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# A Bibliometric Analysis of Obesity in Marketing Research


## Abstract

### Purpose

In spite of the wide civic and academic interest in obesity, there are no bibliometric records of this issue in marketing. Thus, this inquiry is conceived to address this shortcoming and proceeds with a bibliometric analysis of 296 Scopus articles published on the subject between 1987 and 2021.

### Design

The analysis followed a five-step science mapping approach of study design, data collection, data analysis, data visualisation and data interpretation. R programming software was used to review 88 peer reviewed articles published between 1987 and 2021.

### Findings

A sizable stream of literature exploring obesity has accrued in the marketing area as authors have drawn parallels with persuasive communication, advertising, human wellbeing, child health and health promotion. The United States of America is found to be by far the country with the highest number of publications on obesity, followed by Australia and the United Kingdom. The two main strands of the obesity discourse are: (1) social and policy intervention opportunities and (2) the effects on social groups in the population.

### Originality

This is the first bibliometric review of obesity in the marketing literature. This is especially timely for weighing up the utility of research aimed at understanding and reporting the trends, influences and role of stakeholders in addressing obesity.

### Research Implications

This review will shape future enquiries investigating obesity. Beyond the focus on children, males and females, an emerging focus on cola, ethics, food waste, milk, policy-making and students is highlighted.



***Keywords****: Obesity; Marketing; Advertising; Health; Policy; Bibliometrics.*


## 1. Introduction

Paradoxically, despite the challenges in access to nutrition faced in many parts of the world (Onjewu *et al*., 2021), overnutrition [widely termed obesity] is also endemic. The World Health Organisation (WHO) describes obesity as abnormal or excessive fat accumulation that may impair individuals' health (WHO, 2021). The condition has nearly tripled since 1975, and there are now 650 million obese adults in the total adult population, and 39 million obese children in the total child population (WHO, 2021). Nauru is considered the most obese country with a rate of 61%, mostly due to its small population of 12,581 (Central Intelligence Agency, 2021). This is also true for other Oceania countries such as the Cook Islands [55.9%], Palau [55.3%], Marshall Islands [52.9%] and Tuvalu [51.6%] (Central Intelligence Agency, 2021). With considerably higher populations, the least obese countries are Vietnam [2.1%], Bangladesh

[3.6%], Timor-Leste [3.8%], Cambodia [3.9%] and India [3.9%] (Central Intelligence Agency, 2021).

On the academic front, research into the nature, influences and effects of obesity has been undertaken since the 1940s (Newburgh, 1942), as scholars tracked its relationship with antecedents including household affluence, social mobility, ethnicity and religion (Brown and Konner, 1987; Goldblatt *et al*., 1965; Cassia & Magno, 2019; Campra *et al.,* 2021). Subsequently, growing recognition of the influence of commercialisation on society also incited a substantial stream of studies seeking to probe the effect of 'obesity-inducing' marketing communications (Kraak *et al*., 2017; Montgomery *et al*., 2019; Levy and Gendel Guterman, 2021). In the United States, as the Centre for Disease Control declared obesity to be a public epidemic, Seiders and Petty (2004) contemplated the influence of food marketing practices on more than 30% of adults in the country being overweight. Similarly, Wansink and Huckabee (2005: 6) asserted that 'food companies have been accused of contributing to the growing problem of obesity in the United States. The marketers from these companies are torn between hungry consumers and concerned public policy officials who question whether companies should be more responsive in helping control obesity'.

Unsurprisingly, physical health problems arising from obesity have also impelled a multidisciplinary body of work beyond the field of marketing because it is a complex phenomenon influenced by a range of behavioural, extrinsic and hereditary variables (Cohen *et al*., 2006; Cutts *et al*., 2009; Wang and Hooper, 2019; Vrontis *et al.,* 2020; Silva *et al.,* 2022). To cite a few, in clinical studies, Alpert *et al*. (2014: 156) write that 'obesity is both a risk factor and a direct cause of heart failure'. Likewise, Lankford *et al*. (2021:40) state that 'obesity is a risk factor for many other chronic conditions like diabetes, heart disease and cancer', and Fabbrini *et al*. (2010) have associated the condition with non-alcoholic fatty liver disease. In public health studies, Apovian *et al*. (2015) drew parallels between the management of obesity and improved physical health, while Engström *et al*. (2013) signalled correlations between obesity and the performance of clinical activities among nurses. There have even been predictions that obesity 'will halt and perhaps reverse the millennia-long trend of rising human life expectancy' (Campos *et al*., 2006: 55). Governments have also had to stump up billions to settle annual healthcare bills arising from obesity (Argo and White, 2012, Rezaei et al., 2021**).**

The literature examining obesity since Newburgh's (1942) pioneering work is undoubtedly wide-ranging. Hence, for a streamlined perspective, the current bibliometric review seeks to isolate and address the obesity discourse only in the marketing domain. Among other themes, in general business and management studies, scholars have explored issues around being a responsible food business (Lee *et al*., 2013; Riahi Dorcheh *et al.,* 2021; Hosseinzadeh *et al.,* 2022), the extent to which firms should be pre-occupied with obesity (Seiders and Berry, 2007), fast-food firms' corporate responsibility (Schrempf, 2014), addressing obesity in the workplace (Heinen and Darling, 2009), obesity and productivity (Barkin *et al*., 2010), and non-rational economic behaviour (Hojjat, 2015, Khavarinezhad *et al.,* 2022). Weighing up the evident volume of publications on the topic, it is opportune to assess the quality and impact of the corpus through a bibliometric protocol.

A bibliometric analysis is the study of the metadata in a body of work (Pritchard, 1969). It is undertaken to gather periodicals and interpret their statistics to shed light on the course of development of a discipline, as well as the local or universal utility of what has been written (Raisig, 1962). Bibliometric reviews evaluate a greater number of articles than systematic literature reviews while maintaining a high level of rigour and replicability (Dada, 2018; Rey-Martí *et al*., 2016; Czinkota *et al.,* 2021). Indeed, systematic reviews mainly focus on determining and commenting on the conceptual and methodological choices and patterns in extant work (Haddoud *et al*., 2021). Furthermore, Donthu *et al*. (2021) posit that, in comparison to systematic literature reviews, bibliometric analysis relies on quantitative techniques that avoid and/or mitigate bias. A bibliometric analysis is also preferred here because, unlike a meta-analysis that is focused on summarising empirical evidence, the former outlines the intellectual structure of a field by examining the social and structural relationships in the corpus (Donthu *et al*., 2021). Accordingly, the aim of the present review is to offer bibliometric information on 296 marketing studies on obesity obtained from the Scopus database. In doing so, three research questions are addressed: (1) what is the global trend of obesity publications in the marketing field?, (2) what are the underlying insights on obesity in the marketing corpus? and (3) what are the directions for obesity in marketing research?

The press forward, the paper is presented in this order: to demonstrate the paucity of bibliometric studies in the field, section 2 presents a brief overview of existing works outside

the marketing domain. Section 3 describes the bibliometric method from the initial design of the study leading up to data visualisation and interpretation. Section 4 conveys the findings of the analysis, while section 5 discusses the main themes in marketing obesity research aided by a tree map and a topic dendrogram. Section 6 concludes the paper with a reflection on the implications for future research.

## 2. Related Bibliometric Studies

The assessment of obesity using bibliometric data is popular among scholars seeking an overview of the subject from a physical, social, and public health perspective. Generally, the growing availability of bibliometric data has amplified the number of bibliometric studies across disciplines (Ellegaard and Wallin, 2015; Grandhi *et al.,* 2021). Related to obesity, a substantial number of bibliometric reviews have focused on bariatric surgery, acupuncture, children and young people, global and country obesity, and intragastric balloon use. Below, Table 1 itemises the fields and citations of extant bibliometric analyses.

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Please insert **Table 1** here

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As table 1 illustrates, so far, there are no bibliometric analyses tracking the trends and influences of obesity publications in the marketing area. There is an imperative to fill this knowledge gap as numerous studies have associated obesity with firms' marketing practices. To mention a few, these inquiries include Nestle's (2006) assessment of food marketing and childhood obesity, McClure *et al*.'s (2013) analysis of fast-food restaurant marketing and obesity among youth, as well as Seiders and Petty's (2004) treatise on the policy remedies of obesity stimulated by food marketing. In the resulting vacuum, scholars' academic performance as it pertains to obesity in marketing has not been compared at a global level. Hence, to the best of our knowledge, this is the first bibliometric analysis of obesity in the marketing literature. Consistent with Schneor and Vik (2020), Biancone *et al*. 2022 and de Bem Machado *et al*. (2022), the overarching research approach is depicted in table 2.

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Please insert **Table 2** here

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The next section describes the bibliometric procedure.

## 3. Bibliometric Methodology

Following Zupic and Čater's (2015) five-step science mapping method, the current bibliometric analysis was performed by (1) designing the study, (2) data collection, (3) data analysis, (4) data visualisation and (5) data interpretation. This procedure also coheres with Börner *et al*. (2003); Cobo *et al*. (2011); Aria and Cuccurullo (2017) and Secinaro *et al*.'s (2020) bibliometric analysis guidelines. In stage 1 [designing the study], the authors commenced by defining the research questions [as itemised in section 1] as well as specifying keywords for search in the Scopus database. To be sure, in comparison to Web of Science as the alternative multidisciplinary database, Scopus generates a higher number of articles (Sánchez *et al*., 2017; AlRyalat *et al*., 2019; Chatterjee et al., 2021). Also, it has been found to comprise higher-ranked journals with higher impact factors (Gorraiz and Schloegl, 2008). The comparative merits of Scopus have also been extolled by Chadegani *et al*. (2013) who found that it aggregates more recent articles. In terms of the bibliometric technique, both performance analysis and science mapping are undertaken in the current study to reflect the contributions of scholars [known as performance analysis] as well as the relationships in scholars' work [known as science mapping] (Donthu *et al*., 2021).

Proceeding to stage 2 [data collection], the keyword formula used in this study's database search was:

> TITLE-ABS-KEY ((marketing OR advertising OR "marketing ecosystem" OR "social marketing") AND (overconsumption OR obesity OR "physical wellbeing" OR "unhealthy" OR "high-calorie food")) AND (LIMIT-TO (SUBJAREA, "BUSI")) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE, "English")) AND (EXCLUDE (EXACTKEYWORD, "Article")).

The query returned the 296 articles from multiple journals to constitute the sample for the current analysis, with the earliest dating back to 1987 and the most recent being in 2021. Both Guthrie *et al*. (2012) and Massaro *et al*. (2016) have encouraged scholars to include multiple journals in bibliometric analyses for a more exhaustive understanding of the scientific trends, scope and impact of the subject being investigated. Seeing as there were no prior bibliometric analyses of obesity in the marketing literature, the authors did not limit the search to a time interval.

Stage 3 [data analysis] was aided by version 4.0.5 of the open-source R programming software widely used by researchers conducting bibliometric analysis (Mesdaghinia *et al*., 2015; Lovakov and Agadullina, 2019). The interface is proficient in calibrating bibliometric information and converting these into descriptive tables and graphs (R Core Team, 2018). R

programming was preferred over alternative network visualisation software such as Bibexcel, and Pajek due to greater speed and flexibility in the combination of keywords as alluded to by Donthu *et al*. (2021). In this study, the bibliometric information yielded insights into (1) the relevant journal sources, (2) authors per article, (3) number of articles by leading authors, (4) authors' impact, (5) article keywords, (6) article citations, (7) countries of focus, (8) country citations, (9) trend analysis of key themes, (10) sources of growth, (11) total annual publications and (12) country collaborations.

Stages 4 [data visualisation] and 5 [data interpretation] of the bibliometric protocol will be presented in the section 4.

## 4. Bibliometric Analysis

The top line bibliometric data and authorship characteristics are first described. As illustrated in Table 2, the total number of obesity articles emerging from the Scopus query was 296 outputs from 88 peer-reviewed journal sources between 1987 and 2021. The average years of publication was 6.5; this shows the mean number of years since all 88 marketing journals first published papers related to obesity. The average number of citations was 17.7 and is determined by dividing the total number of citations by the total number of papers. Likewise, 1.9 was the average citations per year estimated by dividing the total number of citations by the number of years the journals have published papers on obesity. Altogether, the 296 articles enumerated 17,507 references. In terms of the keywords, there were a total and 881 in all 296 articles and 158 different phrases appearing frequently in the title of articles' references.

Turning to the authorship, the 296 articles were written by a total of 714 authors with a frequency distribution of 817. The vast majority of obesity in marketing articles were multi-authored (676), compared to 38 articles with a sole author. The documents per author, derived from dividing the total number of articles by the total number of authors, was 0.4. The average number of authors in each article was 2.4, slightly lower than the average number of co-authors which was 2.7. Table 2 concludes with a collaboration index of 2.6. This Figure represents the total number of authors in multi-authored articles divided by the total number of multi-authored articles.

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Please insert **Table 3** here

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Furthermore, in terms of the most relevant sources, there were 20 journals with at least four obesity-related articles in the 88 peer-reviewed outlets. The Journal of Public Policy and Marketing had the highest occurrence of articles with 25. Social Marketing Quarterly was the second highest with 19 articles, while the Journal of Marketing and Journal of Social Marketing each published 13 articles. Other outlets in the top 20 most relevant sources were British Food Journal, Journal of Consumer Marketing, Journal of Food Products Marketing and Journal of Marketing Research all of which had 12. Table 3 provides the full list comprising an additional 12 outlets.

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Please insert **Table 4** here

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Taking account of the annual scientific production since 1987, the number of obesity articles in marketing research hovered between 0 and 2 until a noticeable increase in 2003 that led to a steady rise to 13 articles by 2006. Since then, there have been troughs of 7, 8, 11 and 13 as well as peaks of 21, 32 and 38 articles most recently in 2020. Below, Figure 1 portrays the annual scientific production between 1987 and 2021.

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Please insert **Figure 1** here

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It is also worth reporting the distribution frequency of the marketing journals with obesity publications. This was generally insignificant for all outlets except Social Marketing Quarterly between 1987 and 1998. However, there has been an upsurge led by the Journal of Public Policy and Marketing as it overtook Social Marketing Quarterly in the last quarter of 2008. Other outlets with an increased recent frequency are Journal of Social Marketing, Journal of Consumer Marketing and Journal of Marketing. This is depicted in the loess smoothing timeplot in Figure 2 which considers the volume of articles and publication time of the top 8 marketing journals with at least 12 articles on obesity. The regression method of loess smoothing assumes sub-zero values for scores that are too close to zero. This has been argued to be an optimal way of representing publication discontinuity over a given period (Jacoby, 2000).

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Please insert **Figure 2** here

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To offer granular insights into the authorship characteristics, this review proceeds to a closer examination of authors interested in obesity in marketing research.

### *4.1 Authors*

In the top 20 marketing researchers, the most published author on obesity was Sharyn Rundle-Thiele with 6 articles [Carins and Rundle-Thiele, 2014; Schuster *et al*., 2016; Arli *et al*., 2017; Carins *et al*., 2017; Pang *et al*., 2018; Anibaldi *et al*. (2020)]. Three authors with five publications apiece were a joint second: Pierre Chandon [Wansink and Chandon, 2006; Chandon and Wansink, 2007; Chandon and Wansink, 2010; Ordabayeva and Chandon, 2013; Cornil *et al*. 2021], Simone Pettigrew [Roberts and Pettigrew, 2007; Pettigrew *et al*., 2010; Pettigrew and Pescud, 2012; Pettigrew *et al*., 2013; Roberts and Pettigrew, 2013], and Brian Wansink (Wansink and Chandon, 2006; Chandon and Wansink, 2007; Chandon and Wansink, 2010; Biswas *et al*., 2017; Chan *et al*., 2017]. There were four authors with four publications each in the top 20, while the remaining twelve all had three outputs respectively as shown in Table 4. Table 4 also provides figures for fractional authorship to quantify the specific contribution of individual researchers on the presumption of uniform input by co-authors. The fractionalisation ranking is mostly consistent with the number of authors' articles.

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### *4.2 Authors' Impact*

To further assess authors' performance, *h*-index, *g*-index and *m*-index are appropriate quotients for determining and comparing researchers' impact (Bornmann *et al*., 2009). To define these measures, the *h*-index denotes the number of papers by an author with a citation (Hirsch, 2005). The *g*-index measures the citation performance of a set of articles by an author (Egghe, 2006), while the *m*-index denotes the median number of an author's citations (Bornmann *et al*., 2008). Other useful indices in this regard are the total number of citations [TC] and the year of first publication [PY] (Forliano *et al*., 2021). Based on the above, the highest *h*-index in the top 20 marketing authors writing on obesity was 5 achieved by Brian Wansink. Four scholars had a similar *g*-index of 5 and they were Sharyn Rundle-Thiele, Pierre Chandon, Simone Pettigrew and Brian Wansink. Dipayan Biswas had the highest *m*-index of 0.66 while Brian Wansink had the most TC with 749; 24 more than Pierre Chandon in second place. Interestingly, even though the review tracks papers from 1987, the earliest PY for the top 20 authors is 2000 [Gerard

Hastings]. In reverse, the most recent PY is 2017 [Courtney Szocs]. Below, Table 5 outlines the full list of the top 20 authors across the five impact criteria.

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### *4.3 Authors' Keywords*

In bibliometric analyses, keywords reveal the knowledge structure in a field of study (Chen and Xiao, 2016). They are also essential for determining research trends, discourse gaps and possible avenues for further research (Secinaro *et al*., 2020). In Table 6, the keywords per author in the top 20 ranking shows 'marketing' to be the most popular identifier in obesity research with 14 occurrences. This was followed by 'obesity' with 11 occurrences, while 'female', 'human' and 'male' followed suit with 10 occurrences. Other notable keywords were health promotion [6 occurrences], child [6 occurrences] and persuasive communication [5 occurrences]. A preliminary examination of these keywords signals interrelations between effective marketing communication and obesity in childhood, male and female health.

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Please insert **Table 7** here

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Additionally, tree maps are a valuable tool for visualising the frequency of keywords and their hierarchical structure through the size and arrangement of nested rectangles (Choi *et al*., 2011). Thus, Figure 3 expands on Table 6 and shows the added interplay of attitude, exercise, social media, public policy, schools and advertising in marketing and obesity research.

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Please insert **Figure 3** here

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Scholars undertaking bibliometric analyses have also employed topic dendrograms as a clustering technique to depict the correlation thresholds among keywords in a hierarchical structure (Franseschet, 2009). In Figure 4 below, insights can be drawn from the heights at which keywords are linked. Specifically, the lower the height of the connection then the closer the keywords in the cluster. Yet, topic dendrograms do not imply perfect association but only an estimate of the number of clusters emerging to facilitate discussion (Secinaro *et al*., 2021).

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Please insert **Figure 4** here

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In the current dendrogram, there is a clear clustering of child health, economic and social effects, sustainable development, and marketing in the first block, as well as obesity and surgical procedures in the second block.

Moreover, word clouds are an added bibliometric tool for visualising the dominant themes of study in an area in which the most work has been undertaken (Mulay et al., 2020). Word clouds also indicate research hotspots and emerging lines of inquiry (Chen *et al*., 2020). The word size and relative position from the centre of the cloud signify the importance of a keyword to the body of work (Kumar *et al*., 2020). Beyond the focus on children, males and females, the word cloud in Figure 5 highlights emerging foci related to obesity in marketing such as cola, ethics, food waste, milk, policy-making and students.

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Please insert **Figure 5** here

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Turning to the search trends based on the most dominant keywords, in Figure 6, the R software 7 clearly shows a sustained surge in the rate of obesity publications in marketing since 2008. At the start of this period, scholars have mostly focused on body mass index (BMI) issues, and subsequently the effect of social marketing campaigns on obesity and what policy interventions could be legislated to arrest the occurrence. By 2017, the interest morphed into healthy and unhealthy food choices and, for a brief period in 2018, scholars explored product life spans and body image dissatisfaction resulting from obesity. It is also evident that as a professional body, the American Marketing Association has been at the centre of the obesity discourse since 2013 and has garnered the most frequency as a trending topic.

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Please insert **Figure 6** here

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To conclude the analysis on authors, Table 7 illustrates the 20 most cited articles in the marketing and obesity literature. The distribution of the total citations per year suggests that some articles were heavily cited in some years and less so subsequently. So far, with 587 allusions, Raghunathan *et al*.'s (2006) 'The Unhealthy' paper in the Journal of Marketing are the most cited by other marketing and obesity studies. Also, manifest for a number of citations per year are Wansink and Chandon's (2006) treatise on low-fat nutrition and obesity with 28.5 annual mentions, Zlatevska *et al*.'s (2014) review of the effect of portion sizes with 22, and Taufique and Vaithianathan's (2018) investigation of consumer behaviour among young urban Indians with 21.7.

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Please insert **Table 8** here

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On the whole, table 7 demonstrates the popularity of marketing journals as a repository for obesity intelligence. Among the most cited outlets are the Journal of Marketing, the Journal of Marketing Research, Journal of Public Policy Marketing and the Journal of Macromarketing.

### *4.5 Country*

In this section, the dispersion of obesity in marketing research is analysed at the country level. This includes an indication of published articles, single and multi-country publications, the total number of citations and collaboration patterns across geographies.

#### *Total Articles by Country*

In the top 20 countries list in Table 8 and the heatmap in Figure 7, it is clear that obesity outputs in the marketing field have mostly been produced in the United States (307 articles), followed by Australia (120 articles) and the United Kingdom (60 articles). Figure 7 suggests that, in all of North America, evidence is only lacking from Greenland. In Africa, there are only studies emerging from South Africa. In South America, while papers have been set in Argentina, Brazil, Chile and Ecuador, there is a shortage of research from Bolivia, Colombia, Guyana, Paraguay, Peru, Suriname and Uruguay. This is also true in the Middle East with the exception of Israel, Qatar and Saudi Arabia. In Europe, there is apparent engagement with obesity research in the northern, southern, western and central countries with the exception of the Czech Republic and eastern nations like Belarus, Bulgaria, Estonia, Latvia, Lithuania and

Ukraine. In Asia, a significant number of countries have yet to engage in the obesity debate including Kazakhstan, Mongolia, Russia and Vietnam. There is also no indication of research development in Oceania where obesity levels are comparatively high per capita (for example Cook Islands, Marshall Islands, Nauru, Palau and Tuvalu).

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***Authors' Collaboration***

The pattern of the corresponding authors' residence bears similarity with the total number of country publications in Table 9. Once more, the United States leads the way here with more single and multi-country collaboration, followed by Australia, the United Kingdom, Canada and China. However, Malaysia seems to be the only country where there is more multi-country than single country collaboration, while there are only multi-country publications in Hong Kong. On the other hand, Belgium, Denmark, India and Turkey are entirely single country oriented.

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Please insert **Figure 7** here

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***Citations by Country***

In terms of citations, the trend largely mirrors the total number of country publications with the United States, Australia and the United Kingdom occupying the top three positions. However, although New Zealand is the eleventh country by the number of publications, it is the fifth most cited and ranks higher than France, Germany and Italy in this regard. Also, Malaysia does not appear in the top 20 country publication list but is number seven in the country citation ranking. Finland is the highest performing country by average citations relative to publication volume.

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***Country Collaboration***

The essence of assessing country collaboration is to show patterns of networking among authors in different jurisdictions. In Figure 8, alliances are found in the dark blue shaded countries while the pink lines indicate the direction of collaboration. There are strong

connections between the United States and Australia, Canada, Sweden and the UK. There are also moderately strong links between Australia and the UK. Albeit weak, there is some evidence of activity between the United States and France as well as Italy, Spain and France, and between China and Denmark. There is no evidence of collaboration in Africa, South America, South East Asia, nor Oceania. Nevertheless, obesity research in marketing has been determined to be a transcontinental effort.

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Please insert **Figure 8** here

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Informed by the findings in this section, a discussion is now initiated.

## 5. Discussion

The discussion is predicated on the keywords and evolution of topics in Figures 4, 5, 6 and 7. It is also framed by the themes of focus in the top 20 articles on obesity in marketing research and geographic concentration.

### *5.1 Evolution of Topics on Obesity in Marketing from 2008 - 2021*

The analysis of topics from 1987-2021 led to the identification of three clusters. In the periods leading right up to 2008 and shortly after, marketing research on obesity was mostly focused on the emergence of social marketing campaigns and initiatives aimed at increasing individual and community awareness of the perils of overconsuming fast food. In this regard, the body of work shed light on the importance of body mass index in exploring a healthy product market. In effect, researchers tried to provide guidance for policymakers to promote nutrition education, shape dietary guidance, and regulate food marketing. Then, beginning in 2016, marketing scholars mainly focused on the role of marketing incentives in individual's healthy versus unhealthy food choices. The literature was also dominated by papers investigating obesity and body image dissatisfaction among adults (particularly women). Possibly, this stemmed from the argument that advertising influences people's self-esteem and self-image. In due course, recent research since 2020 builds on behavioural perspectives to extend the investigation of unhealthy eating. At the same time, green consumer behaviour and eco-friendly food products have gained popularity as trending topics. These articles focus on the reduction of food waste through optimum marketing practices for short shelf-life foods.

### *5.2 Themes/Specialisation of Top 20 Articles*

Appraising the top 20 cited articles led to the identification of key themes in the food marketing research. To begin with, a high number of papers stressed consumers' perception of unhealthy foods as a tastier option. For example, Raghunathan *et al*. (2006) found that unhealthy foods were a preferred choice for many in the general public for being more delicious and enjoyable during consumption. Relatedly, Mai and Hoffmann (2015) explored the role of health consciousness in the tension between unhealthy and tasty intuition. In another stream of papers, the caloric knowledge of consumers and the relationship with individual's food consumption has been vastly examined in highly cited publications. Chandon and Wansink (2007) argue that underestimation of calories is positively associated with meal size, which very likely stimulates obesity. However, knowledge of the consequences of calories and obesity has been found to have a curvilinear relationship with individual intention to purchase advertised high-calorie junk food such as snack bars (Andrews *et al*., 2009). On the other hand, Wansink and Chandon (2006) suggest a regulatory reconsideration of 'low-fat' labelling as they cause overconsumption and obesity due to decreasing consumption guilt. Moreover, the third stream of papers highlights how food marketing practices directly or indirectly stimulate obesity (Chandon and Wansink, 2011; Seiders and Petty, 2004; Sadraei et al., 2018). Indeed, although supersizing is seen as a marketing tool to attract people to pay less for larger portions, this practice is found to encourage higher consumption and cause obesity (Zlatevska et al., 2014). Finally, the analysis of highly cited research reveals an increasing appeal in associated topics such as food advertising and child health (e.g. Dhar and Baylis, 2011; Roberts and Pettigrew, 2007; Rezaei et al., 2022), women's body control (e.g. Gurrieri et al., 2013), green consumer behaviour (e.g. Taufique and Vaithianathan, 2018; Vrontis *et al.*, 2021), social marketing initiatives (e.g., Szmigin *et al*., 2011; Vrontis & Basile, 2021), and ethical problems (e.g. Hunt and Chonko, 1987).

### *5.3 Geography of Obesity in Marketing Research*

The findings of our research indicate that the United States has the highest contribution to obesity and marketing research. The research highlights that more than 25% of Americans reflect that they are either overweight (BMI⩾25) or obese (BMI⩾30), while the objectively measured weights reveal that this rate is greater than 33% (Strum, 2007). Worse than industrialised cities, Trivedi *et al*. (2015) argue that obesity in rural areas is as high as 40%. However, obesity is not only an issue for the United States. Rather, other Anglo-Saxon countries such as Australia, the United Kingdom, Canada, and New Zealand have shown a high

contribution to obesity in marketing research. For instance, obesity is reported to be prevalent among 25% and 40% of English and Australian adults respectively (Strum, 2007; Colagiuri *et al*., 2010, Wang *et al*., 2011). This has become a perennially challenging national issue. For example, in 2008, Australia disbursed more than $8.3 billion in direct and indirect costs to manage obesity (Access Economics, 2008). This substantial draw on public finance has also provoked increasing interest in obesity in marketing research. From the current bibliometric analysis, it can be deduced that obesity has a positive relationship with countries' economic development and growth. Clearly, African countries (except for South Africa) are exempt from this trend, while advanced European countries (such as France and Germany), as well as emerging markets such as China, India, and Mexico, have shown an increasing rate of obesity occurrence and research.

## 6. Conclusion

To summarise, research into obesity in marketing has intensified since the early to mid-2000s. Although the Journal of Public Policy and Marketing is the most popular outlet for such works, the Journal of Social Marketing, Journal of Consumer Marketing, Journal of Marketing, Journal of Food Products Marketing, Social Marketing Quarterly and British Food Journal are also noteworthy. The vast majority of studies in the area have been predicated on examining the effect of marketing practices in stimulating obesity among children, men and women, as well as the mechanism of individual decision-making between healthy and unhealthy food choices. More recently, there is emerging literature on the interrelations between obesity and green consumer behaviour, and how effectively consumers can manage obesity when the burden of responsibility lay with them. Further theoretical and empirical developments are expected in these areas in the short to long term. Dwelling on the theoretical implications arising from this review, there is a general need for increased scholarship in obesity in marketing research. The volume of papers in the field does not compare favourably with other marketing themes. Remedying this deficit will require a greater diversity and intensity of country collaboration. Practically, stakeholders such as the Centre for Disease Control and Prevention in the United States and counterpart bodies in other countries can reflect on the current trends to support research on obesity in the marketing domain. Seeing as there is already ample evidence of the aftereffects of obesity, funding research to grow awareness into the cognitive factors of obesity from a food marketing perspective could be a preventative and more efficacious means of managing the crisis. Regarding limitations, there is a possibility that reliance on Scopus reduced the volume of analysable outputs. Therefore, papers related to marketing in some

business and management journals may have been excluded from the analysis. It is also recognised that bibliometric analysis merely offers a short-term forecast of the research domain (Donthu *et al*., 2021). Accordingly, as the body of work evolves, the conclusions drawn in this study will be contestable. A further limitation is that quantitative metrics generated in a bibliometric study are not a full reflection of the value of scholars' individual and collective outputs. Therefore, a co-citation analysis will be more suitable to determine seminal works in the obesity in marketing area. For future research directions, upcoming bibliometric analyses may prioritise research in countries with higher per capita obesity. New lines of inquiry can investigate the influence of advanced marketing practices like neuromarketing on obesity. Equally, there is a shortage of evidence from overlooked and relatively more affected contexts such as Oceania.

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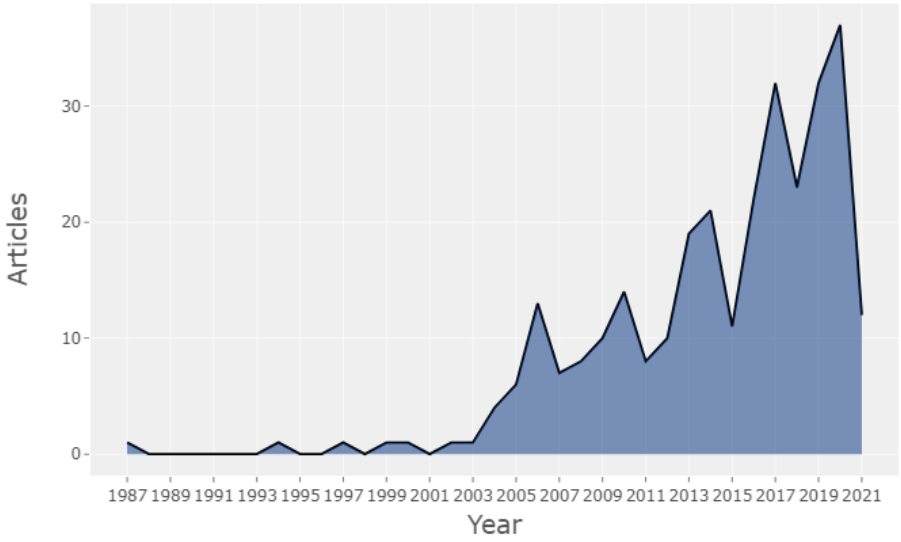


**Figure 1.** Annual Scientific Production (***Source: Authors' Elaboration in Bibliometrix R Studio)***

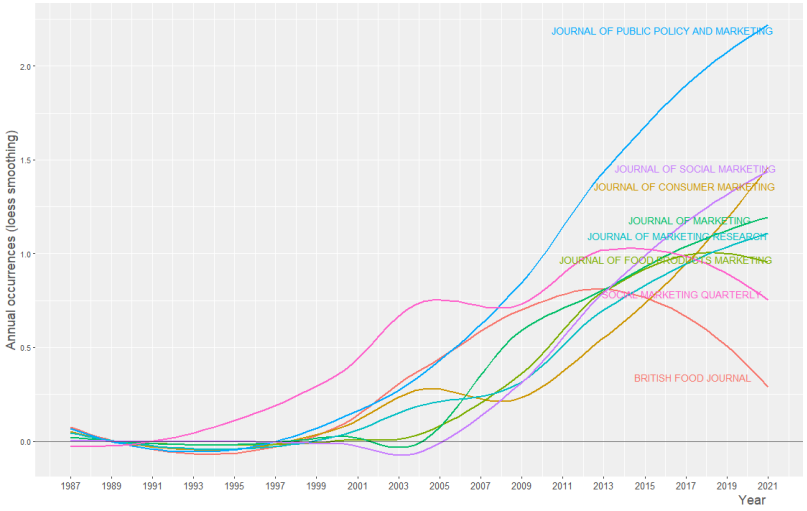


**Figure 2.** Source Growth (***Source: Authors' Elaboration in Bibliometrix R Studio)***

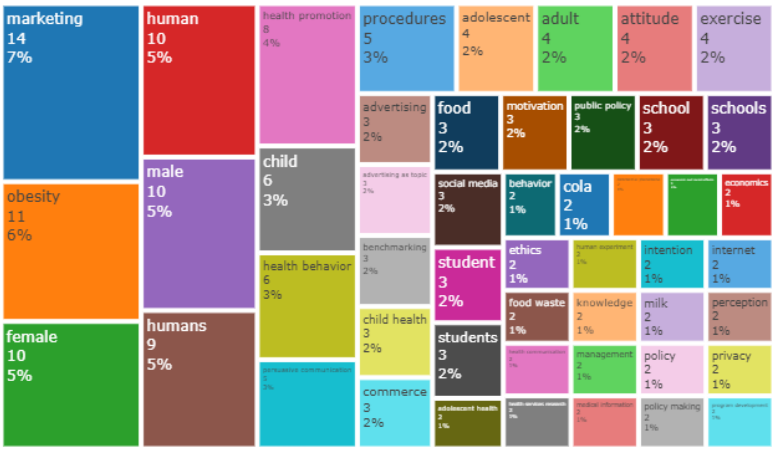


**Figure 3.** Keyword Tree Map (***Source: Authors' Elaboration in Bibliometrix R Studio)***

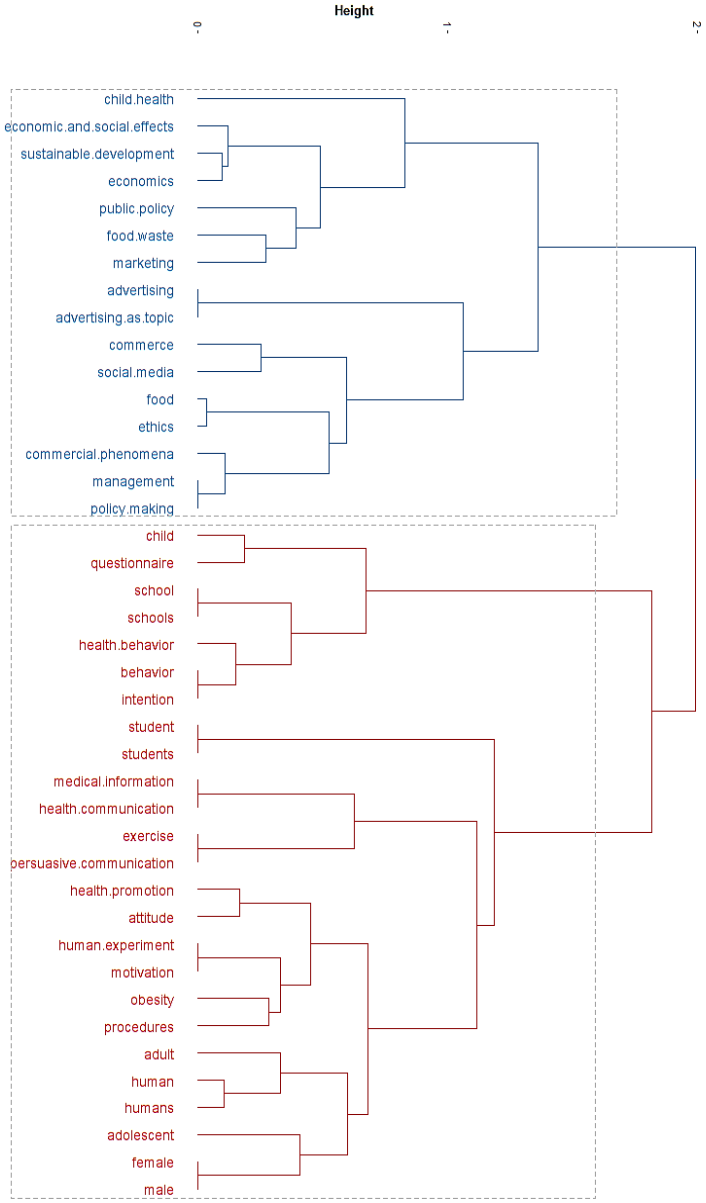


**Figure 4.** Topic Dendrogram (***Source: Authors' Elaboration in Bibliometrix R Studio)***


**Figure 5.** Word Cloud (***Source: Authors' Elaboration in Bibliometrix R Studio)***

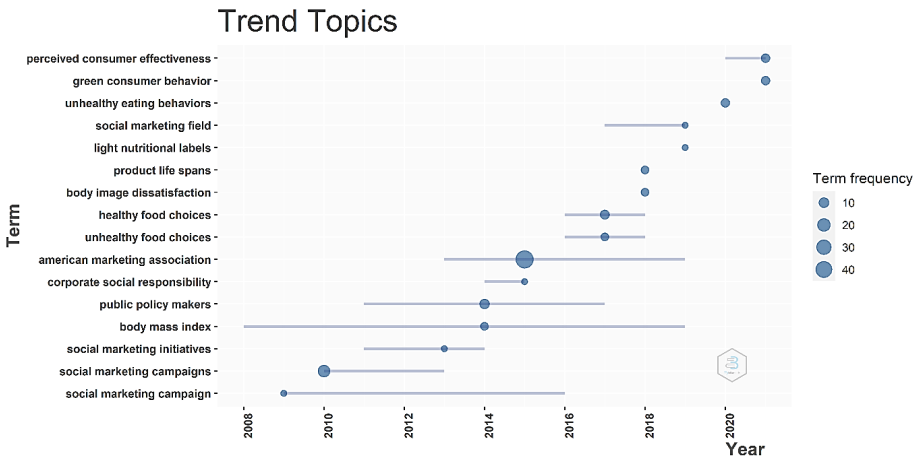


**Figure 6.** Trending Topics (***Authors' Elaboration in Bibliometrix R Studio***)

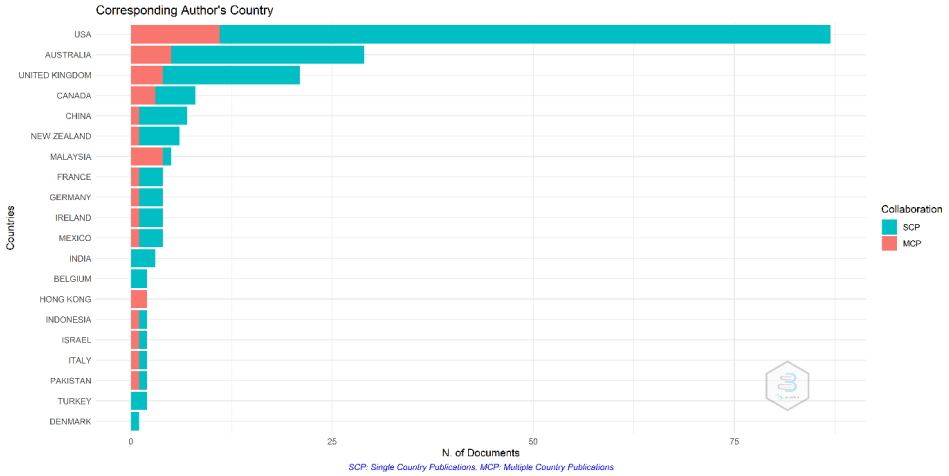


**Figure 7.** Country Scientific Production (***Source: Authors' Elaboration in Bibliometrix R Studio)***

**Table 1.** Bibliometric Studies on Obesity

| References | Field/Keywords |
|---|---|
| Lu and Li (2012); Kou *et al*. (2016); Wang *et al*. (2020) | Acupuncture |
| Ahmad *et al*. (2015); Dabi *et al.* (2016); Ozsoy and Demir (2018a); Ozsoy and Demir (2018b); Paolino *et al.* (2020); Toro-Huamanchumo *et al.* (2021) | Bariatric Surgery |
| De Lusignan (2010); Biglu and Ghavami (2016); Tran (2019); Kawuki *et al*. (2020) | Children and Young People |
| Rajpal *et al*. (2011) | Drug Discovery |
| Martíneza *et al.* (2019) | Executive Dysfunction |
| Sweileh *et al*. (2014); Khan *et al.* (2016); Zhao *et al.* (2019); Aletaha *et al*. (2021) | Global and Country Obesity |
| Yao *et al*. (2018); Ejtahed *et al.* (2019) | Intestinal Microbiota |
| Semertzidou (2017); George *et al*. (2018) | Intragastric Balloon Use |
| Gao *et al*. (2018) | Macrophage Polarization |
| Baskaran *et al*. (2021) | Male Fertility |
| Zhang *et al*. (2015) | Non-Alcoholic Fatty Liver Disease |
| Kiss *et al*. (2019) | Policy Research |
| Vioque *et al*. (2010) | Public Medicine |
| Wang *et al*. (2010), Fei *et al*. (2019) | Traditional Medicine |
| Andrés *et al.* (2018) | Transtheoretical Behaviour Modeling |

***Source: Authors' Elaboration in Bibliometrix R Studio***

**Table 2. Research Approach**

| | |
|---|---|
| Topic | Obesity in marketing research |
| What is already known? | To the authors' best knowledge, there are no prior bibliometric analyses on obesity in the marketing domain |
| Research Motivation | To identify the global trend of obesity publications in the marketing field, the underlying insights and directions for future research. |
| Research Protocol | Study design, data collection, data analysis, data visualisation and data interpretation. |
| Research Interval | 1987 - 2021 |

**Table 3. Main information**

| Description | Results |
|---|---|
| MAIN INFORMATION ABOUT DATA | |
| Timespan | 1987:2021 |
| Sources (Journals) | 88 |
| Documents | 296 |
| Average years from publication | 6.56 |
| Average citations per documents | 17.77 |
| Average citations per year per doc | 1.959 |
| References | 17507 |
| DOCUMENT TYPES | |
| Article | 296 |
| DOCUMENT CONTENTS | |
| Keywords Plus (ID) | 158 |
| Author's Keywords (DE) | 881 |
| AUTHORS | |
| Authors | 714 |
| Author Appearances | 817 |

| | |
|---|---|
| Authors of single-authored documents | 38 |
| Authors of multi-authored documents | 676 |
| AUTHORS COLLABORATION | |
| Documents per Author | 0.415 |
| Authors per Document | 2.41 |
| Co-Authors per Documents | 2.76 |
| Collaboration Index | 2.64 |

***Source: Authors' Elaboration in Bibliometrix R Studio***

**Table 4.** Most Relevant Sources

| Sources | Articles |
|---|---|
| JOURNAL OF PUBLIC POLICY AND MARKETING | 25 |
| SOCIAL MARKETING QUARTERLY | 19 |
| JOURNAL OF MARKETING | 13 |
| JOURNAL OF SOCIAL MARKETING | 13 |
| BRITISH FOOD JOURNAL | 12 |
| JOURNAL OF CONSUMER MARKETING | 12 |
| JOURNAL OF FOOD PRODUCTS MARKETING | 12 |
| JOURNAL OF MARKETING RESEARCH | 12 |
| INTERNATIONAL JOURNAL OF ADVERTISING | 10 |
| JOURNAL OF BUSINESS RESEARCH | 10 |
| INTERNATIONAL JOURNAL OF CONSUMER STUDIES | 9 |
| JOURNAL OF MACROMARKETING | 9 |
| PSYCHOLOGY AND MARKETING | 9 |
| HEALTH MARKETING QUARTERLY | 8 |
| EUROPEAN JOURNAL OF MARKETING | 5 |
| JOURNAL OF ADVERTISING | 5 |
| AUSTRALASIAN MARKETING JOURNAL | 4 |
| INTERNATIONAL REVIEW ON PUBLIC AND NONPROFIT MARKETING | 4 |
| JOURNAL OF CONSUMER POLICY | 4 |
| JOURNAL OF CURRENT ISSUES AND RESEARCH IN ADVERTISING | 4 |

***Source: Authors' Elaboration in Bibliometrix R Studio***

**Table 5.** Number of articles by the top 20 authors

| Authors | Articles | Articles Fractionalised |
|---|---|---|
| RUNDLE-THIELE S | 6 | 2.25 |
| CHANDON P | 5 | 2.14 |
| PETTIGREW S | 5 | 2.08 |
| WANSINK B | 5 | 2.08 |
| BISWAS D | 4 | 1.58 |
| HARKER D | 4 | 1.25 |
| HARKER M | 4 | 1.25 |
| PESCUD M | 4 | 1.25 |
| BUI M | 3 | 0.92 |
| BURTON S | 3 | 1.00 |
| CARINS J | 3 | 1.00 |
| GREWAL D | 3 | 0.70 |
| HASTINGS G | 3 | 0.92 |
| HAWS KL | 3 | 1.00 |
| HOWLETT E | 3 | 1.00 |
| KUBACKI K | 3 | 1.17 |
| MCDERMOTT L | 3 | 0.78 |
| MCFERRAN B | 3 | 1.17 |
| STEAD M | 3 | 0.78 |
| SZOCS C | 3 | 1.08 |

***Source: Authors' Elaboration in Bibliometrix R Studio***

**Table 6.** Authors' Impact

| Author | *h*-index | *g*-index | *m*-index | TC | PY |
|---|---|---|---|---|---|
| RUNDLE-THIELE S | 3 | 5 | 0.375 | 30 | 2014 |
| CHANDON P | 4 | 5 | 0.25 | 725 | 2006 |
| PETTIGREW S | 4 | 5 | 0.267 | 111 | 2007 |
| WANSINK B | 5 | 5 | 0.313 | 749 | 2006 |
| BISWAS D | 4 | 4 | 0.667 | 171 | 2016 |
| HARKER D | 4 | 4 | 0.267 | 38 | 2007 |
| HARKER M | 4 | 4 | 0.267 | 38 | 2007 |
| PESCUD M | 3 | 4 | 0.25 | 35 | 2010 |
| BUI M | 3 | 3 | 0.273 | 27 | 2011 |
| BURTON S | 3 | 3 | 0.231 | 146 | 2009 |
| CARINS J | 2 | 3 | 0.25 | 35 | 2014 |
| GREWAL D | 2 | 3 | 0.222 | 41 | 2013 |
| HASTINGS G | 3 | 3 | 0.136 | 154 | 2000 |
| HAWS KL | 3 | 3 | 0.333 | 63 | 2013 |
| HOWLETT E | 3 | 3 | 0.273 | 76 | 2011 |
| KUBACKI K | 2 | 3 | 0.333 | 16 | 2016 |
| MCDERMOTT L | 3 | 3 | 0.188 | 117 | 2006 |
| MCFERRAN B | 3 | 3 | 0.375 | 46 | 2014 |
| STEAD M | 3 | 3 | 0.188 | 117 | 2006 |
| SZOCS C | 3 | 3 | 0.6 | 128 | 2017 |

***Source: Authors' Elaboration in Bibliometrix R Studio***

**Table 7.** Authors' Keywords

| Words | Occurrences |
|---|---|
| Marketing | 14 |
| Obesity | 11 |
| Female | 10 |
| Human | 10 |
| Male | 10 |
| Humans | 9 |
| Health Promotion | 8 |
| Child | 6 |
| Health Behaviour | 6 |
| Persuasive Communication | 5 |
| Procedures | 5 |
| Adolescent | 4 |
| Adult | 4 |
| Attitude | 4 |
| Exercise | 4 |
| Advertising | 3 |
| Advertising as Topic | 3 |
| Benchmarking | 3 |
| Child health | 3 |
| Commerce | 3 |

***Source: Authors' Elaboration in Bibliometrix R Studio***

**Table 8.** Top 20 Articles by Citation

| Paper and Source | DOI | Total Citations | TC per Year |
|---|---|---|---|
| RAGHUNATHAN R, 2006, J MARK | 10.1509/jmkg.70.4.170 | 587 | 36.6875 |
| WANSINK B, 2006, J MARK RES | 10.1509/jmkr.43.4.605 | 456 | 28.5 |
| ZLATEVSKA N, 2014, J MARK | 10.1509/jm.12.0303 | 176 | 22 |
| CHANDON P, 2007, J MARK RES | 10.1509/jmkr.44.1.84 | 164 | 10.9333 |
| SEIDERS K, 2004, J PUBLIC POLICY MARK | 10.1509/jppm.23.2.153.51406 | 141 | 7.8333 |
| DHAR T, 2011, J MARK RES | 10.1509/jmkr.48.5.799 | 102 | 9.2727 |
| VAREY RJ, 2010, J MACROMARK | 10.1177/0276146710361931 | 100 | 8.3333 |
| TAUFIQUE KMR, 2018, J CLEAN PROD | 10.1016/j.jclepro.2018.02.097 | 87 | 21.75 |
| MAI R, 2015, J PUBLIC POLICY MARK | 10.1509/jppm.14.006 | 82 | 11.7143 |
| MCDERMOTT L, 2006, INT J ADVERT | 10.1080/02650487.2006.11072986 | 79 | 4.9375 |
| ANDREWS JC, 2009, J PUBLIC POLICY MARK | 10.1509/jppm.28.1.41 | 77 | 5.9231 |
| LYNCH JR JG, 2006, J PUBLIC POLICY MARK | 10.1509/jppm.25.1.67 | 76 | 4.75 |
| SZMIGIN I, 2011, EUR J MARK | 10.1108/03090561111120028 | 74 | 6.7273 |
| DIVINE RL, 2005, J CONSUM MARK | 10.1108/07363760510611707 | 73 | 4.2941 |
| CHANDON P, 2010, FOUND TRENDS MARK | 10.1561/1700000016 | 70 | 5.8333 |
| GUTHRIE J, 2015, PSYCHOL MARK | 10.1002/mar.20795 | 66 | 9.4286 |
| GURRIERI L, 2013, J MACROMARK | 10.1177/0276146712469971 | 66 | 7.3333 |
| HASTINGS G, 2000, SOC MARK Q | 10.1080/15245004.2000.9961102 | 63 | 2.8636 |
| ROBERTS M, 2007, INT J ADVERT | 10.1080/02650487.2007.11073018 | 61 | 4.0667 |
| HUNT SD, 1987, J ADVERT | 10.1080/00913367.1987.10673091 | 61 | 1.7429 |

***Source: Authors' Elaboration in Bibliometrix R Studio***

**Table 9.** Total Number of Country Publications (top 20)

| Country | Articles | Single Country Publication | Multiple Country Publication |
|---|---|---|---|
| USA | 87 | 76 | 11 |
| AUSTRALIA | 29 | 24 | 5 |
| UNITED KINGDOM | 21 | 17 | 4 |
| CANADA | 8 | 5 | 3 |
| CHINA | 7 | 6 | 1 |
| NEW ZEALAND | 6 | 5 | 1 |
| MALAYSIA | 5 | 1 | 4 |
| FRANCE | 4 | 3 | 1 |
| GERMANY | 4 | 3 | 1 |
| IRELAND | 4 | 3 | 1 |
| MEXICO | 4 | 3 | 1 |
| INDIA | 3 | 3 | 0 |
| BELGIUM | 2 | 2 | 0 |
| HONG KONG | 2 | 0 | 2 |
| INDONESIA | 2 | 1 | 1 |
| ISRAEL | 2 | 1 | 1 |
| ITALY | 2 | 1 | 1 |
| PAKISTAN | 2 | 1 | 1 |
| TURKEY | 2 | 2 | 0 |
| DENMARK | 1 | 1 | 0 |

***Source: Authors' Elaboration in Bibliometrix R Studio***

**Table 10.** Country Citations

| Country | Total Citations | Average Article Citations |
|---|---|---|
| USA | 2124 | 24.41 |
| AUSTRALIA | 360 | 12.00 |
| UNITED KINGDOM | 339 | 16.14 |
| CANADA | 236 | 29.50 |
| NEW ZEALAND | 172 | 28.67 |
| FRANCE | 121 | 24.20 |
| MALAYSIA | 106 | 21.20 |
| FINLAND | 53 | 53.00 |
| MEXICO | 47 | 11.75 |
| HONG KONG | 35 | 17.50 |
| GERMANY | 31 | 7.75 |
| CHINA | 22 | 3.14 |
| IRELAND | 21 | 5.25 |
| TURKEY | 20 | 6.67 |
| SWITZERLAND | 19 | 19.00 |
| THAILAND | 17 | 17.00 |
| ITALY | 12 | 6.00 |
| IRAN | 9 | 9.00 |
| INDIA | 8 | 2.67 |
| PAKISTAN | 8 | 4.00 |

***Source: Authors' Elaboration in Bibliometrix R Studio***