are only a few similar products in the market. In the ongoing discourse about comparative advertising regulations, an essential point of contention around whether the objects of comparison should be identified in advertising norms. In response, many scholars have chosen to classify comparative advertising into 'direct comparative advertising' and 'indirect comparative advertising' based on whether the advertisement explicitly mentions competitors. They subsequently evaluate the disadvantages and advantages of these categories separately.

Scholars opposing the use of direct comparative advertising in commercial advocacy mainly express concerns from four perspectives. Firstly, the easily use of comparative advertising leads to phenomena that violate fair market competition, giving rise to marketing methods that maliciously expose the flaws of other products rather than introducing the quality of one's own product (Yang, 2016). Secondly, it's difficult to avoid one-sided comparison. Comparing only one's strengths with the opponent's weaknesses may jeopardize the objectivity and fairness of the comparison, potentially leading to consumer misguidance (Liu, 2014). Thirdly, the extensive use of direct comparative advertising easily confronts consumers with conflicting and complex information, leading to decreased trust in the content of the advertisements (Tan & Xia, 2001). Fourthly, to a certain extent, direct comparative advertising also promotes competitors' products or services, which may lead to the weakening of advertising effect and lower efficiency (Zhou, 2008).

However, other scholars hold the opposite perspectives, believing that direct comparative advertising should be allowed to stimulate the market and help consumers make shopping decisions. Zhang (2007) held the view that comparative advertising can provide consumers with more information intuitively and reduce the cost of obtaining information to help them make decisions. Scholars, such as Huang (2017) pay attention to the promotion of direct comparative advertising to free market competition. It is also believed that direct comparative advertising can free market competition (Li, 2001). Moreover, direct comparative advertising enables some enterprises to more clearly recognize their own shortcomings and promptly make targeted improvements, thereby promoting business development, product upgrades, and market competition (Zhang & Peng, 2005).

In light of the 'Sustainable Development Goals' initiative, scholars from different disciplines believe sustainable development is one of the current focuses. Similarly, scholars conducting research on advertising also consider 'Advertising Sustainability' as an important theme. Scholars investigating green advertising, the incorporation of sustainability messages in advertising, and the way in which these can be effectively communicated, also emphasize the need to explore strategies that mitigate the adverse environmental impact of advertising, considering both social and technological factors, foreshadowing a potential avenue for future research (De Pelsmacker et al., 2023).

Considering environmental sustainability, Parssinen et al. (2018) highlighted that online advertising significantly contributes to energy consumption, potentially leading to environmental degradation. Hence, industries leveraging internet technology must implement measures to curtail carbon dioxide emissions. As for social sustainability, Rathee and Milfeld (2023) suggested that fair trade employee training could be necessary. In terms of economic sustainability, Bachnik and Nowacki (2018) discovered that due to the heightened communication effectiveness of advertisements disseminating controversial information, most companies tend to align with social norms and environmentally friendly policies in other operations rather than in advertising.

Thirdly, from a research perspective, the discussion of comparative advertising related to law issues has gradually attracted the attention of scholars, with the refinement of relevant rules and the improvement of the advertising supervision systems becoming vital research subjects.

Some scholars have made a detailed analysis of situations where comparative advertising might lead to unfair competition, studying its regulation from the perspective of anti-unfair competition law. For example, Huang (2017) discussed the regulation system of three types of advertising: false or misleading, using others'

goodwill, and slandering others' goodwill. Other scholars have paid attention to the advertising supervision system. For instance, Long (2017) proposed that 'adopting social governance in market regulation is essential to fully realize the positive effects of comparative advertising'. As the United States is considered to have a relatively mature advertising regulatory system, Pompeo (1986) and Crihfield (1980) outlined and analyzed this self-regulatory system at the core of the industry. Meanwhile, Lee (1981) and Gallo (1986) started from the view of 'reducing the negative effects of direct comparative advertising', putting forward that the validity of advertisements can be determined by referring to the results of 'forced exposure' and 'day after recall'.

2.2. Review of bibliometric analysis

The above traditional literature reviews have revealed a series of academic research results, which, however, remains unclear to us what are the real research status, hotspots, and trends, although many literature reviews have already been done through traditional methods. Furthermore, nowadays digital technology has achieved greater progress than ever before, and the forms of advertising have been changing for maximum profits by neglecting the interests of consumers, the damage to social resources, and sustainable consumption and production patterns. Accordingly, the hotspots of research on advertising also seem to be changing. Therefore, a more convenient and modern retrieval method for literature review needs to be adopted for further study.

Bibliometric analysis is an effective method often used to find out the research status, hotspots, and trends in a large number of documents. With the help of statistical analysis, various elements of academic publications are analyzed in this way. The number of articles published or cited and the cooperation involved reveal how an article affects subsequent research (Yavuz et al., 2021). Bibliometric analysis is 'the statistical analysis of books, articles or other publications to measure the output of individuals/ research teams, institutions, and countries, to identify national and international networks' and draw a development map of new multidisciplinary science and technology fields (Kamran et al., 2020; Zhang et al., 2021). Presently, CiteSpace is one of the scientific software usually adopted for bibliometric analysis. It can display the evolutionary process of the relevant field with a knowledge map of the citation network through a spatial layout in a diversified, time-sharing, and dynamic citation analysis visual method.

Based on this point, CiteSpace 6.2.R4 was used to visually analyze the literature related to the legitimacy recognition of comparative advertising in the past 30 years from the perspectives of co-occurrence, co-citation, and reference cluster to build up the knowledge mapping and find out the academic hotspots and development trends. This study attempts to capture the overall research knowledge on the picture of legitimacy recognition of comparative advertising and explore its frontiers and knowledge bases. It investigates research hotspots using keyword co-occurrence and co-citation. It systematically collects, describes, analyzes, and summarizes research papers related to the legitimacy cognition of comparative advertising by using bibliometric analysis methods. A knowledge domain was mapped using CiteSpace 6.2.R4. Such an analysis can provide valuable insights into the knowledge structure within the research field of the legitimacy recognition of comparative advertising and help scholars find the research hotspots and trends of the legitimacy recognition of comparative advertising.

However, there are few visualization studies on the legitimacy recognition of comparative advertising. This paper mainly discusses the following research questions:

Q1: who, as the co-authors, have actively devoted themselves to the research of the legitimacy recognition of comparative advertising and are more influential than others?

Q2: Which countries, regions, and organizations have actively collaborated in the research of the legitimacy recognition of comparative advertising and are more influential than others?

Q3: What are the hot research topics and emerging trends in the research on the legitimacy recognition of comparative advertising?

Q4: What are the journals and references cited most often in the research on the legitimacy recognition of comparative advertising?

Q5: What are the present situations, and future directions of studies of the legitimacy recognition of comparative advertising on sustainable development?

3. Research materials and method

3.1. Research data sources

To ensure that the original data were accurate, comprehensive, and had a high-quality degree of interpretation, the study used Web of Science core collection (with SSCI) as one data source and the retrieval search topic was limited to Topic= ('comparative advertis*' AND legal*), refined by languages: English or Chinese, document types: article, and publication years: from 1993 to 2023. However, through this search string, only 37 articles were found in the Web of Science core collection. Therefore, for the purpose of covering data as completely as possible, the search string was extended to Topic = ('comparative advertis*'), yielding a total of 1147 articles. Then, the titles, abstracts, and keywords of all the data were manually screened to filter out articles related to legality. After combing the two results and removing duplicates, as well as filtering out 'review' and 'book review', a total of 856 articles were retrieved from the Web of Science core collection. Similarly, the same process was used to search data from the Chinese Social Science Citation Index (CSSCI) by using a search string with the Chinese language as '比较广告' OR '比较广告合法性'. Finally, 20 articles were retrieved from CSSCI. All the 876 data were exported with proper format for further study (Figure 1).

3.2. Research methods and tools

In this study, a scientometric visualization method using CiteSpace was used to review the literature. Specifically, co-occurrence analysis including co-occurrence of authors, institutions, and countries/regions was used to answer the research Q1 and Q2. Co-keyword analysis and cluster analysis were used to retrieve the hot research topics and emerging trends (Q3). As for research Q4, the co-citation analysis of co-cited journals and co-cited documents was conducted to locate the most popular journals and the most influential articles. In terms of research Q5, cluster analysis of co-cited documents helped to identify the present situations and future directions. Detailed information about the three types of analysis is presented as follows:

Co-occurrence analysis: It is a type of content analysis method, seeking to extract the themes of topics from the content of texts (Sedighi, 2016). Co-occurrence analysis of the keywords can reflect the research hotspots in a field (Kaushal et al., 2023), and other types of co-occurrence analysis, such as author,

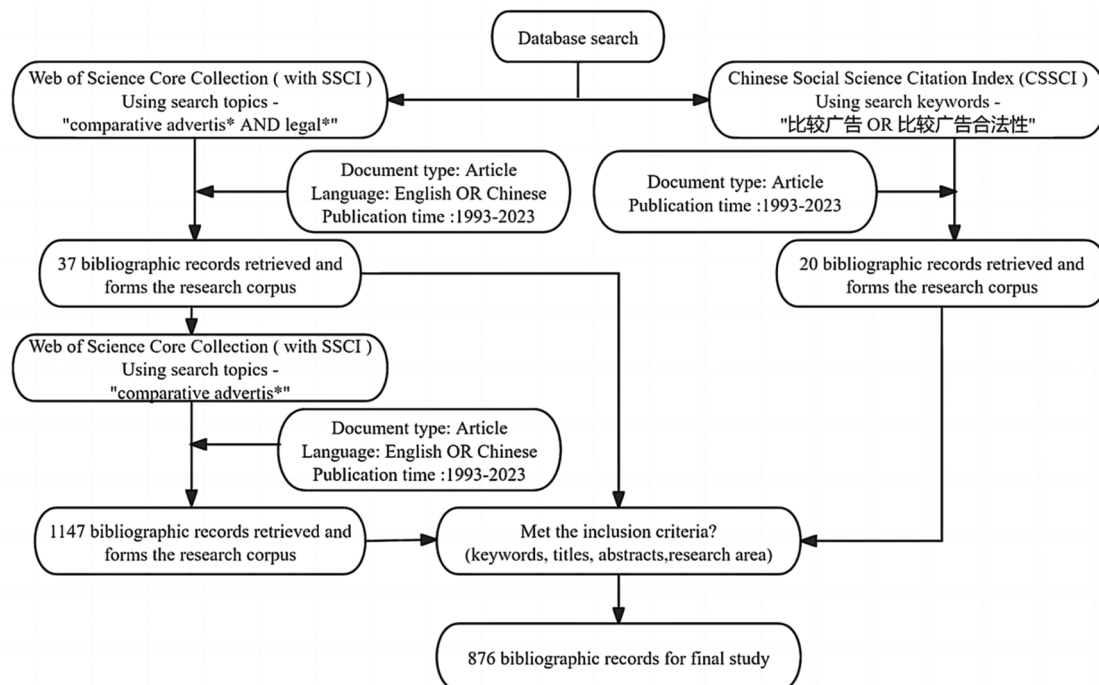


Figure 1. Literature search and indexing strategy.

institutions, and countries/regions co-occurrence analysis help to identify the distribution situations of the topic.

Co-citation analysis: This analysis reflects the frequency with which two specific items of period research are cited in subsequent articles (Yang et al., 2019). The higher the co-citation frequency is, the closer the academic relationship is. The frontier research problems in any field can be reflected by the articles actively cited by scholars, and they also reveal the emergence of research trends and new topics (Chen, 2006).

Cluster analysis: It is used to analyze the similarity between relevant papers and emergent topics, as well as to identify research trends (Van Eck & Waltman, 2017). Whether a cluster is reasonable or not is measured by mean silhouette S . A higher S implies better homogeneity (Lim & Aryadoust, 2022), if S is higher than 0.5, the cluster is regarded as reasonable (Hou et al., 2018). This study used log-likelihood rate (LLR) to label each cluster because LLR allows the generation of the best results in terms of coverage and uniqueness (Chen, 2006).

In terms of data processing, the obtained data is transformed into the appropriate format and then imported into the CiteSpace software. Regarding parameter settings, due to a time span of 30 years, to ensure the visibility of the data map, a time slice of five years is used. The selection of node types is based on the analyzed content, and the selection criteria use the g -index with a set value of $k=25$. The map is pruned using the pathfinder method. If the generated map is not reasonable, adjustments to the parameters will be made as needed. If there are no other instructions, these settings will be considered as the default settings.

4. Results and analysis

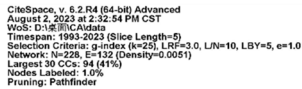
4.1. Co-occurrence analysis

4.1.1. Co-author analysis

Figure 2 shows the author's co-occurrence network diagram. From the point of view of the number of nodes, a large number of scholars have conducted in-depth research on the legitimacy of comparative advertising in the past 30 years. Among them, Barone MJ (seven articles), Rose RL (six articles), Manning KC (six articles), and Miniard PW (six articles) contributed the most in this field. Table 1 lists the top 10 authors in terms of their research output. By comparing the number of nodes and the number of connections, it can be found that the number of nodes connected by line segments in the figure is far more than that of nodes alone, indicating that in the past 30 years, most of the authors of research in this field prefer to discuss the issues in the form of cooperation, rather than conduct independent research centered on individuals. In addition, although Rossi Claudio and Angeloni Silvia have only a single cooperation partner, several relatively stable cooperative teams have also been formed, such as the research team formed by four scholars Barone MJ, Rose RL, Manning KC, and Miniard PW, the team formed by Grewal D, Kavanoor S, Compeau LD, and the team of Maier Christian, Mattke Jens, Reis Lea and Weitzel Tim.

4.1.2. Co-institution analysis

This section explores the contributions of different institutions to the body of knowledge and research progress in this field. As shown in Figure 3, most institutions have different degrees of cooperative relationships. From the size of the nodes, driven by the research institutions, such as State University System of Florida (24 articles), University of Texas System (11 articles), Egyptian Knowledge Bank (11 articles), University of Oxford (10 articles), and the Ministry of Education & Science of Ukraine (10 articles), studies on the legality of comparative advertising have been made remarkable progress. It is worth noting that among these institutions, both the Egyptian Knowledge Bank (EBK) and the Ministry of Education & Science of Ukraine had citation bursts during 2019–2023 (Figure 4). On the one hand, compared with other agencies during this period, it may indicate that these two agencies paid more attention to advertising problems and conducted in-depth research in the field of comparative advertising. On the other hand, because the time of citation's bursts coincided with the time of post-COVID-19 economic recovery, their discussions may focus on more cutting-edge and novel topics in the field of comparative advertising. As a result, the two institutions may become major and play a more central role in future related research.



Authors

Authors	Year	Counts	Degree
Barone MJ	1993	7	1
Rose RL	1993	6	3
Manning KC	1993	6	1
Miniard PW	1993	6	1
Grewal D	1997	4	2
Nielsen Rasmus Kleis	2018	4	2
Kayri Murat	2019	3	3
Mattke Jens	2019	3	2
Maier Christian	2019	3	1
Fisher Carla L	2019	3	1

The co-country network (Fi

The co-country network (Figure 5) highlights that study on the legitimacy of comparative advertising is widely carried out around the world, and scholars attach great importance to cross-regional exchanges and cooperation. On the one hand, although some countries and regions have tried collaborative research, they have not yet formed a research team with a close cooperative relationship, which may be caused by many factors, such as different academic concepts or cooperation costs. On the other hand, relatively strong cooperative relationships, such as Ireland, Finland, Bulgaria, and Greece also exist, which may be driven by geographical proximity or shared cultural practices. From the point of node size, the USA, China, and Spain produced a significant number of articles (255, 80, and 74, respectively), showing more enthusiasm for promoting the research. The centrality of nodes measures whether nodes are strongly interconnected with each other (Pestana et al., 2019), the higher the centrality value is, the stronger the role the node plays in the network. Nodes with centrality values greater or equal to 0.1 can be considered important nodes (Chen, 2006). When considering node centrality values, besides the USA, China, and Spain, countries, such as Germany, the UK, Canada, and Poland also play a key role in this field (Table 2). The USA, in particular, stands out with both the largest number of published articles and

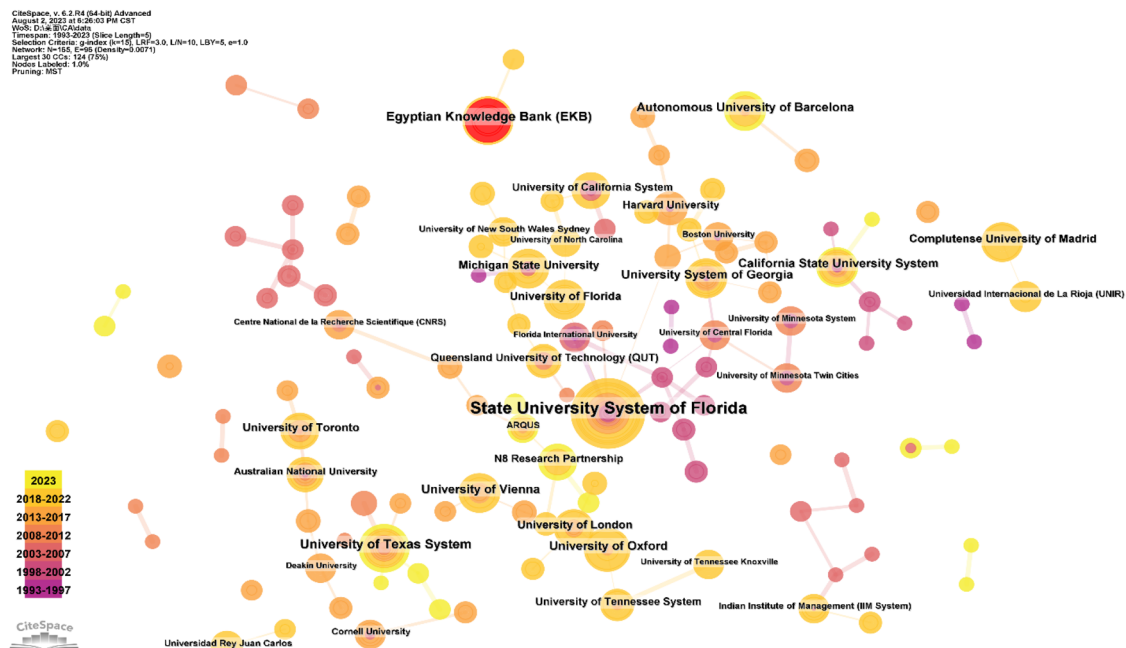


Figure 3. Co-institution network.

Top 2 Institutions with the Strongest Citation Bursts

Institutions	Year	Strength	Begin	End	1993 - 2023
Egyptian Knowledge Bank (EKB)	2019	4.43	2019	2022	<div style="width: 100%; height: 10px; background: linear-gradient(to right, blue, red);"></div>
Ministry of Education & Science of Ukraine	2019	3.95	2019	2023	<div style="width: 100%; height: 10px; background: linear-gradient(to right, blue, red);"></div>

Figure 4. Institution's citation burst.

the highest centrality value. On the one hand, this is because the 'We try harder' advertisement released by Avis in the USA in the early 1960s is considered to be the earliest comparative advertisement in the world, and comparative advertisement in the USA has been rising since the 1990s. Therefore, the USA is considered to be the origin and rise of comparative advertising (Hatry, 1981). The attitude of comparative advertising in America was finally formed after the long-term in-depth discussion of the academics, the improvement of the advertising industry's self-regulation system, and the continuous exploration of judicial practice. On the other hand, considering the 1970s as a watershed, American determination of the legitimacy of comparative advertising has gone through two stages: allowing only indirect comparisons and encouraging direct comparisons. It was only after extensive discussions by numerous scholars, ongoing improvements in the self-regulation of the advertising industry, and continuous exploration in judicial practice that the USA ultimately adopted a stance supporting direct comparisons.

4.1.4. Co-keyword analysis

Keywords, as a highly refined content of the article, can be used as an important tool to explore and understand the core meaning and central idea of the article. Therefore, the co-occurrence analysis of article keywords is an effective way to reveal the research hotspots and changing trends in related fields. A keyword co-occurrence graph is formed with keywords as nodes (Figure 6). As can be seen from the figure, the nodes corresponding to the five keywords 'impact', 'model', 'information', 'strategy', and 'social media' are relatively significant. This indicates that scholars engaged in the study of the legitimacy of comparative advertising may be inclined to carry out investigations and research on the aspects of the impact of comparative advertising, the relationship between comparative advertising and social media, coping strategies, and the information conveyed by comparative advertising. Among them, since the role and influence of comparative advertising in commercial publicity reflects a country's management attitude

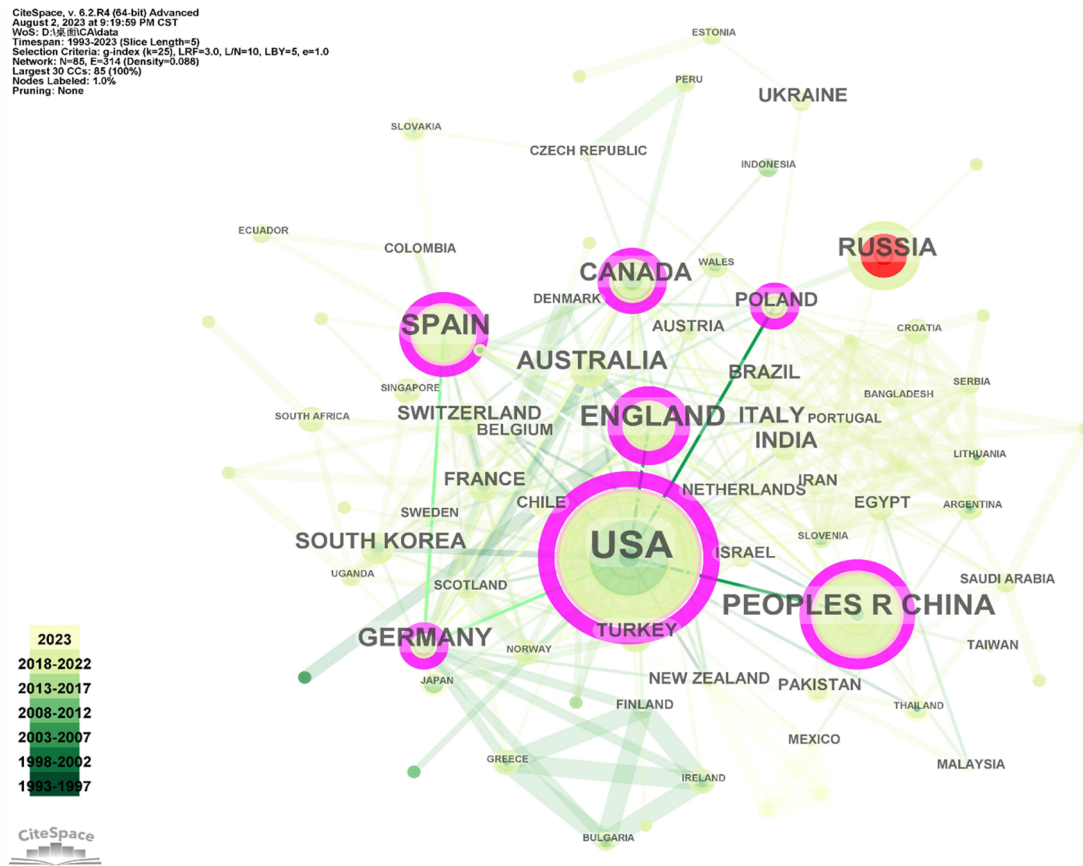


Figure 5. Co-country network.

Table 2. Top seven countries' centrality scores.

Country	Centrality	Counts
USA	0.42	255
England	0.24	61
Germany	0.16	39
Canada	0.15	36
Spain	0.15	74
Poland	0.15	14
People's Republic of China	0.12	80

towards this kind of publicity, scholars would inevitably have to conduct research on this issue. The theme of the role or influence of comparative advertising has been at the heart of the research for nearly 30 years.

At the same time, by sorting out the keywords with a centrality value ≥ 0.1 , seventeen keywords including region, age, policy, and other aspects are obtained (Table 3). On the one hand, more keywords with high frequency and centrality appeared from 1990 to 2000, because it was the era of rapid economic development and rapid media update in many countries. Against this background, more and more people participated in the market competition, hoping to get more consumers' attention and gain more market share through advertising. As a result, comparative advertising has quickly come into public view and has been widely used. On the other hand, the discussion of the legitimacy of comparative advertising involves many considerations. The keywords of 'age', 'children', and 'adolescents' indicate that scholars have noticed that children, adolescents, and others are relatively deficient in the ability to judge the authenticity of information conveyed by advertising and their ability to screen information, thus the effect of comparative advertising targeted at different age groups may be different. Therefore, some scholars tend to study the reactions of underage groups after watching the advertisements. And then, the appearance of the keywords of 'impact', 'attitude', 'choice', 'strategy', 'policy', and 'involvement' also shows that clarifying the role and influence of advertising is an important premise to judge the legitimacy of comparative advertising.



Table 3. Top 17 keywords' centrality scores.

Keywords	Centrality	Counts	Year
Impact	0.31	73	1993
Age	0.15	7	2003
Attitude	0.14	27	1994
Advertisements	0.19	26	1994
Ad	0.1	10	1997
Information	0.18	59	1993
Model	0.13	46	1995
Policy	0.17	10	2011
Involvement	0.1	14	1994
Evolution	0.11	16	1993
Appeals	0.1	10	2000
Strategy	0.11	37	1996
Choice	0.1	8	2011
Children	0.12	8	2014
Behavior	0.1	24	1996
Adolescents	0.12	8	2003
United States	0.13	23	1999

In addition, keywords indicating Citation bursts also represent significant themes in the field of comparative advertising research (Figure 7). Firstly, social media shows the strongest citation bursts

Top 6 Keywords with the Strongest Citation Bursts

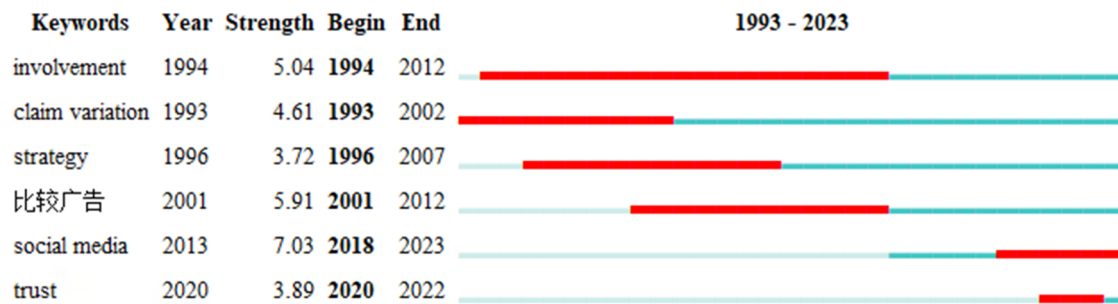


Figure 7. Keywords' citation bursts.

between 2018 and 2023, which is consistent with the fact that '2013–2023' is the time for continuous improvement and rapid development of all kinds of communication media, indicating that the application of comparative advertising may be closely related to the development of social media. The increase in the number of social media platforms and the update of their functions may make advertising appear in a more hidden form of comparison, which not only promotes the development of the advertising industry but also increases the difficulty for the government to conduct normative management and supervision. In the future, social media may still be a hot topic in this field. Secondly, the three keywords of 'involvement', 'strategy', and '比较广告 (comparative advertising)' lasted for more than a decade, although the time of their appearance is far away from now. This may indicate that the academics have reached a consensus on the concept, nature, and role of comparative advertising itself and even in the norms, guiding functions, and coping strategies of relevant government departments, so the same kind of discussion on these topics has been reduced in the past decade.

4.2. Co-citation analysis

4.2.1. Document co-citation analysis

The co-citation analysis (see Figure 8) shows that by 2023, a total of nine cited articles have received 5 or more citations (see Table 4). Among them, three articles written by Grewal et al. (1997), Hayes and Scharkow (2013), and Pechmann and Ratneshwar (1991), also appeared in citation bursts (Figure 9). Pechmann and Ratneshwar (1991) put forward the opinion that direct comparative advertising can more obviously show the difference between the advertised brand and the compared brand, and demonstrated the role of comparative advertising in brand positioning. Grewal et al. (1997), based on the previous research results of other scholars, concluded that comparative advertising is superior to non-comparative advertising in attracting audience attention and enhancing brand awareness, further put forward the view that the comparison forms of direct and indirect advertising may also have an impact on consumer purchase intentions. These two articles, focusing on the study of direct comparative advertising and putting forward the view that direct comparative advertising has the positive significance of improving consumers' cognition of brands and helping them make consumption decisions, appeared in citation bursts in 1993–1997 and 1998–2002, respectively. This indicates that the different effects of direct comparison and indirect comparison attracted the attention of scholars in the 1990s. Consequently, an increasing number of scholars began to explore the significance of this differentiation. To a certain extent, it also laid the foundation for countries to allow limited use of direct comparative advertising in the future.

4.2.2. Journal co-citation analysis

An analysis of the journal co-citation network graph (Figure 10) can identify which journal has a greater impact in the field of comparative advertising research.

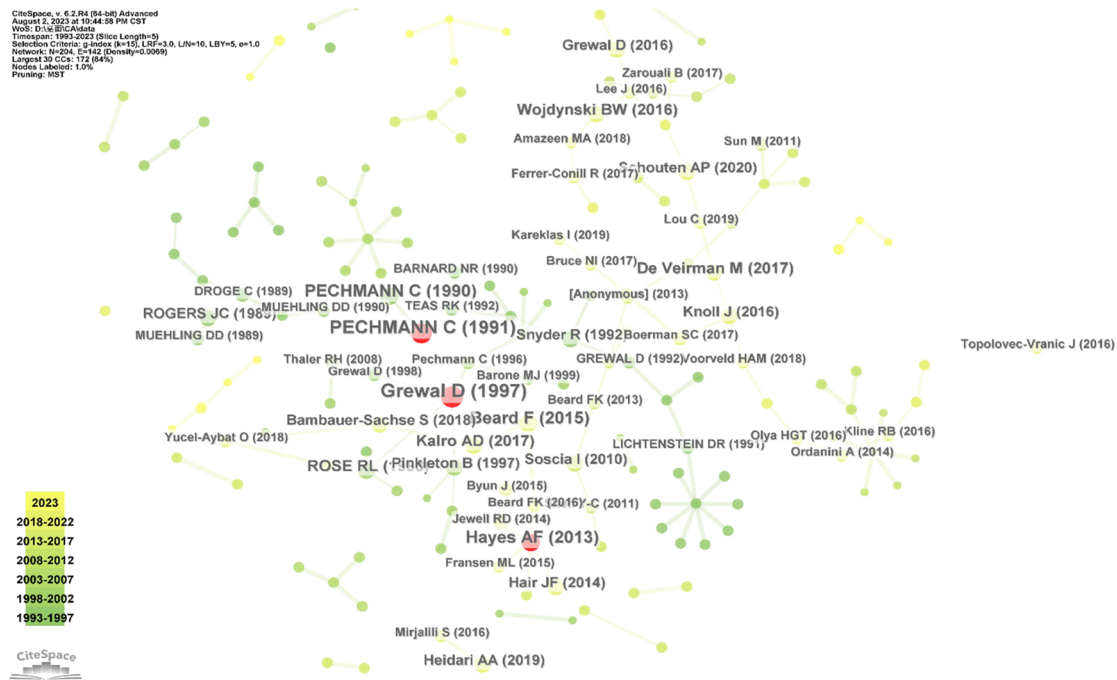


Figure 8. Document co-citation network.

Table 4. Top nine co-cited documents.

Author	Frequency	Year
Grewal D	8	1997
Pechmann C	7	1991
Pechmann C	6	1990
Beard F	6	2015
Hayes AF	6	2013
Rose RL	5	1993
Wojdyski BW	5	2016
Kalro AD	5	2017
De Veirman M	5	2017

Top 3 References with the Strongest Citation Bursts

References	Year	Strength	Begin	End	1993 - 2023
PECHMANN C, 1991, J CONSUM RES, V18, P145, DOI 10.1086/209248, DOI	1991	3.56	1993	1997	
Grewal D, 1997, J MARKETING, V61, P1, DOI 10.2307/1252083, DOI	1997	4.67	1998	2002	
Hayes AF, 2013, INTRO MEDIATION MODE, V0, P0	2013	3.48	2013	2022	

Figure 9. References' citation bursts.

Firstly, the node size represents the frequency of co-citations of different journals. As shown in Table 5, there are seven journals with more than 100 citation frequencies. These journals and magazines mainly published articles on the business environment, market competition, consumers, and advertising. On the one hand, it shows that the legitimacy of comparative advertising may involve the discussion of the legitimacy of market competition behavior, the protection of various rights and interests of consumers, and the concept and nature of comparative advertising. On the other hand, it also shows that the legitimacy of comparative advertising should not only be discussed at the level of law, but also may involve communication, economics, and other interdisciplinary issues.

Secondly, the centrality of nodes has the significance of identifying journals that play a central role in related research. After sorting out all cited journals, it was found that there were 24 journals with a centrality value ≥ 0.1 , among which four journals had a centrality score of more than 0.25, as shown in Table 6.

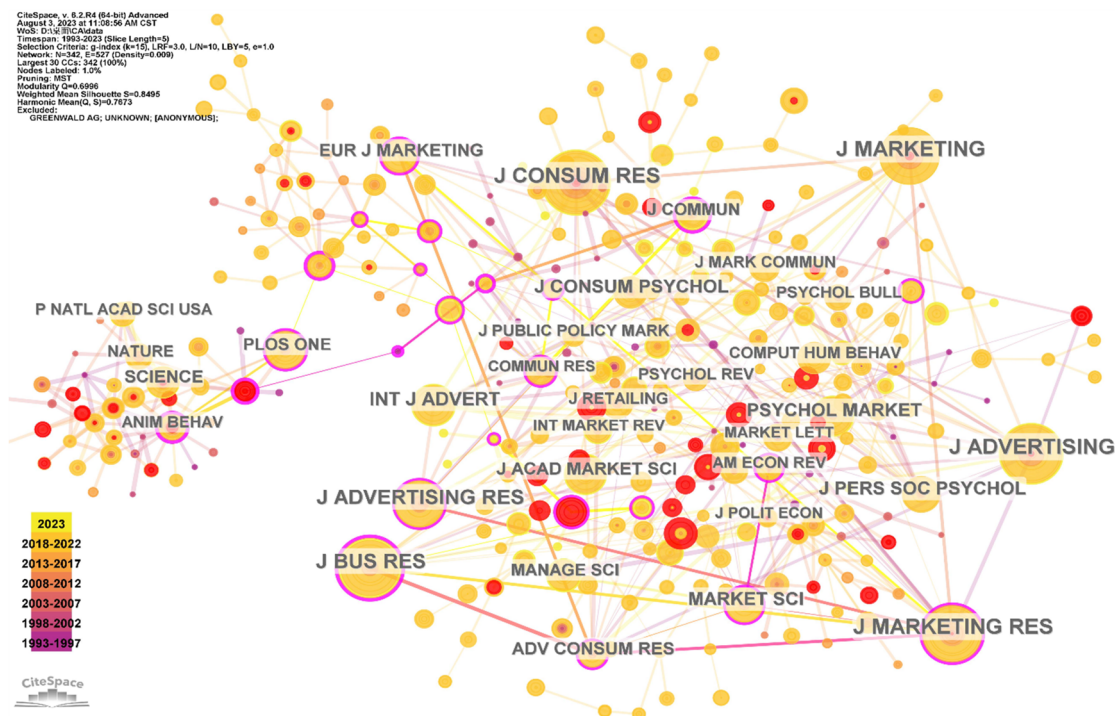


Figure 10. Journal co-citation network.

Table 5. Top seven cited journals' frequency.

Journal	Frequency	Year
Journal of Advertising	184	1993
Journal of Consumer Research	183	1993
Journal of Marketing Research	176	1993
Journal of Marketing	176	1993
Journal of Advertising Research	153	1993
Journal of Business Research	141	1998
International Journal of Advertising	104	1993

Note: Year = the Earliest publication time of relevant article from the journal (1993–2023).

Table 6. Top four cited journals' centrality scores.

Journal	Centrality	Year
Journal of Broadcasting & Electronic Media	0.39	1995
Journal of Communications	0.35	1999
Journal of Comparative Physiology A	0.27	1996
Journal of Ecology	0.27	1995

Note: Year = the Earliest publication time of relevant article from the journal (1993–2023).

This shows that as a means of publicity and market competition with the help of radio, television, and other media, scholars discuss the legitimacy of comparative advertising from the perspective of sustainable economic development. Furthermore, the management attitude and regulation model were determined through the study of the impact of comparative advertising in the market competition on the operators, consumers, and other subjects.

Thirdly, the analysis of periodical citation bursts can more clearly show the journals that are more influential and more concerned by scholars in different stages. It can be seen from Figure 11 that the citation bursts of journals, such as *Journal of Political Economy*, *Behavioral Ecology and Sociobiology*, *Animal Behaviour*, *Econometrica*, *Journal of Comparative Physiology A*, and *Advertising Age*, lasted for 20 years or more. This indicates that these journals may have caught hot issues in the field in the past, and put forward valuable views, which played a positive role in promoting research in this field. It also underscores that the issues of the role of comparative advertising in market operation and economic activities,

Top 60 Cited Journals with the Strongest Citation Bursts

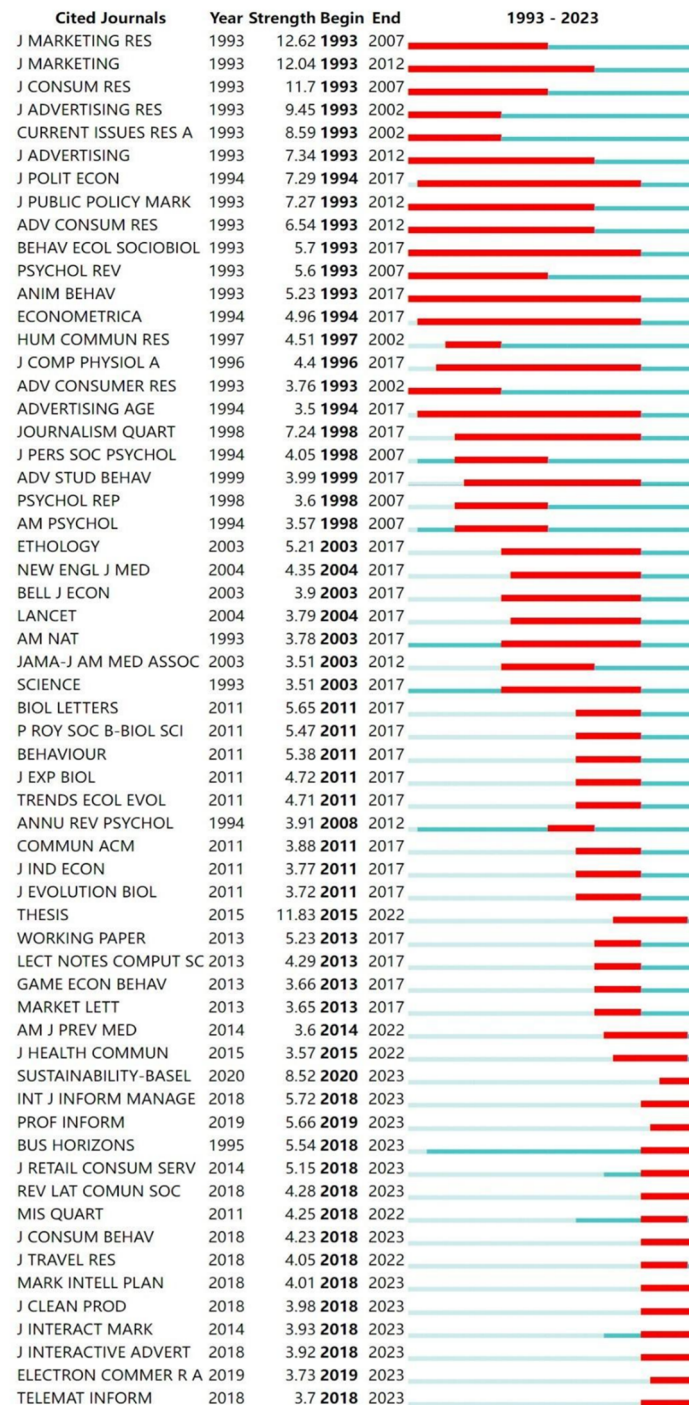


Figure 11. Cited journals' citation bursts.

along with related investigation and demonstration through interdisciplinary knowledge, such as behavioral psychology, have always been focused by academics in the process of discussing its legitimacy. On the other hand, journals, such as *Sustainability (Basel)*, *International Journal of Information Management*, *Journal of Retailing and Consumer Services*, and *Journal of Consumer Behaviour* appeared in citations bursts during 2018–2023. This indicates that the current academic discussion on the legitimacy of comparative advertising is more focused on the realization of the goal of sustainable economic development, the function of advertising in transmitting information, and the protection of consumer rights and interests.



Figure 12. Document co-citation clusters.

These journals will play a more boosting role in promoting future research. Taking *Sustainability (Basel)* as an example, Jigani et al. (2020) suggested that one of the important reasons why governments promote a sustainable selective waste collection process to avoid side effects for the environment and public health may be the excessive advertising and aggressive advertising campaigns. Meanwhile, due to the changing and guiding role of advertising on consumer behavior patterns, Salimi et al. (2020) proposed that advertising can be used as an important tool for achieving SDG.

There are 19 clusters in the citation cluster analysis graph (Figure 12). Table 7 is obtained by ranking these 19 clusters according to the number of literatures included. On the one hand, the S value of each cluster is >0.9, which further indicates that the clustering results have high quality and the topics involved in the articles in each cluster are consistent. On the other hand, the number of articles in each cluster is relatively small and varies greatly. The maximum and minimum number of articles are 29 and 5, respectively, and there are only six clusters with more than 10 articles, which illustrates that scholars have not reached a consensus on the specific theme of the research of comparative advertising. Furthermore, most of the clusters were formed between 2010 and 2019, which is consistent with the fact that the development of social media forms was diversified, multi-channel Internet technology was applied, and comparative advertising has become more widely used by market operators for commercial promotion.

As a whole, clustering labels generally include discussions on the classification and impact of comparative advertising (such as cluster#4), the relationship between advertising and media (such as cluster#7), and the ways in which comparative advertising works (such as cluster#17). However, although the current research on comparative advertising may seem to involve discussions from multiple dimensions, the topic ‘the connection between comparative advertising and sustainable development’ has not yet attracted more attention from scholars.

On the one side, clustering labels named sustainability or other related topics have not yet been formed, indicating that this research perspective has not get widespread attention from scholars and formed no consistent research topic. On the other side, even if a small number of scholars have focused on the importance of sustainable development in the advertising field during the research process, they

Table 7. Documents co-citation clusters.

Cluster ID	Size	Silhouette	Label (LLR)	Mean (year)
#0	29	0.931	Native advertising	2017
#1	22	0.928	Judgments	1990
#2	20	1	Product category involvement	1996
#3	14	1	Literature review	1990
#4	14	0.98	Comparative advertising	2015
#5	10	0.946	Perceived extension risk	2011
#6	9	1	Benefit appeal	2007
#7	9	1	Mass media	2002
#8	8	0.959	Voter turnout	2012
#9	8	1	Differential game theory	2010
#10	7	1	Chaos and complexity	2017
#11	6	1	Strategic communication	2003
#12	6	1	Chemicals in secondhand vapor	2013
#13	5	1	Chile	2011
#14	5	1	Alcohol	2011
#15	5	1	Active presence	2017
#16	5	1	Growth models	2019
#17	5	1	Perceived risk	2002
#18	5	1	Science	2018

have only had very limited discussions. Firstly, most scholars focus on the potential impact of advertising on the sustainable development of good health and well-being (Biener, 2002; Jernigan & Ross, 2014; Rosenthal et al., 2002; Smith et al., 2014), and sustainable development of environment (De Pelsmacker et al., 2023; Parssinen et al., 2018), rather than the sustainability of production and consumption. Secondly, although a small number of scholars have noticed the guiding role of sustainable development goals in production and consumption in the field of advertising, their discussion still only focuses on the relationship and impact of advertising on sustainable development, without refining to the comparative advertising, a specific type of advertising (Grosset et al., 2011; He et al., 2011; Huang et al., 2012).

In terms of time, three different clustering labels, such as native advertising, chaos and complexity, and active presence, were formed around 2017. On the one hand, this may indicate that scholars have found that comparative advertising has begun to appear in a more subtle and vague way, making it difficult to find that comparative advertising is used for propaganda, and even difficult to judge whether it has the nature of advertising, which has caused obstacles to management and regulation. De Veirman et al. (2017) and Knoll (2016) put forward the view that product promotion on the platform through bloggers on social media may make the boundary between advertising and non-advertising more blurred. On the other hand, although comparative advertising has the characteristics of both good and bad, more and more scholars have begun to believe that the positive effect of comparative advertising is greater than the negative impact, so they tend to support the use of comparative advertising for product promotion.

Meanwhile, articles with high citation frequency or centrality in each cluster will affect the cluster label to varying degrees, so it is necessary to show much concern for these articles. Since the number of articles contained in cluster #0, cluster #1, and cluster #2 is significantly more than other clusters, the information conveyed by these three clusters is specifically selected for analysis.

The articles contained in cluster #0 are relatively new, among which the most frequently cited articles were published after 2015. The label 'native advertising' indicates that scholars have gradually begun to pay attention to the impact of various special forms of advertising, including comparative advertising, which is more hidden and personalized on consumer groups. From the perspective of visual attention, Wojdyski and Bang (2016), through eye-tracking technology, collected and analyzed consumers' reactions when they watched native advertisements and other special forms of advertisements. It is argued that these advertisements have a certain weakening effect on the viewer's attention, which leads to the decline of advertising recognition ability and information processing ability. De Veirman et al. (2017) and Knoll (2016) mainly focused on the discussion on the promotion of bloggers as a form of advertising and believed that under certain circumstances, the promotion of brands or products in the form of evaluation or recommendation by popular bloggers can, compared with traditional advertising forms, gain more trust from consumers and have a greater impact on consumer groups.

The label of cluster #1 points to the consumers' ability of judgment and recognition, including the interpretation and recognition ability of a variety of comparison contents, such as quality, product

appearance comparison, and sales. Within this cluster, three scholars, Grewal, Dhruv, Mayhew GE, and Lichtenstein, discussed from the perspective of price comparison advertising. Grewal and Compeau (1992), aiming at the price comparison between products of different brands, pointed out that consumers are easy to link price with quality and popularity and thus affect their consumption decisions. Lichtenstein et al. (1991) and Mayhew and Winer (1992) demonstrated the impact of comparative advertising on consumer decision-making from the perspective of price self-ratio.

Several articles with high citation frequency in cluster #2, discuss the effects of two different types of advertising, namely comparative and non-comparative advertising, direct and indirect comparative advertising. Grewal et al. (1997) proposed that comparative advertising is superior in capturing attention, helping to make purchasing decisions, and enhancing brand awareness, but it is easy to reduce consumers' trust in advertising. Miniard et al. (1993) put forward that an important factor affecting the unique publicity effect of comparative advertising is whether comparative indicators are selected for comparison test, that is, whether the expression 'How likely is brand X to be more durable than brand Y' is adopted for publicity.

5. Discussions

There are two disadvantages in the traditional methods of literature review at least: one is that the author's subjectivity in selecting the literature may come into play and may result in producing some deviations and defects due to the author's personal and intentional selection of limited publications (Li et al., 2021; Zhu et al., 2020). The other one is that it is difficult to reveal the core literature and the main paths of the key literature (Liu & Lu, 2012). This kind of bibliometric method not only avoids the possible factors of subjective selection of papers in the traditional review but also avoids the omission of key documents by searching and selecting all the relevant literature in a certain period of time. This method is adopted to quantitatively study the knowledge structure, hotspots, and emerging trends in some scientific fields (Yang et al., 2020; Zhang et al., 2021). To provide more objective findings for further study on the legitimacy of comparative study, the bibliometric analysis was used to analyze 876 articles by using CiteSpace 6.2.R4.

With Q1, the researchers aimed at helping researchers quickly identify the international and potential co-operators in the study of the legitimacy of comparative advertising from the perspective of author contributions. Rose RL, Miniard PW, Grewal D and Pechmann C, Droge C, Donthu N played pivotal roles in the existing research of comparative advertising, laying a solid foundation for future research. At the same time, articles published by Hayes AF, Woodside AG, Jain SP, Chang CC, Fornell C, and Hofstede G have received a high number of citations during 2021–2023. Therefore, it is believed that these scholars will become a main force to promote in-depth research in this field in the future. In addition, several research teams, such as the team including four scholars of Barone MJ, Rose RL, Manning KC, Miniard PW, the team consisting of three scholars of Grewal D, Kavanoor S, Compeau LD, and the team including four scholars of Maier Christian, Mattke Jens, Reis Lea, Weitze Tim, and some other teams, have also promoted the development of research in this field through cooperation and exchanges.

With Q2, in terms of geographical distribution of literature, China, the USA, Canada, Germany, the UK, Spain, and other countries have played more significant roles in the research of comparative advertising. In comparison, European and American countries have produced more relevant literatures with higher quantity and quality than that from Asian, African, and Latin American countries, and similarly developed countries produced more than that from developing countries. As various economies continue to improve, it can be believed that while countries like the USA, Canada, and Germany continue to carry out new research on the legitimacy of comparative advertising, other developing countries and regions will also join in the study. From the point of research institutions, the collaboration and contact between scholars, institutions, and countries occupied a large proportion. So, it is believed that more communication platforms and more stable research teams will be formed in the future. The strong citation bursts by two institutions, the Egyptian Knowledge Bank (EKB) and the Ministry of Education & Science of Ukraine, in 2019–2023 suggests that in future studies, they will probably remain one of the main fronts on the subject. Among the top 40 authors with strong citation bursts, scholars from universities account for most, therefore, it is anticipated that scholars and research teams from universities will still play a more important role in the future.

With Q3, the researchers aimed to help researchers have an insight into the research hotspots and development trends in this field. From the perspective of keywords, the contents previously discussed by scholars involved the impact of comparative advertising, the relationship between comparative advertising and social media, coping strategies, and the information conveyed by comparative advertising, etc. In addition, some scholars also analyzed the impact of comparative advertising by adopting physiological and psychological knowledge. It shows that the research on the legitimacy of comparative advertising is not just a legal issue. On the other hand, the occurrence of strong bursts of the two keywords 'social media' and 'trust' from 2018 to 2023 is consistent with the fact that network technology and media methods are developing rapidly and may also be the core topics to be promoted in the future.

With Q4, the researchers aimed to help researchers identify influential and productive journals and important references. Among the references with high influence, the classifications of direct and indirect comparative advertising and the study of its different effects account for a certain proportion, which indicates that future research, may still be based on this classification. Miniard et al. (1993), through the analysis of the perception theory, proposed that the important factor affecting the effectiveness of comparative advertising was whether to select relative indicators for comparison and believed that selecting relative indicators for comparison could better play the publicity effect of comparative advertising. Grewal et al. (1997), based on the analysis of the previous research of other scholars, first pointed out that 'comparative advertising has the advantages of attracting consumer attention and conveying information, but meanwhile has disadvantages of lowering consumer confidence, etc.', and then studied the influence on the consumers' cognition of advertising content and purchase intention when selecting relative or non-relative measures. Pechmann and Ratneshwar (1991) also suggested that direct comparative advertising has the advantage of directly showing the visual differences among brands. Through its association with other more well-known brands, it has the effect of boosting consumers' cognition.

In terms of journals, six journals, such as *Journal of Political Economy*, *Behavioral Ecology and Sociobiology*, *Animal Behaviour*, *Econometrica*, *Journal of Comparative Physiology A*, and *Advertising Age*, have played a central role in promoting research in this field for a long time in the past and several other journals, such as *Sustainability (Basel)*, *International Journal of Information Management*, *Journal of Retailing and Consumer Services*, and *Journal of Consumer Behaviour*, covers a wide range of disciplines, which can be considered to have more positive significance for the development of future research.

With Q5, the researchers aimed to assess the current status of comparative advertising in relation to sustainable development. This endeavor seeks to generate greater awareness and emphasis on promoting sustainable consumption and production patterns. According to contents on keywords co-occurrence, co-cited journals, and co-cited references, it is found that present studies mainly focused on the effect of comparative advertising, the influence of social media, consumers' attitudes toward comparative advertising, etc. Little attention is paid to the analysis of comparative advertising from the perspective of sustainable development. As mentioned earlier, the existing research in the advertising field, even if it involves discussions on sustainable development and related content, only a few scholars have paid attention to the sustainable development of production and consumption except the sustainability of health and environment. And, instead of refining to the specific research field of comparative advertising, these research results only discuss the relationship between advertising and sustainability. Despite that, it is worth mentioning the journal *Sustainability (Basel)*, which contains the topic of sustainable development, is prominent in this field. Therefore, despite the limited focus on sustainable development in current research, future studies might explore areas, such as the potential impact of unfair comparative advertising, blind consumption, or wasting resources on sustainable consumption, the way of maintaining sustainable consumption through comparative advertising, etc.

To sum up, under the background of the growing acceptance of comparative advertising, how to regulate its application to maximize its effect has become an urgent problem to be solved. Studies on the legitimacy have been conducted by scholars and mainly focused on the forms of advertising, management methods from government, the legitimacy and regulation, and so on, and scholars have also shown many concerns on the study on the impact of emerging technologies, such as AI multi-medias platforms on the legitimacy of comparative advertising, but it mainly oriented from ensuring the fairness of market competition, avoiding damaging the interests of consumers. It is believed that the current

study orientation relatively ignores this point that comparative advertising may result in blind consumption, wasting resources and thus impacting sustainable consumption and production patterns.

6. Conclusions and recommendations

In this study, the method of bibliometric analysis has been used to systematically analyzed and summarized literature in the study of legitimacy recognition of comparative advertising. Firstly, it explains the importance of the study on the comparative advertising and the issue of its legitimacy recognition. Then, it illustrates the advantages of the bibliometric analysis in this research by the comparison with traditional literature review. Next, based on the introduction of the methodology of data collection and data processing, CiteSpace 6.2.R4 software was used to conduct the study to provide a thorough understanding of the research field of legitimacy recognition of comparative advertising and generated a smart knowledge structure map. Based on its bibliometric research findings, this study suggests some topics for future research to provide direction and guidance to researchers on related topics. Its practical implications and recommendations can be summarized as follows.

6.1. Theoretical implications

This study not only reviews and summarizes the research hotspots and trends from 1993 to 2023 in the field of comparative advertising but also provides directions for future research.

From a research perspective, establishing a diverse academic team and exploring interdisciplinary research paths are important approaches to enriching research perspectives and promoting research innovation.

On the one hand, advertising is a comprehensive activity involving multiple disciplines, such as law, management, psychology, economics, sociology, and communication studies. So it would be better to do the research by multidisciplinary research, which means using a variety of disciplines, fields, or academic methods to have an examination or investigation of an issue to test a theory, rather than solely relying on the research conducted within a single disciplinary background (Kaurav & Gupta, 2022). Based on the distinct characteristics of different disciplines, comparative advertising should be studied from multiple angles, across a wide spectrum, and in-depth, utilizing various research methods (such as qualitative research, quantitative research, mixed research methods, etc.). On the other hand, enhancing communication and collaboration among different research entities, which includes different countries, institutions, academicians and practitioners, and young and experienced scholars together, contributes to the professionalism of research teams (Kaurav & Gupta, 2022). Presently, scholars engaged in related research mostly hail from academic institutions. However, the expertise of professionals from administrative bodies, industry associations, and those who are in closer contact with practical issues has not been fully utilized in this field. Hence, fostering communication between university scholars and practitioners is equally important in broadening the research perspective. In conclusion, strengthening interdisciplinary exchanges, consolidating the strengths of various research entities, and initiating relevant discussions from different perspectives are crucial tasks facing comparative advertising research.

In terms of specific research content, there are primarily four recommendations.

Firstly, more practical and theoretical studies related to comparative advertising need to be conducted. Present (2023) research is mainly on the advantages and disadvantages of direct comparative advertising and indirect comparative advertising. Different countries hold different attitudes towards the two kinds of comparative advertising. The consensus has not been reached in the academics, the politics, and the industries so far. Direct comparative advertising can convey more information about the goods to consumers and help them make more rational purchasing decisions. While the indirect comparative advertising can avoid advertising campaigns between market operators, affecting the fairness of market competition and business order. These two types of comparative advertising have different advantages in achieving the goal of responsible production and consumption, as well as economic sustainability. Therefore, whether direct comparative advertising is more advantageous than indirect comparative advertising or not needs to be justified and proved by both practical and theoretical studies, which is relatively lacking in current studies.

Secondly, the unveiling of hidden influence and future regulatory prospects of evolving social media in comparative advertising should be explored. The advertising on social networks has a higher influence than most other types of advertising (Korenkova et al., 2020). With the progress of information technology, social media has diversified, and social media platforms have gradually become the preferred way of advertising for businessman due to the features of its extensive dissemination scope, diversity of presentation methods, and relatively low publicity costs. Meanwhile, it has the feature of hidden publicity in forms, and consumers would not regard the recommendation as advertisements for trusting the bloggers, thus making wrong purchasing decision, and resulting in causing the trust crisis of consumers. Therefore, whether the progress of Internet technology may give rise to other forms of more hidden comparative advertising, and whether Internet technology can be applied to the management and regulation of comparative advertising to promote the standardized use of comparative advertising, may be one of the future research directions.

Thirdly, more focus should be paid to harmonizing comparative advertising research with national realities. Developed countries have comparatively more matured advertising supervision systems as well as a more stable and diversified research team. As a result, developed countries have been paying more attention to the relevant factors that may affect fair market competition and carry out more detailed normative management, which may provide experience for other countries to a certain extent. In contrast, most developing countries or regions started the research on comparative advertising relatively late, and their research results have not been widely concerned in a short period of time. Of course, to ensure the sustainable development of domestic consumption and production, developing countries or regions will also strengthen research on how to regulate domestic commodity advertising. Therefore, one of the future research directions may be how to, based on the advanced management experience and specific situations of different countries, strengthen the legal regulation and supervision of its own national market advertising. Besides, with the continuous research of comparative advertising, how to combine research results with the national specific reality, and form the regulatory rules with ethnic characteristics or regional characteristics may be an important direction for the next phase of research.

Fourthly, ensuring legitimate comparative advertising for sustainable production and consumption. The basic function of commercial advertising is to convey information about a product, brand, or service, but those false and misleading comparative advertisements may cause consumers to make wrong and wrong consumption decisions, which may lead to the waste of production resources, and go against the original intention of sustainable development of production and consumption patterns. However, in the existing research, there are still deficiencies in the research of legitimacy recognition of comparative advertising. For example, how to identify the legitimacy of comparative advertising, how to punish the operators using non-standardized comparative advertising, and how to choose measures to eliminate the negative impact of non-standardized comparative advertising in view of the needs of sustainable production. Therefore, further research should be conducted from the perspective of sustainable production and consumption.

6.2. Practical implications

There are two main practical implications as follows. Firstly, scholars have long focused on the pros, cons, legitimacy, and coping strategies regarding comparative advertising. This emphasizes the need for lawmakers to update laws and create consistent rules. For example, in China, differing regulations on direct and indirect comparative advertising create legal conflicts, disrupting order. Future laws might favor a more accepting view of authentic and non-misleading direct comparative advertising. Also, legislators might need to define penalties for non-standard comparative advertising.

Secondly, analyzing research on advertising regulation can help shape a more thorough oversight system. Proper regulation is crucial to lessen the negative impact of comparative advertising and boost its positive effects. Entities like marketing supervision bodies, major broadcasters, advertising associations, and online platform executives need to play more active roles in monitoring comparative advertising.

7. Limitations

There are still some limitations in this study for some reasons as follows:

On the one hand, some limitations in the process of literature retrieval and data analysis may have a certain impact on the final research results. Firstly, the literature analyzed by CiteSpace only comes from WoS and CSSCI databases, so the relevant literature stored in other databases cannot be included in the scope of discussion. Secondly, as the languages are limited to 'English' and 'Chinese' in the process of literature retrieval, most of the research results of scholars from non-English speaking and non-Chinese countries may not be included in the scope of analysis. Thirdly, from the perspective of literature publication time, the time is set from 1993 to 2023 in the search process, so the analysis results of those literature published before 1993 are missing. Fourthly, from the point of literature category, only articles are downloaded to be analyzed, and the meeting summary, reviews, news reports, books, book chapters, and work results are excluded from the retrieval scope, which may result in some important views and hot spots could not present in the analysis. To some extent, the adopted CiteSpace software also has limitations. With this in mind, when describing bibliometric analysis, it is suggested to conduct more in-depth content analysis for further research. Alternatively, to avoid the potential limitations of using a single analysis software, it may be better to use both CiteSpace and VOSviewer or other quantitative analysis software to analyze the literature. What's more, due to the limited number of articles on the connection between comparative advertising and sustainability in the current search results, the discussion on this issue is not comprehensive and in-depth enough.

On the other hand, some of the limitations of the authors may also affect the results. Comparative advertising involves various knowledge from different fields, but this study couldn't combine these due to professional limitations. Instead of an interdisciplinary approach, this article mainly looks at summarizing the research hotspots and trends in comparative advertising. It focuses on legal aspects, such as advertising regulation, addressing unfair competition caused by non-standard advertising, and supervising advertising from a legal perspective.

Despite these limitations, this article is a rare attempt to explore current research trends in comparative advertising through a scientometric method. It gives an overview of ongoing research and future directions, which could help progress research in the field.

Author contributions

Wen-xi Cai: conceptualization, data curation, visualization, software, validation, formal analysis, funding acquisition, project administration, methodology, writing—original draft, writing—review, and editing. Bo Xiang: methodology, supervision, writing—review and editing, software, validation, visualization.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Funding

This research received no external funding.

Data availability statement

The data that support the findings of this study are available from the corresponding author, [B.X], upon reasonable request.

References

- Bachnik, K., & Nowacki, R. (2018). How to build consumer trust: Socially responsible or controversial advertising. *Sustainability*, 10(7), 1. <https://doi.org/10.3390/su10072173>
- Biener, L. (2002). Anti-tobacco advertisements by Massachusetts and Philip Morris: What teenagers think. *Tobacco Control*, 11, 1143–26.
- Byun, J., & Jang, S. (2018). “To compare or not to compare?”: Comparative appeals in destination advertising of ski resorts. *Journal of Destination Marketing & Management*, 10, 143–151. <https://doi.org/10.1016/j.jdmm.2018.09.003>
- Cao, X. (1999). A brief exploration of legal issues in comparative advertising. *Studies in Law and Business*, (5), 94–98. <https://doi.org/10.16390/j.cnki.issn1672-0393.1999.05.022>
- Chen, C. M. (2006). CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature. *Journal of the American Society for Information Science and Technology*, 57(3), 359–377. <https://doi.org/10.1002/asi.20317>
- Code of Federal Regulations. (1979). <https://www.ecfr.gov/current/title-29/subtitle-B/chapter-XVII/part-1979?toc=1>.
- Crihfield, P. J. (1980). Methods and considerations for pursuing the comparative advertising challenge. *Antitrust Law Journal*, 49(2), 845–860.
- De Pelsmacker, P., Diehl, S., Neijens, P., & Terlutter, R. (2023). Editorial: Perspectives on advancing the advertising field for academics and practitioners. Celebrating 40 years of the International Journal of Advertising. *International Journal of Advertising*, 42(1), 1–12. <https://doi.org/10.1080/02650487.2022.2131279>
- De Veirman, M., Cauberghe, V., & Hudders, L. (2017). Marketing through Instagram influencers: The impact of number of followers and product divergence on brand attitude. *International Journal of Advertising*, 36(5), 798–828. <https://doi.org/10.1080/02650487.2017.1348035>
- Fang, X., & Shen, Z. (1997). Discussing several legal issues of comparative advertising – Also discussing the improvement of comparative advertising legal regulations in China. *Journal of Henan University of Economics and Law*, (1), 8–12.
- Friede, A. I. (1979). Comparative advertising – An overview. *Food, Drug, Cosmetic Law Journal*, 34(11), 580–589.
- Gallo, A. A. (1986). False and comparative advertising under Section 43(a) of the Lanham Trademark Act. *Communications and the Law*, 8(1), 3–30.
- Grewal, D., & Compeau, L. D. (1992). Comparative price advertising: Informative or deceptive? *Journal of Public Policy & Marketing*, 11(1), 52–62. <https://doi.org/10.1177/074391569201100106>
- Grewal, D., Kavanoor, S., Fern, E. F., Costley, C., & Barnes, J. (1997). Comparative versus noncomparative advertising: A meta-analysis. *Journal of Marketing*, 61(4), 1–15. <https://doi.org/10.2307/1252083>
- Grosset, L., Roberti, P., & Viscolani, B. (2011). A goodwill model with predatory advertising. *Operations Research Letters*, 39(6), 419–422. <https://doi.org/10.1016/j.orl.2011.10.001>
- Hatry, P., & Katz, J. C. (1981). Comparative advertising law and a recent case thereon. *Communications and the Law*, 3, 35.
- Hayes, A. F., & Scharkow, M. (2013). The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis: does method really matter?. *Psychological Science*, 24(10), 1918–1927. <https://doi.org/10.1177/0956797613480187> 23955356
- He, X. L., Krishnamoorthy, A., Prasad, A., & Sethi, S. P. (2011). Retail competition and cooperative advertising. *Operations Research Letters*, 39(1), 11–16. <https://doi.org/10.1016/j.orl.2010.10.006>
- Hou, J., Yang, X., & Chen, C. (2018). Emerging trends and new developments in information science: A document co-citation analysis (2009–2016). *Scientometrics*, 115(2), 869–892. <https://doi.org/10.1007/s11192-018-2695-9>
- Huang, J., Leng, M. M., & Liang, L. P. (2012). Recent developments in dynamic advertising research. *European Journal of Operational Research*, 220(3), 591–609. <https://doi.org/10.1016/j.ejor.2012.02.031>
- Huang, W. (2017). Legal regulation of unfair comparative advertising. *Peking University Law Journal*, 29(6), 1624–1646.
- Jernigan, D. H., & Ross, C. S. (2014). Commentary on Bosque-Prous et al. (2014): Alcohol advertising and older adults. *Addiction*, 109(10), 1644–1645. <https://doi.org/10.1111/add.12649>
- Jigani, A.-I., Delcea, C., & Ioanăș, C. (2020). Consumers’ behavior in selective waste collection: A case study regarding the determinants from Romania. *Sustainability*, 12(16), 6527. <https://doi.org/10.3390/su12166527>
- Kamran, M., Ullah Khan, H., Nisar, W., Farooq, M., & Rehman, S.-U. (2020). Blockchain and internet of things: A bibliometric study. *Computers & Electrical Engineering*, 81, 106525. <https://doi.org/10.1016/j.compeleceng.2019.106525>
- Kaurav, R. P. S., & Gupta, P. (2022). Trends in multidiscipline management research: Past, present and future of FIIB business review. *FIIB Business Review*, 11(4), 382–404. <https://doi.org/10.1177/23197145221136966>
- Kaushal, N., Kaurav, R. P. S., Sivathanu, B., & Kaushik, N. (2023). Artificial intelligence and HRM: Identifying future research agenda using systematic literature review and bibliometric analysis. *Management Review Quarterly*, 73(2), 455–493. <https://doi.org/10.1007/s11301-021-00249-2>
- Kim, S., Jeong, S.-H., & Hwang, Y. (2018). Why are there cross-national differences in response to comparative advertising?: Some mediators. *Journal of Marketing Communications*, 24(6), 569–587. <https://doi.org/10.1080/13527266.2015.1135180>
- Knoll, J. (2016). Advertising in social media: A review of empirical evidence. *International Journal of Advertising*, 35(2), 266–300. <https://doi.org/10.1080/02650487.2015.1021898>
- Korenkova, M., Maros, M., Levicky, M., & Fila, M. (2020). Consumer perception of modern and traditional forms of advertising. *Sustainability*, 12(23), 9996. <https://doi.org/10.3390/su12239996>

- Lee, J. G. (1981). Comparative advertising, commercial disparagement and false advertising part I – Articles and reports. *The Trademark Reporter*, 71(6), 620–640.
- Li, R. (2001). Discussion on legal issues related to comparative advertising. *Journal of Shanghai University (Social Sciences Edition)*, (5), 75–80.
- Li, Y. N., Fang, R. Y., Liu, Z. H., Jiang, L. P., Zhang, J. D., Li, H. H., Liu, C. Y., & Li, F. (2021). The association between toxic pesticide environmental exposure and Alzheimer's disease: A scientometric and visualization analysis. *Chemosphere*, 263, 128238. <https://doi.org/10.1016/j.chemosphere.2020.128238>
- Li, Y., & Dai, L. (2018). On the legal regulation of comparative advertising in China: From the perspective of legislative connection and supplement. *Journalism and Mass Communication*, 92(8), 78–83.
- Lichtenstein, D. R., Burton, S., & Karson, E. J. (1991). The effect of semantic cues on consumer perceptions of reference price ads. *Journal of Consumer Research*, 18(3), 380–391. <https://doi.org/10.1086/209267>
- Lim, M. H., & Aryadoust, V. (2022). A scientometric review of research trends in computer-assisted language learning (1977–2020). *Computer Assisted Language Learning*, 35(9), 2675–2700. <https://doi.org/10.1080/09588221.2021.1892768>
- Liu, J. S., & Lu, L. Y. Y. (2012). An integrated approach for main path analysis: Development of the Hirsch Index as an example. *Journal of the American Society for Information Science and Technology*, 63(3), 528–542. <https://doi.org/10.1002/asi.21692>
- Liu, Y. (2014). On the improvement of comparative advertising legislation in China: Taking Wang Laoji V. Jia Duobao as an example. *Journal of Jinzhong University*, 31(6), 59–64.
- Long, J. (2017). Legal recognition and market regulation of commercial defamation in comparative advertising. *Research on China Market Regulation*, (7), 55–59.
- Mayhew, G. E., & Winer, R. S. (1992). An empirical analysis of internal and external reference prices using scanner data. *Journal of Consumer Research*, 19(1), 62–70. <https://doi.org/10.1086/209286>
- Miniard, P. W., Rose, R. L., Barone, M. J., & Manning, K. C. (1993). On the need for relative measures when assessing comparative advertising effects. *Journal of Advertising*, 22(3), 41–57. <https://doi.org/10.1080/00913367.1993.10673410>
- Pärssinen, M., Kotila, M., Cuevas, R., Phansalkar, A., & Manner, J. (2018). Environmental impact assessment of online advertising. *Environmental Impact Assessment Review*, 73, 177–200. <https://doi.org/10.1016/j.eiar.2018.08.004>
- Pechmann, C., & Ratneshwar, S. (1991). The use of comparative advertising for brand positioning – Association versus differentiation. *Journal of Consumer Research*, 18(2), 145–160. <https://doi.org/10.1086/209248>
- Pestana, M. H., Sánchez, A. V., & Moutinho, L. (2019). The network science approach in determining the intellectual structure, emerging trends and future research opportunities – An application to senior tourism research. *Tourism Management Perspectives*, 31, 370–382. <https://doi.org/10.1016/j.tmp.2019.07.006>
- Pompeo, P. E. (1986). To tell the truth: Comparative advertising and Lanham Act Section 43(a). *Catholic University Law Review*, 36(2), 565–586.
- Rathee, S., & Milfeld, T. (2023). Sustainability advertising: Literature review and framework for future research. *International Journal of Advertising*, 43(1), 7–35. <https://doi.org/10.1080/02650487.2023.2175300>
- Rieckmann, M. (2017). *Education for sustainable development goals: Learning objectives*. UNESCO Publishing.
- Rosenthal, M. B., Berndt, E. R., Donohue, J. M., Frank, R. G., & Epstein, A. M. (2002). Promotion of prescription drugs to consumers. *The New England Journal of Medicine*, 346(7), 498–505. <https://doi.org/10.1056/NEJMsa012075>
- Salimi, A. H., Noori, A., Bonakdari, H., Samakosh, J. M., Sharifi, E., Hassanvand, M., Gharabaghi, B., & Agharazi, M. (2020). Exploring the role of advertising types on improving the water consumption behavior: An application of integrated Fuzzy Ahp and Fuzzy Vikor method. *Sustainability*, 12(3), 1232. <https://doi.org/10.3390/su12031232>
- Sedighi, M. (2016). Application of word co-occurrence analysis method in mapping of the scientific fields (Case study: The field of informetrics). *Library Review*, 65(1/2), 52–64. <https://doi.org/10.1108/LR-07-2015-0075>
- Smith, K. C., Cukier, S., & Jernigan, D. H. (2014). Regulating alcohol advertising: Content analysis of the adequacy of federal and self-regulation of magazine advertisements, 2008–2010. *American Journal of Public Health*, 104(10), 1901–1911. <https://doi.org/10.2105/ajph.2013.301483>
- Sun, J., & Chai, R. (2008). The legitimacy of comparative advertising, the legislative choice and institutional improvement in China. *Economic Law Review*, (1), 178–196.
- Tan, L., & Xia, W. (2001). On the legal regulation of comparative advertising. *Law Review*, (2), 130–136. <https://doi.org/10.13415/j.cnki.fxpl.2001.02.018>
- Van Eck, N. J., & Waltman, L. (2017). Citation-based clustering of publications using Citnetexplorer and Vosviewer. *Scientometrics*, 111(2), 1053–1070. <https://doi.org/10.1007/s11192-017-2300-7>
- Wang, L. (2011). The competitive essence of comparative advertising. *Literature & Art Studies*, (2), 156–157.
- Wojdyski, B. W., & Bang, H. (2016). Distraction effects of contextual advertising on online news processing: An eye-tracking study. *Behaviour & Information Technology*, 35(8), 654–664. <https://doi.org/10.1080/0144929X.2016.1177115>
- Wu, G. (2007). Analysis of affiliating ads competition law. *Jiang-Huai Tribune*, (1), 39–43.
- Wu, L., & Wen, T. J. (2019). Positive versus negative comparison in advertisements: The affect priming perspective. *Journal of Promotion Management*, 25(7), 1009–1027. <https://doi.org/10.1080/10496491.2019.1612497>
- Xu, M., & Deng, H. (2005). Study on the legal regulation of comparative advertising. *Law Science*, (10), 60–67.
- Yang, H., Shao, X., & Wu, M. (2019). A review on ecosystem health research: A visualization based on CiteSpace. *Sustainability*, 11(18), 4908. <https://doi.org/10.3390/su11184908>

- Yang, W. T., Zhang, J. T., & Ma, R. L. (2020). The prediction of infectious diseases: A bibliometric analysis. *International Journal of Environmental Research and Public Health*, 17(17), 19. <https://doi.org/10.3390/ijerph17176218>
- Yang, Z. (2016). The trademark legal regulation of comparative advertising in Europe and America and its implications. *Intellectual Property*, (10), 113–120.
- Yavuz, M., Kayali, B., & Tural, Ö. (2021). Trend of distance education research in the COVID-19 period: A bibliometric and content analysis. *Journal of Educational Technology and Online Learning*, 4(2), 256–279. <https://doi.org/10.31681/jetol.922682>
- Yucel-Aybat, O., & Kramer, T. (2018). The impact of competitiveness on consumer responses to comparative advertisements. *Journal of Advertising*, 47(2), 198–212. <https://doi.org/10.1080/00913367.2018.1430624>
- Zhang, J., Jiang, L., Liu, Z., Li, Y., Liu, K., Fang, R., Li, H., Qu, Z., Liu, C., & Li, F. (2021). A bibliometric and visual analysis of indoor occupation environmental health risks: Development, hotspots and trend directions. *Journal of Cleaner Production*, 300, 126824. <https://doi.org/10.1016/j.jclepro.2021.126824>
- Zhang, L. (2007). Legal regulation of comparative advertising under anti-unfair competition laws. *Journal of Guizhou Minzu University (Philosophy and Social Sciences)*, (1), 99–102.
- Zhang, W., & Peng, Z. (2005). Legal analysis of comparative advertising. *Journal of Henan University of Economics and Law*, (2), 144–147.
- Zhou, D. (2008). Research on comparative advertising legal issues from a comparative law perspective – Also discussing the improvement of comparative advertising legal regulation in China. *Journal of Nanjing Audit University*, (3), 51–56.
- Zhou, X., Ma, X., & Chen, X. (2018). How to discount size affects consumer's positive feedback behavior in comparative price advertising. *Chinese Journal of Management*, 15(3), 410–419.
- Zhu, Q., Yang, Y., Zhong, Y., Lao, Z., O'Neill, P., Hong, D., Zhang, K., & Zhao, S. (2020). Synthesis, insecticidal activity, resistance, photodegradation and toxicity of pyrethroids (a review). *Chemosphere*, 254, 126779. <https://doi.org/10.1016/j.chemosphere.2020.126779>