



RAM. Revista de Administração Mackenzie

ISSN: 1518-6776

ISSN: 1678-6971

Editora Mackenzie; Universidade Presbiteriana Mackenzie

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RAM. Revista de Administração Mackenzie, vol. 22, no. 2, eRAMG210209, 2021

Editora Mackenzie; Universidade Presbiteriana Mackenzie

DOI: <https://doi.org/10.1590/1678-6971/eRAMG210209>

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SUSTAINABLE CONSUMPTION: THEMATIC EVOLUTION FROM 1999 TO 2019¹

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To cite this paper: Araújo, A. C. M., Oliveira, V. M., & Correia, S. E. N. (2021). Sustainable consumption: Thematic evolution from 1999 to 2019. *Revista de Administração Mackenzie*, 22(2), 1–34. doi:10.1590/1678-6971/eRAMG210209

Submission: Dec. 20, 2019. **Acceptance:** July 17, 2020.

¹ This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior Brasil (Capes – Finance Code 001) and the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq). We thank the reviewers for their contributions, their recommendations and suggestions, which contributed to the improvement of the article.

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ABSTRACT

Purpose: Analyze the thematic evolution of the research field on sustainable consumption from 1999 to 2019.

Originality/value: The study advances the understanding of the development of the research field on sustainable consumption, analyzing the main publications and topics covered.

Design/methodology/approach: Systematic literature review through a bibliometric study with analysis based on citations supported by the CitNetExplorer software, using core publication and clustering techniques. Two hundred sixty-four articles were analyzed.

Findings: The most recent publications converge on the need to change the current patterns and levels of consumption and to engage different stakeholders in participatory and co-creation processes. Also, the existence of five research clusters was identified, namely: 1. eco-efficiency with a focus on greening the market; 2. consumer behavior with an emphasis on encouraging the purchase of green products; 3. social nature of consumption that inserts the sociological perspective; 4. dynamic approach for considering the interdisciplinarity of the field; and 5. the role of education for sustainable consumption. The various themes found reveal contributions from different areas of knowledge and the importance of developing research that integrates the dynamics of the challenges to achieve sustainable consumption. We emphasize the need for an integrated approach due to the inherent complexity of the theme that involves economic, technological, political, social, psychological, and environmental aspects for governance in favor of sustainable consumption.

KEYWORDS

Sustainable consumption. Bibliometrics. CitNetExplorer. Core publication. Cluster.

1. INTRODUCTION

Sustainable consumption and production are considered one of the main determinants of sustainable development (Barber, 2007; Bengtsson, Alfredsson, Cohen, Lorek, & Schroeder, 2018; Liu, Qu, Lei, & Jia, 2017). Sustainable consumption, specifically, has received attention in recent years in the political, academic, and social spheres (Ceglia, Oliveira Lima, & Leocadio, 2015; Fischer, Boehme, & Geiger, 2017). It is part of one of the 17 sustainable development goals (SDGs) developed by the United Nations (UN) in 2015. Modifying current consumption practices (patterns and levels), therefore, represents a challenge that society needs to face (Barth, Adomßent, Fischer, Richter, & Rieckmann, 2014; Moll et al., 2008) in order to guarantee the conditions of survival and the balance between the present and future generations and in discussions on sustainable development (Fischer et al., 2017; Tanner & Kast, 2003).

Some of the main barriers to sustainable consumption are the high price of eco-friendly products, lack of information, and knowledge on the part of consumers, unsustainable habits, and low levels of ecological awareness (Han, 2020), among other complex and contextual issues (Kreuzer, Weber, Off, Hackenberg, & Birk, 2019) involving macro-structural, institutional and market aspects, which must be considered in the development of research and policy formulation to promote sustainable consumption (Brizga, Mishchuk, & Golubovska-Onisimova, 2014; Byers & Gilmer, 2018; Jackson, 2005; Prothero et al., 2011; Schröder et al., 2019; Thøgersen, 2010; Tukker et al., 2008). The focus on definitions of sustainable consumption has fallen more on economic and environmental aspects; however, social elements, such as quality of life, equity in access and distribution of resources, and satisfaction of needs must also be considered (Bartolj, Murovec, & Slabe-Erker, 2018). These elements are crucial aspects of the transition from a development model that is fair, equitable, and inclusive, and which respects the limits of the ecosystem.

The research field on sustainable consumption began to diversify with different methodological approaches and multidisciplinary theoretical contributions. It was ranging from the emphasis on environmental governance that considered the participation of only a few actors to the collaboration of various stakeholders in the formulation of policies to achieve ways of sustainable production and consumption (Liu et al., 2017), as well as a systemic perspective (Akenji & Bengtsson, 2014; Bengtsson et al., 2018).

In this context, it becomes relevant to understand the development of a field of study to analyze the progress that a research area is following. Also, identifying themes that have not yet been addressed in the literature and which of them need further theoretical deepening, thus, allowing the emergence of research agendas for future studies. Bibliometry, as a research method, makes it possible to map this process based on bibliographic information (Lu & Liu, 2016; Song, Heo, & Kim, 2014).

In this sense, the study by Liu et al. (2017) analyzed the evolution of the research field on sustainable consumption from 1995 to 2014, identifying the main authors and networks of co-authorship by bibliometric methods. However, to date, no bibliometric analysis has been identified on the topic that analyzes the main research approaches through cluster analysis, representing a justification for carrying out this study.

Thus, the specific objectives of this study were: 1. to identify the main publications in the field of research on sustainable consumption; and 2. to verify the main research topics on sustainable consumption. Therefore, the objective of this article is to analyze the thematic evolution of the research field on sustainable consumption, from 1999 to 2019, through a bibliometric study. For this, it used the tool CitNetExplorer, a software to analyze and visualize the links of citations between scientific publications, following the main research themes and their evolution paths over time and the changes the topics presented according to the literature (Wu, Li, Huang, Miao, & Li, 2017).

The structure of this article is divided into five sections. In addition to this introduction, section two presents the theoretical contribution to the evolution of the research field on sustainable consumption. Section three describes the methodological path adopted in this study. The show of data analyzes appear in the sequence, with the main publications in the field of research on sustainable consumption, and the main research topics covered. The last section presents the final considerations of the authors.

2. EVOLUTION OF THE RESEARCH FIELD ON SUSTAINABLE CONSUMPTION

The discussions on sustainability emerged on the international stage in 1972, during the World Conference on Man and the Environment. In this context, the recognition of the concept of Sustainable Development occurred in the Brundtland Report entitled “Our Common Future” only in 1987, and

the sustainable consumption was only mentioned for the first time in Agenda 21, elaborated during the 1992 United Nations Conference on Environment and Development (Rio 92). Chapter 4 of this Agenda deals with “Changes in consumption patterns” highlighting the need for international collaboration to achieve sustainable consumption patterns, including changes in lifestyles less dependent on finite natural resources (Jackson, 2007).

More recently, Agenda 2030 (2015) proposed the 17 sustainable development goals (SDGs) to be achieved by the year 2030, among which, specifically, there is SDG 12, whose purpose is to ensure production and consumption sustainably standards. To achieve this goal, macro-structural changes are required (Akenji, 2014; Prothero et al., 2011; Tukker et al., 2008), combined with institutional and market factors (Brizga et al., 2014; Byers & Gilmer, 2018; Geels, McMeekin, Mylan, & Southerton, 2015; Hobson, 2013; Jackson, 2007; Prothero et al., 2011).

Among the strategies to reduce the socioenvironmental impacts of consumption, we highlight the ecological labeling of products and services, campaigns aimed at consumer awareness, eco-efficiency, environmental certification, green technologies, ecological public purchases, recycling of products after use, product labeling, waste recycling policies, among others (Akenji, 2014). These strategies are focused on the technical aspects associated with products and production processes, as well as issues involving consumer behavior. Also, other reasons for the international effort to promote sustainable consumption stem from the inequality in the distribution of consumer goods, population growth, climate change, in addition to the environmental impacts resulting from the increase in the consumption scale (Gwozdz, Reisch, & Thøgersen, 2020; Jackson & Michaelis, 2003).

However, many of these actions focus on greening the market through efficiency gains, using less energy-intensive technologies and materials, analysis of the product life cycle, and zero-emission in production processes (Tseng, Chiu, Tan, & Siriban-Manalang, 2013). Still, the volume of extraction of renewable and non-renewable resources continues to increase (Akenji, 2014), and access issues are not considered.

Although supply-side strategies have their importance in reducing the environmental impacts of consumption, they are not sufficient to reduce consumption levels or to generate social justice in the process of distributing the wealth produced (Jackson, 2005; Mont & Plepys, 2008). On the other hand, some approaches seek to identify the attitudes and behaviors of consumers concerning sustainable consumption in order to understand which aspects influence their choices and what are the barriers to the adoption of

sustainable consumption practices, which may be related to lack of knowledge or even interest in making efforts towards sustainable consumption (Dąbrowska & Janoś-Kresło, 2018; Gwozdz et al., 2020).

The understanding that sustainable economies must be developed considering sustainable consumption (Clark, 2007) stimulated the development of alternative proposals that require changes in favor of sustainable development (Tukker et al., 2008), whose principles defend simplicity, sustainable adoption lifestyles, frugality, sufficiency, and focus on well-being (Geels et al., 2015).

In this context, it is included the discussions on degrowth, which propose a political and social transformation to reduce patterns and levels of production and consumption (Kallis, 2011; Kallis et al., 2018; Latouche, 2010, 2018; Schneider, Kallis, & Martinez-Alier, 2010; Sekulova, Kallis, Rodríguez-Labajos, & Schneider, 2013), and also, the Green Economy that advocates low carbon emissions, resource efficiency and social inclusion (Barbier, 2011; Droste et al., 2016; Loiseau et al., 2016; Lorek & Spangenberg, 2014). These perspectives insert the component of collective social well-being in the governance approach to “strong, sustainable consumption” (Hobson, 2013; Lorek & Fuchs, 2013). It emphasizes social innovation as one way to bring about disruptive changes in society, through production and consumption alternatives arising from the role of the consumers themselves (Jaeger-Erben, Rückert-John, & Schäfer, 2015; Lorek & Fuchs, 2013).

The need to analyze the social nature of consumption, considering the interaction of a diversity of actors in society and the influence of social structures, became evident for the development of research and policy formulation (Wilhite & Lutzenhiser, 1999). Consumption is a social activity, in which it is necessary to consider the different aspects of human needs when developing proposals for sustainable consumption (Briceno & Stagl, 2006).

It is necessary to explore theoretical approaches that broaden the understanding of a variety of social contexts when analyzing sustainable consumption. It cannot restrict studies in analyzing consumer behavior. For this, there is the contribution of the theory of social practice with a sociological and more profound approach to the context that influences the behavior of individuals (Jaeger-Erben & Offenberger, 2014). A significant contribution from the sociological perspective is the compression of social life viewed as a series of reproduced and shared practices in their daily lives, going beyond the individualistic view of environmental behavior (Spaargaren, 2011). The theory of practice used as a methodological unit contributes to the construction of global environmental governance for sustainable consumption,

providing a more holistic view of the influence of socio-technical dynamics (Jaeger-Erben & Offenberger, 2014; Spaargaren, 2011).

In addition to these approaches, it is possible to promote sustainable consumption through social innovation (Jaeger-Erben et al., 2015) based on a typology of practices with the following classification: Do-it-together, Strategic consumption, Sharing communities, Do-it-yourself, and Utility-enhancing consumption.

Theories of the sharing economy, co-creation of value, and collaborative consumption also offer new horizons for sustainable production and consumption (Ma et al., 2019). They are studied as new forms of collective use for sustainable consumption ((Hirschl, Konrad, & Scholl, 2003). However, the incorporation of these alternatives to traditional consumption in daily routines depends on an institutional approach that involves regulatory and normative aspects and investigates the determining and impeding factors for the adoption of more sustainable consumption practices by consumers (Holt, 2012; Mont, 2004).

The most recent perspective of research on sustainable consumption has emphasized the role of citizens who organize for more sustainable lifestyles with changes in individual values (Bachnik & Szumniak-Samolej, 2018; John, Jaeger-Erben, & Rückert-John, 2016; Schröder et al., 2019), taking into account that the consumption problem is not limited to eco-friendly products and environmental impacts, but is also a social issue (Briceno & Stagl, 2006; Jaeger-Erben & Offenberger, 2014; Lorek & Spangenberg, 2014).

It is emphasized the importance of the participation of consumers as citizens in the process of promoting sustainable consumption, as, for example, consumers start to have a more political action as an exercise of citizenship, manifesting practices that benefit or punish companies due to the impacts on society (Echegaray, 2016). Reducing consumer participation to just agreeing or disagreeing with the options that experts and politicians develop, disregards the knowledge, values, experiences of individuals and their ability to contribute to the change process ((Di Giulio, Ruesch Schweizer, Defila, Hirsch, & Burkhardt-Holm, 2019).

Another equally important aspect of the discussion on the theme is the need to consider different points of view of multiple actors as crucial for a political intervention of sustainable consumption (Kiss, Pataki, Köves, & Király, 2018). Contributions can come from groups that are generally not considered in policymaking, and creating favorable conditions for collective learning are critical in this process. In this context, society's participation in changing unsustainable production patterns and consumption arises through

inclusive governance that involves diverse social groups, such as local initiatives, neighborhood representatives, social organizations, and citizens engaged in causing changes in consumption habits. (Schröder et al., 2019).

Promoting learning for sustainable consumption through education is an emerging area in the literature on the subject (Adomßent et al., 2014). The proposal is to develop teaching skills that allow dealing with the current challenges of unsustainable production and consumption patterns (Barth et al., 2014; Frank & Stanszus, 2019). Analyzing the development of this field of research and its thematic evolution over the years is essential to understand which theories have been most studied in the literature, which are being neglected, and which have a potential theoretical contribution.

3. METHODOLOGICAL PROCEDURES

The objective of this study was to analyze the thematic evolution of the research field on sustainable consumption in the period from 1999 to 2019. For this purpose, it was carried out a bibliometric study with the CitNetExplorer software. Bibliometric research analyzes the literature through citation analysis, mapping a research field through bibliographic information (Lu & Liu, 2016; Song et al., 2014).

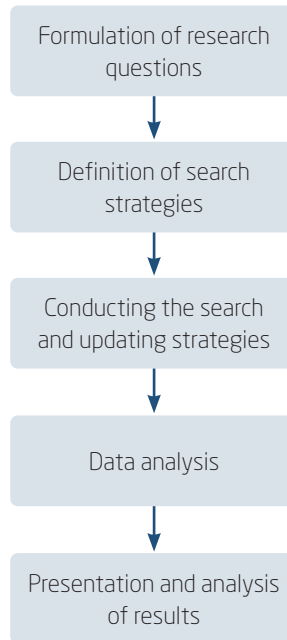
To present a systematic and transparent process, the Cochrane Systematic Review (CSR) instructions described in the Cochrane Collaboration, which provides a clear and rigorous guide within pre-established criteria for the literature review, were explored and adapted (Higgins, 2011). Figure 3.1 shows the steps developed for the CSR.

The specific objectives of this study were: 1. to identify the main publications in the field of research on sustainable consumption; and 2. to check the main research topics on sustainable consumption. For the first objective, we used the core publication functionality in the CitNetExplorer software and, for the second, it was applied clustering analysis.

The database used was Web of Science (WoS). It is considered a highly reliable data source, widely used in the bibliometric analysis in various areas of knowledge (Dzikowski, 2018; Rossetto, Bernardes, Borini, & Gattaz, 2018). The search was carried out from the term “sustainable consumption” only in the title, from 1999 to 2019, considering the growing evolution of the interest in the theme in the political map, discussions, and research on sustainability from the end of the 1990s on.

(Figure 3.1)

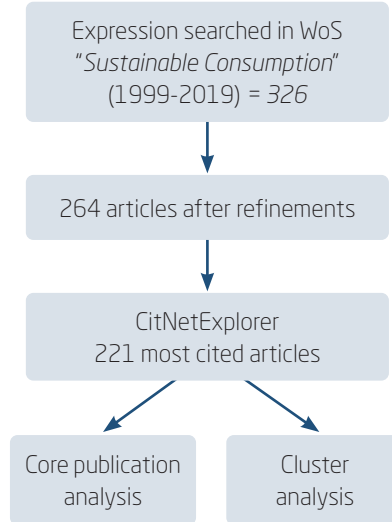
STAGES FOR CONDUCTING THE COCHRANE SYSTEMATIC REVIEW (CSR)



Source: Adapted from Higgins (2011).

The initial number of articles identified in the database was 326. In refining the search, only the publications that make up the main collection of the WoS database were included, with articles published in English. It gathers journals from the Science Citation Index Expanded (SCI-EXPANDED), the Social Sciences Citation Index (SSCI), and the Arts & Humanities Citation Index (A & HCI), ensuring that the retrieved articles are of high quality. Also, the areas used as categories in the refinement of the research were: Environmental Sciences, Green Sustainability, Science Technology, Environmental Engineering, Environmental Studies, Business, Economics, Regional Urban Planning, Development Studies, Ecology, Management, and Political Science. After these refinements, the search resulted in a base consisting of 264 articles loaded into the CitNetExplorer software, which identified 221 articles as the most cited. The details of these steps are in Figure 3.2.

(Figure 3.2)
STUDY OPERATION STEPS



Source: Elaborated by the authors.

The conduct and updating of search strategies followed an interactive process, as the filters for the search refinements were applied. The data analysis tool used was the Citation Network Explorer from the CitNetExplorer software, which allows for exploratory quantitative analysis and a view of the citation links of the relevant scientific literature (van Eck & Waltman, 2014b). The software was chosen because it provides the chronology of publications that highlights the evolution of the theme and also the viewing of publications that are strongly connected in terms of citations (van Eck & Waltman, 2014a, 2014b).

It used the techniques that analyze the relevant publications (core publication) and the groupings of articles by the year and by proximity (clustering) to investigate the main themes of the research field on sustainable consumption. Five clusters were identified that address from the most traditional research topics that represent the mainstream of scientific publications on the subject, to more recent studies that adopt social and emerging perspectives with areas of research still little explored.

As a cut-off criterion for the most cited articles (core publication), the h-index, developed by Hirsch (2005), was used to combine the author's productivity with its impact. That is, it consists of a tool to quantify the researchers' productivity based on their most cited articles, considering quantity (number of articles) and quality (number of citations) (Hirsch,

2005) simultaneously. According to this criterion, the impact factor of the core publications has $h\text{-index} = 11$. Therefore, the 11 papers that presented a citation number (≥ 11) higher than or equal to eleven were analyzed. CitNetExplorer's internal citation scores refer to the number of citations in a publication within the citation network under analysis (van Eck & Waltman, 2014b). It means, for example, that the impact factor of the article by Young, Hwang, McDonald, and Oates (2010) presented an internal score with value $h\text{-index} = 29$ (Figure 4.1.2), that is, 29 articles from the internal network citation referenced this publication.

Clustering analysis was used to group publications in the research area and focused on groupings by similarities or associations of papers with a connection in terms of citation. It helps to identify research topics in the literature and analyze the chronology and evolution within each identified cluster (van Eck & Waltman, 2017). The standard resolution parameter used 1.00 of the CitNetExplorer program for all cluster analyzes. This feature controls the size of the generated clusters. In this case, the higher the parameter value, the greater the number of clusters obtained (van Eck & Waltman, 2014b). The cluster size was defined for ten publications. Clusters with some publications below the established minimum were merged with other clusters.

The software's "drill down" feature allows you to drill down a complete network and to drill down to reach a subnet. This functionality was applied to analyze each cluster's main publications (van Eck & Waltman, 2014b), identifying the pioneer publications with the highest scores and the most recent articles in the network. The titles, abstracts, and keywords of each cluster's publications were analyzed to identify the main research topics on sustainable consumption, as explained in the following section.

4. PRESENTATION AND ANALYSIS OF RESULTS

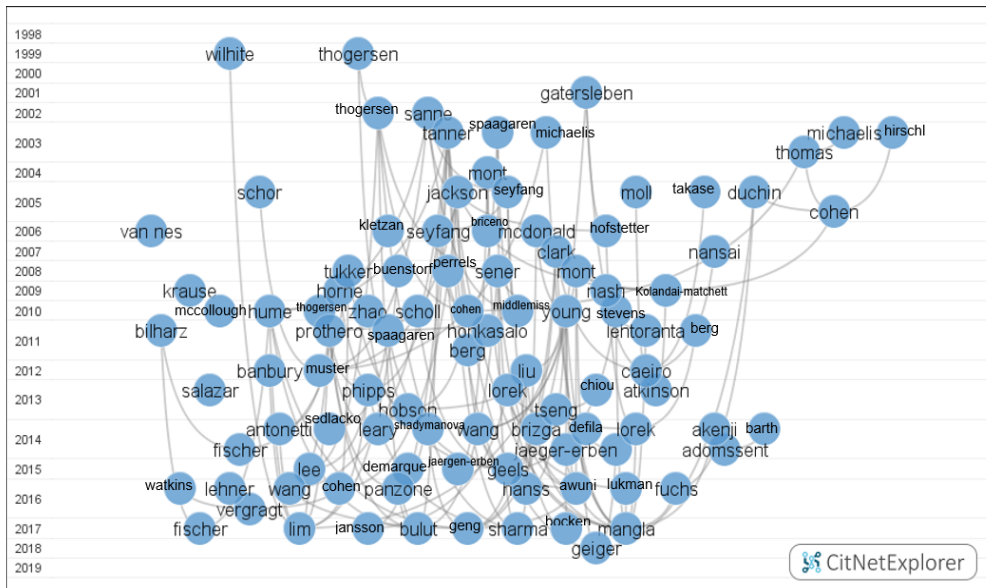
This section analyzes the main publications on sustainable consumption with the highest internal citation (core publication). Of the 264 articles in the database, 221 correspond to the most cited publications in the area from 1999 to 2019.

4.1 The main publications in the research field on sustainable consumption

The first functionality applied in the software was the core publication to analyze the main publications in the field, observing the publications'

chronology, as shown in Figure 4.1.1. Based on the results, it was found the main research in the area covers everything from publications that represent the mainstream of the sustainable consumption policy, that is, the dominant theoretical current in the field, to the new social perspectives emerging in the literature.

(Figure 4.1.1)
VISUALIZATION OF THE CORE PUBLICATIONS ON SUSTAINABLE CONSUMPTION (1999-2019)



Source: Network of publications generated on CitNetExplorer.

The oldest publication is “Social loading and sustainable consumption advances”, published in 1999, by Wilhite and Lutzenhiser. This article addresses the meaning of social burden to understand levels of household consumption by families, presenting some examples of cases in Norway, Scandinavia, North America, and Japan. The authors suggest the importance of considering the social nature of consumption and its implications for research agendas and policymaking.

In the same year, Thøgersen, through a study with Danish adults, tested hypotheses about possible mechanisms for spillover processes (acting in an ecologically correct way in one area can influence the behavior in other related fields) among pro-environmental actions. This study brought contribu-

tions to future research on behavioral change towards a pro-environmental consumption pattern (Thøgersen, 1999; Thøgersen & Ölander, 2002). In addition to the first studies on the theme, it identified the list of the most cited main articles and the respective citation score, as shown in Figure 4.1.2.

(Figure 4.1.2)

THE 11 MOST CITED PUBLICATIONS FROM THE INTERNAL CITATION NETWORK

Order	Author(s)	Publication	Journal	Citation score
1	Young, Hwang, McDonald, and Oates (2010)	Sustainable consumption: Green consumer behavior when purchasing products	<i>Sustainable Development</i>	29
2	Tanner and Kast (2003)	Promoting sustainable consumption: Determinants of green purchases by Swiss consumers	<i>Psychology & Marketing</i>	23
3	Prothero et al. (2011)	Sustainable consumption: Opportunities for consumer research and public policy	<i>Journal of Public Policy & Marketing</i>	23
4	Lorek and Fuchs (2013)	Strong sustainable consumption governance: Precondition for a degrowth path?	<i>Journal of Cleaner Production</i>	21
5	Sanne (2002)	Willing consumers – or locked-in? Policies for a sustainable consumption	<i>Ecological Economics</i>	17
6	Jackson (2005)	Live better by consuming less? Is there a “double dividend” in sustainable consumption?	<i>Journal of Industrial Ecology</i>	15
7	Seyfang (2006)	Ecological citizenship and sustainable consumption: Examining local organic food networks	<i>Journal of Rural Studies</i>	15
8	Spaargaren (2003)	Sustainable consumption: A theoretical and environmental policy perspective	<i>Society & Natural Resources</i>	14
9	Mont and Plepys (2008)	Sustainable consumption progress: Should we be proud or alarmed?	<i>Journal of Cleaner Production</i>	14

(continue)

(Figure 4.1.2 (conclusion))

THE 11 MOST CITED PUBLICATIONS FROM THE INTERNAL CITATION NETWORK

Order	Author(s)	Publication	Journal	Citation score
10	Clark (2007)	Evolution of the global sustainable consumption and production policy and The United Nations Environment Programme's (Unep) supporting activities	<i>Journal of Cleaner Production</i>	11
11	Tukker et al. (2008)	Fostering change to sustainable consumption and production: An evidence-based view	<i>Journal of Cleaner Production</i>	11

Source: Elaborated by the authors.

The first most cited article is by Young et al. (2010). They investigated the buying process for green consumers about consumer technology products in the United Kingdom. This study found that the lack of time is one of the impediments to the purchases of green products. However, some incentives could help consumers to decide at the time of purchase, such as labels on eco-friendly products to facilitate the choice and the comparison with other products on the market (Young et al., 2010). Besides, one of the obstacles to sustainable consumption practices is the gap that still exists between “attitude-behavior” or “action-values” (Young et al., 2010), that is, consumers’ concern about environmental issues necessarily reflects in their shopping behavior.

Understanding the personal and contextual barriers that influence consumers’ attitudes is essential to know the determining and impeding factors of ecological purchases. In this sense, Tanner and Kast (2003) carried out the second most cited study. The authors identified some facilitators of the purchase of green food from rural and urban families in Switzerland. Positive consumer attitudes towards environmental protection, fair trade, local products, and the provision of knowledge related to the action are negatively associated with perceived barriers to time and frequency of shopping in supermarkets.

The third article with the highest number of citations was an essay by Prothero et al. (2011) suggesting directions for future research to face the challenges related to sustainable consumption, among which the following stand out: the inconsistency between the attitudes and behavior of consumers

about aspects related to sustainability; to address the role of the citizen in society; and the need to have a macro-structural approach to promote sustainability and sustainable consumption.

The fourth article, with a theoretical focus, highlights that little progress has been made for sustainable consumption because the strategies have focused on the approach of a “weak sustainable consumption” that is not able to face the challenges of sustainable development (Lorek & Fuchs, 2013). This approach focuses on efficiency through technological improvements, neglecting social issues, and the limits of natural resources. In turn, the perspective of “strong sustainable consumption” is based on the need for changes in patterns and levels of consumption, considering the dimension of social well-being and emphasizing the promotion of social innovation (Lorek & Fuchs, 2013).

From a theoretical perspective, the fifth article points out that; in addition to the approach that focuses on social and psychological factors in the individual choice of consumers in their purchasing decisions. The structure in which consumption must also be analyzed includes conditions of work-life, urban aspects, and the patterns of daily life that can influence individuals to specific behaviors (Sanne, 2002). Consumers are locked (“lock-in”) to consumption patterns unsustainable by social structures, such as the market, work patterns, urban planning, and development, or even their circumstances (Sanne, 2002).

The sixth article presents a theoretical discussion on the different perspectives in which consumer behavior is analyzed. The first approach is the eco-humanist view of consumption, which emphasizes sufficiency in meeting needs, warning about the social, environmental, and psychological consequences of materialism. It contemplated the dynamic nature of consumer behavior from the evolutionary view of consumption, which must consider holistic aspects instead of simplistic solutions. Finally, there is an approach that considers the social, cultural roles, and the symbolic nature of material goods, which are highlighted from the perspective of consumption (Jackson, 2005). The author points out that a “double dividend” is inherent to sustainable consumption: the ability to live better while consuming less and reducing the impact on the environment in this process. For this, win-win relationships will require a broad social effort to materialize.

The seventh article is by Seyfang (2006), which emphasizes the proposal of ecological citizenship as a useful approach that allows for more excellent reflection and awareness of sustainability issues, as it implies reducing the impacts on the environment. This approach is a path to sustainable

consumption. The study found empirically, through a local organic food chain in the United Kingdom, that citizens voluntarily commit to sustainability, changing their lifestyles to sustainable consumption practices and making decisions in their daily lives that impact less on the environment (Seyfang, 2006). The article proposes an alternative development model that considers the social, environmental, and social welfare aspects in conjunction with the economic, following an approach that is called “new,” “humanistic”, or “green economy”, based on justice and social welfare, redefining wealth, prosperity and progress (Seyfang, 2006).

The eighth most cited article is Spaargaren (2003), who discusses some political experiences in the field of sustainable consumption in the Netherlands and defends a contextual analysis for sustainable consumption through the sociological approach. The author considers the contribution of the social practices model that analyzes real behavioral practices comprehensively and not individually, encompasses the daily routine and the different domains of social life for a group of individuals, and social structures are no longer external variables. He put it at the center of the analysis.

The ninth article is by Mont and Plepys (2008). The authors present the mapping of different initiatives and political interventions in favor of sustainable consumption, used by the countries of the European Union and the Organization for Economic Cooperation and Development (OECD). Based on this information, the authors argue that environmental strategies that focus only on eco-efficiency are insufficient because they cannot deal with the impacts caused by the increase in consumption levels. Actions by the government, companies, and consumers themselves are necessary to achieve sustainable consumption, seeking to achieve balance with the principles of sustainable development, socio-economic goals, and global political agendas from a multidisciplinary and comprehensive perspective (Mont & Plepys, 2008).

The tenth article presents the evolution of the global policy of sustainable production and consumption and the support activities of the United Nations Environment Program (UNEP). Sustainable production and consumption policies have focused on programs that encourage cleaner and more efficient production processes instead of considering the environmental impacts of the design, use, and disposal of products by consumers. It is noteworthy that both, over-consumption and under-consumption, exert pressure on the environment, considering that many of the population’s basic needs remain unmet, undermining the preservation of natural resources and increasing social inequalities (Clark, 2007).

Finally, Tukker et al. (2008) summarize the results of research carried out by the Sustainable Consumption Research Exchange Network (SCORE!). The authors suggest a framework with policies and actions to promote sustainable production and consumption considering the roles of actors such as Government, Business, and Civil Society. Among some actions contained in the framework, it is suggested that companies adopt a cleaner production, such as the ecological design in the management of supply chains; the government must combat oligopoly and monopoly markets, provide sustainable infrastructures, define advertising standards that do not promote offers that are harmful to the environment or targeted at vulnerable groups, define criteria to promote transparency on the socio-environmental performance of products; and consumers must adopt more sustainable lifestyles and take responsibility for their consumption behavior (Tukker et al., 2008).

Therefore, to promote sustainable consumption, companies, suppliers, educational institutions, and the media, the government and consumers must assume responsibilities in the area in which they operate and a systemic approach of cooperation between all stakeholders from the actors of the production chain to the final consumer. Thus, actions in favor of changes in current consumption patterns and consumer behavior towards more sustainable lifestyles are increasingly important issues for sustainable development, among other emerging and promising research themes that will be exposed in the next section.

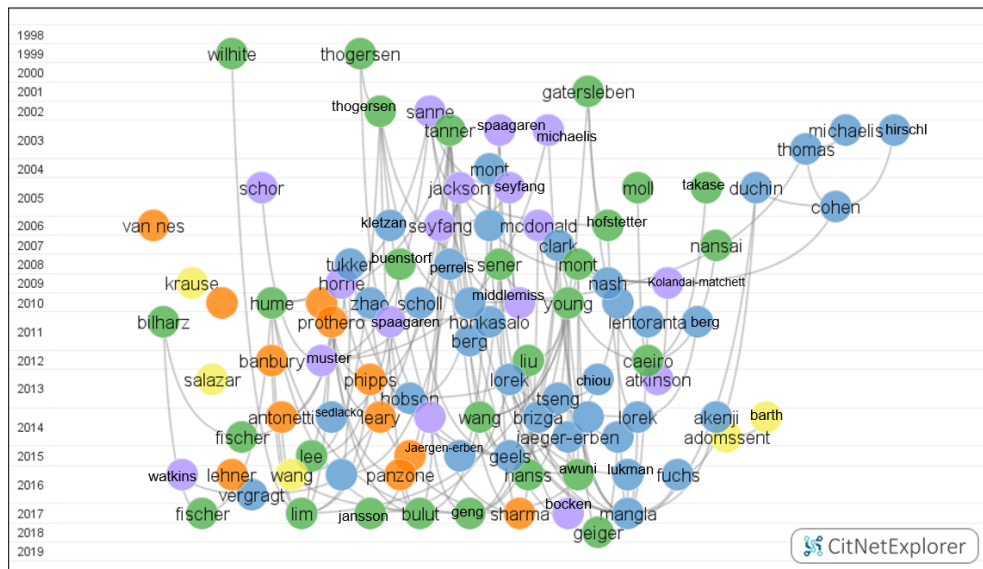
4.2 The main research topics on sustainable consumption

The thematic analysis of the research field on sustainable consumption was carried out. The main research topics through the cluster analysis that reveals the proximity of themes present in the groupings of publications were observed. The articles that belong to each cluster were analyzed separately, with aid of the drill-down technique to visualize the publication network better.

We identified five clusters that represent different topics of research on sustainable consumption: the first cluster with 67 publications (blue), the second cluster with 59 articles (green), the third cluster with 50 articles (lilac), the fourth cluster with 30 articles (orange) and the fifth cluster with 11 articles (yellow color). It is emphasized that 47 of the analyzed publications do not belong to any cluster. The visualization of the citation network with the main publications, by cluster, is shown in Figure 4.2.1.

(Figure 4.2.1)

VISUALIZATION OF THE MOST RELEVANT PUBLICATIONS SEPARATED BY CLUSTER

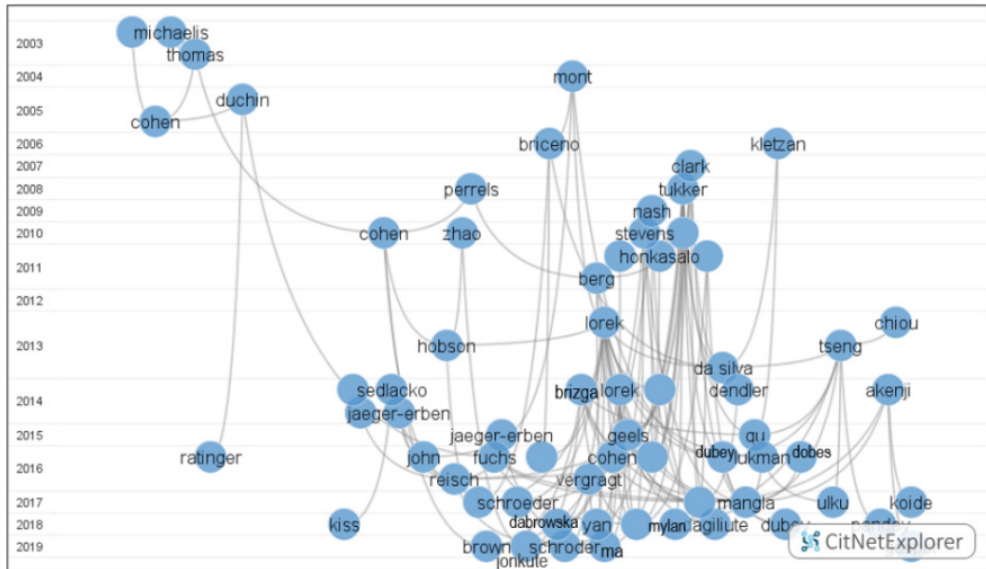


Source: Network of publications generated on CitNetExplorer.

Cluster 1 (blue) has 67 publications with 133 citation links from 2003 to 2019 (Figure 4.2.2). After analyzing the titles, abstracts, and keywords of the articles, the predominant themes of this group are about the potential of technology to overcome environmental impacts; new ways of using products, such as sharing, renting, and repairing as a proposal to deal with unsustainable consumption patterns; Green economy and degrowth; the social aspect of consumption; social innovation and co-creation of value between consumers and companies as new opportunities for sustainable production and consumption.

To contemplate the main themes extracted from publications belonging to cluster 1, it was called **Ecoefficiency**, given that the articles focus on resource efficiency strategies, eco-efficient production processes, and technological improvements, whose emphasis is on the greening of supply chains and incentives for green products.

(Figure 4.2.2)
VIEW OF THE DRILL-DOWN FOR CLUSTER 1

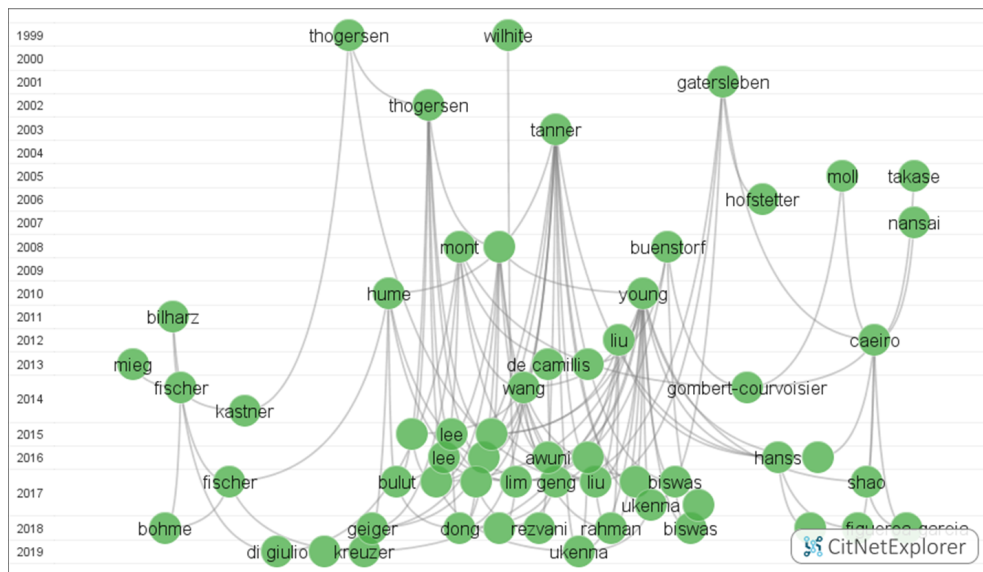


Source: Network of publications generated on CitNetExplorer.

Cluster 2 (green) has 59 publications with 122 citation links from 1999 to 2019 (Figure 4.2.3). The central themes of this group address studies on behavioral change towards a pattern of pro-environmental consumption (Spillover); consumer behavior; ecological shopping; education, citizen and civic competence; the influence of cultural factors and elements on consumption behavior and sustainable consumption behavior. Thus, cluster 2 was named **Consumer Behavior**, considering the emphasis of the articles on better understanding consumers' purchasing decisions and the determining and restrictive factors for the purchase of eco-friendly products.

However, there are still gaps in studies on the intention and behavioral attitude of consumers in matters related to sustainability, with the absence of models and metrics that make it possible to measure and evaluate everyday consumption practices. Thus, this cluster can be useful in formulating policies on more effective public policies regarding sustainable consumption.

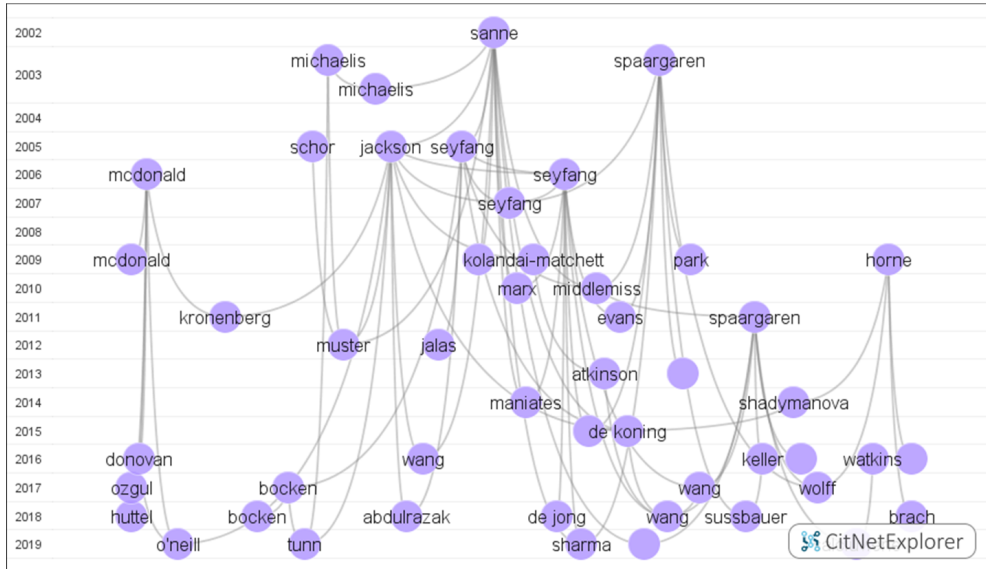
(Figure 4.2.3)
VIEW OF THE DRILL-DOWN FOR CLUSTER 2



Source: Network of publications generated on CitNetExplorer.

Cluster 3 (lilac) has 50 publications, with 79 citation links from 2002 to 2019 (Figure 4.2.4). The main themes are consumer behavior, ecological citizenship, the theory of social practices; alternative sustainable consumption; organic food; the role of communication to increase the understanding of sustainable consumption; global environmental governance; business models for sustainable consumption, collaborative and circular economy. Thus, cluster 3 was named the **Social Nature of Consumption**, since there is a concentration of articles that analyze consumption under the lens of the theory of practice that considers consumption within a variety of contexts, socio-cultural aspects, and social practices rooted in everyday lives to avoid individualistic approaches to consumer behavior.

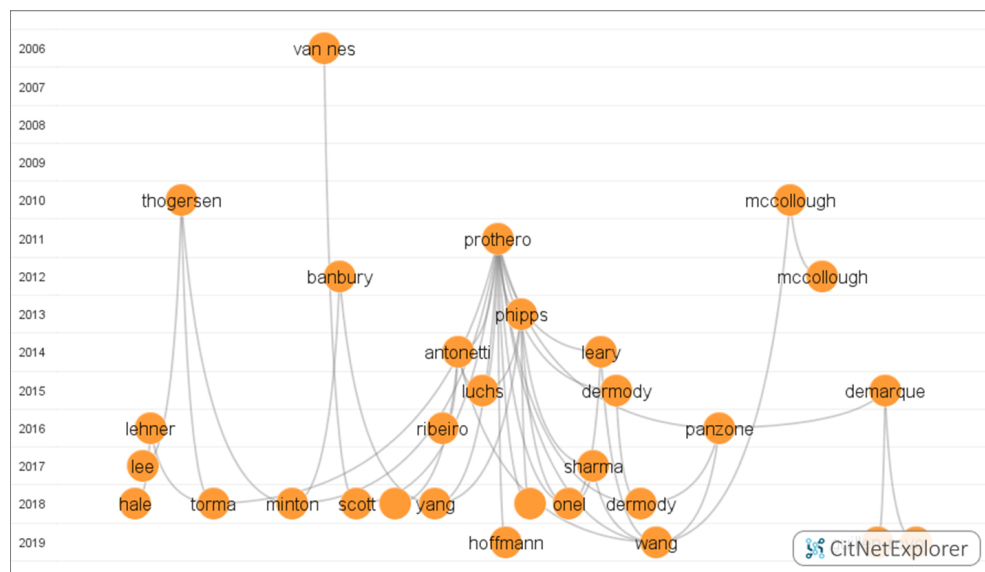
(Figure 4.2.4)
VIEW OF THE DRILL-DOWN FOR CLUSTER 3



Source: Network of publications generated on CitNetExplorer.

Cluster 4 (orange) has 30 publications with 44 citation links from 2006 to 2019 (Figure 4.2.5). The most prominent topics are about strategies to optimize the product's useful life; consumption of organic food; macro-structural approach to the formulation of public policies; the influence of feelings, such as guilt and pride, in consumption choices; the influence of sociodemographic attitudes and variables; the role of culture; social initiatives in consumption through shared and collaborative economy. Therefore, cluster 4 was called **Dynamic Approach to Sustainable Consumption**, with research that focuses on the interactive and interdependent process of personal, environmental, and behavioral factors that impact consumption, expanding the understanding of the underlying aspects that influence sustainable consumption.

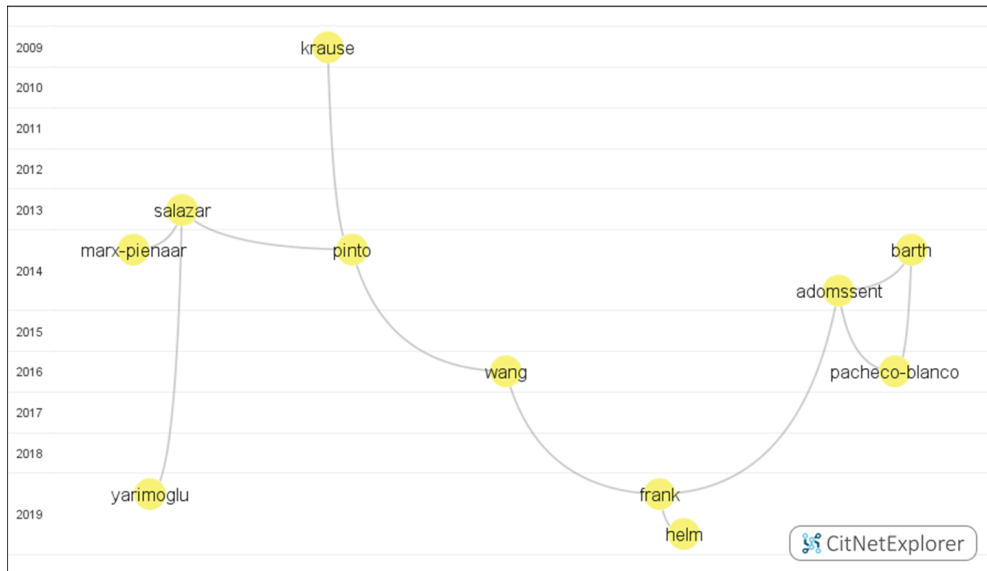
(Figure 4.2.5)
VIEW OF THE DRILL-DOWN FOR CLUSTER 4



Source: Network of publications generated on CitNetExplorer.

Cluster 5 (yellow) has 11 publications with 11 citation links from 2009 to 2019 (Figure 4.2.6). The most recurring themes are about policy for environmental sustainability; the influence of social groups, such as family and friends, in the decision to choose eco-friendly products; education to develop skills for sustainable consumption; theoretical and managerial implications of the relationship between identity, gender, and sustainable consumption; effects of emotions on behavior; public purchases; ecologically conscious consumer behavior. According to the main themes analyzed in the database articles, cluster 5 was called **Education for Sustainable Consumption**, as educational institutions must develop the necessary skills to meet the growing demands of society and contemporary socio-environmental challenges.

(Figure 4.2.6)
VIEW OF THE DRILL-DOWN FOR CLUSTER 5



Source: Network of publications generated on CitNetExplorer.

Therefore, technological improvements, incentives for green consumption, and pro-environmental campaigns alone are inefficient. They do not focus on reducing consumption patterns and levels, nor on social interactions (Phipps et al., 2013; Salazar, Oerlemans, & van Stroe-Biezen, 2013; Ma et al. 2019; Wilhite & Lutzenhiser, 1999), cultural factors (Banbury, Stinerock, & Subrahmanyam, 2012; Minton, Spielmann, Kahle, & Kim, 2018), the influence of feelings (Antonetti & Maklan, 2014; Lee, 2017) and values (Ma et al., 2019; Şener & Hazer, 2008; Sharma & Jha, 2017) on consumer behavior.

The scope of research on sustainable consumption has expanded and considered a range of social, psychological, economic, environmental, and political factors that influence consumer behavior's dynamic and complex process. With areas of study still little explored, emerging research on sustainable consumption has a potential contribution to direct a global effort towards sustainable development. Developing skills to enable individuals to propose and implement innovative solutions to ecological problems is one of the promising research lines in the area.

5. FINAL CONSIDERATIONS

The purpose of this article was to analyze the thematic evolution of the research field on sustainable consumption, from 1999 to 2019, through a bibliometric study. For this, it used the features of the CitNetExplorer software: core publication to identify the main publications on the topic; and clustering to analyze its thematic evolution as a research field.

The bibliometric analysis results show the inherent complexity of the process to achieve sustainable consumption, which involves economic, technological, political, social, psychological, and environmental aspects. However, the most recent publications converge on the need to change the patterns and levels of consumption in today's society and to engage various stakeholders in participation and co-creation processes to develop policies and strategies that make a useful contribution to sustainable consumption.

When considering the trajectory of publications, over the years, one can perceive the evolution of research on sustainable consumption. It is possible to observe the contribution of several areas of knowledge to the research field, expanding the perspective of the analysis. The phenomenon is investigated from multiple theoretical and practical lenses, with contributions from sociology, psychology, politics, ecology, and economics.

With the analysis of the clusters, we found that the studies on sustainable consumption were initially centered on the potential of technology to mitigate the environmental impacts of consumption and on the incentive to purchase green products. However, as it is a multidisciplinary area, other perspectives of analysis were included in the discussion, involving contextual and macro-structural aspects, as emphasized by Bengtsson et al. (2018).

However, there was a lack of studies that analyze the engagement between the various actors in promoting sustainable consumption, as well as issues of access to consumption, in addition to the development of sustainable infrastructures that anchor consumption practices, which reinforces the concept that sustainable consumption is a complex and multifaceted concept. The heart of the discussions is to engage consumers in sustainable consumption practices, one of the main challenges inserted in the political agendas for sustainable development.

Furthermore, there is a need to update the definition of sustainable consumption for the theoretical and empirical development of research in the field. The studies analyzed to use the description focused on the production process, emphasizing technology and efficiency, and on the cycle of purchase, consumption, and disposal. The present study does not match the

current perspectives of studies that advocate the need for an interaction of social actors, organizational and institutional, each exercising its role in the systemic process of promoting sustainable consumption. The research advances in the understanding of sustainable consumption, expanding the scope to observe macro-structural, contextual and cultural factors that affect consumer behavior. Thus, analyzing consumption from a social perspective is essential to understand the complexity of aspects that can influence individuals' engagement in sustainable consumption behaviors.

As a limitation of this study, the consultation considered only the scientific articles published in the Web of Science (WoS), but this limitation is minimized by the fact that it is one of the largest and most significant databases of scientific literature, peer-reviewed. Some practical implications of this study involve the formulation of policies that consider the culture and the local context, in addition to the need for an integrated approach that favors governance in favor of sustainable consumption, as highlighted by Brizga et al. (2014) and Lorek and Fuchs (2013).

It is suggested that future research analyzes productivity through the combination of other bibliometric indexes, such as co-creation analysis, bibliographic coupling, co-author analysis, a co-word analysis. These allow the identification of the main authors in the area, journals of impact, the most influential countries, and other techniques for mapping the scenario of publications and the intellectual structure of the research field on sustainable consumption.

CONSUMO SUSTENTÁVEL: EVOLUÇÃO TEMÁTICA DE 1999 A 2019

RESUMO

Objetivo: Analisar a evolução temática do campo de pesquisa sobre consumo sustentável, no período de 1999 até 2019.

Originalidade/valor: O estudo avança na compreensão sobre o desenvolvimento do campo de pesquisa sobre consumo sustentável, analisando as principais publicações e temas abordados.

Design/metodologia/abordagem: Revisão sistemática da literatura por meio de um estudo bibliométrico com análise baseada em citações com apoio do *software* CitNetExplorer, utilizando as técnicas *core publication* e *clustering*. Foram analisados 264 artigos.

Resultados: As publicações mais recentes convergem sobre a necessidade de mudar os atuais padrões e os níveis de consumo e de engajar diversos *stakeholders* em processos participativos e de cocriação. Além disso, identificou-se a existência de cinco *clusters* de pesquisa, a saber: 1. ecoeficiência com foco no esverdeamento do mercado; 2. comportamento do consumidor com ênfase no incentivo para compra de produtos verdes; 3. natureza social do consumo que insere a perspectiva sociológica; 4. abordagem dinâmica por considerar a interdisciplinaridade do campo; e 5. papel da educação para o consumo sustentável. Conclui-se que os diversos temas encontrados revelam contribuições de diferentes áreas do conhecimento e a importância de desenvolver pesquisas que integram a dinamicidade dos desafios para alcançar o consumo sustentável. Ressalta-se a necessidade de uma abordagem integrada devido à complexidade inerente a temática que envolve aspectos econômicos, tecnológicos, políticos, sociais, psicológicos e ambientais para uma governança em prol do consumo sustentável.

PALAVRAS-CHAVE

Consumo sustentável. Bibliometria. CitNetExplorer. *Core Publication. Cluster.*

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