

# Education for Consumption: Thematic Evolution Analysis Using Scientific Mapping

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## Abstract

The purpose of this article was to analyze the course of consumer education research, identifying the most developed and relevant topics related to the subject under study. To achieve this, we used exploratory, descriptive, bibliometric research with a quantitative approach. The data was collected from the Web of Science database, and SciMAT software was used for scientific mapping analysis based on co-words, in three periods: 2014-2017, 2018-2020, 2021-2023. Overall, this study presents the main trends on sub-themes related to

consumer education: behavior, consumer education, consumer, innovation, and product. Not only does it point out the different facets associated with the construct, but it also provides a theoretical basis for further research, especially with regard to expanding the field of knowledge on the subject in question.

**Keywords:** education for consumption, SciMAT, consumer education, scientific mapping.

## **1. Introduction**

Currently, practically every daily activity involves consumption, whether it's using the phone, turning on the lights or even washing your face, therefore, it becomes essential to implement political and legislative actions to safeguard the rights and responsibilities of consumers, which is why consumer education (CE) emerges as a vital tool, aiming to raise the level of awareness of individuals in relation to their role as consumers (Calafell et al., 2019).

In this segment, Castillejo et al. (2011) point out the concern about overconsumption, where consumers' irresponsible behavior implies an emerging need for consumer education. In his words, this consumer education leads to having access to information, the ability to analyze and be aware of the consequences of consumption, the impact of which puts the maintenance of life on the planet at risk.

In this context, this study sought to answer the following guiding question: How has scientific production on the subject of consumer education evolved over the last 10 years?

Based on this concern, the research aimed to analyze the evolution of the topic of consumer education, using an approach that combines performance analysis and scientific mapping, primarily identifying the most relevant topics (driving themes) related to the subject under study, by means of co-word analysis carried out using SciMAT software, to detect the different themes covered by the research area over three periods: 2014-2017, 2018-2020 and 2021-2023.

Consumer education provides a fundamental insight into the formation of conscious and responsible consumers. Analyzing the evolution of this topic allows us to understand the changes in the topics considered relevant by the academic community. Using SciMAT software for a co-word analysis, it is possible to identify not only the frequency, but also the connection between emerging topics, offering an integrated view of performance and scientific progress in the area.

Therefore, this study can contribute to guiding future research and educational practices, ensuring that consumer education keeps pace with social needs and market trends, promoting a more informed and sustainable society.

## **2. Methods**

The proposed aim of this study was to carry out an exploratory, descriptive, bibliometric study with scientific mapping analysis, using the open-source software SciMAT (Science Mapping Analysis Software Tool), which was created by Cobo et al. (2011), using a quantitative approach.

With the significant increase in the amount of scientific literature published recently, researchers are finding it challenging to keep up to date in their areas of interest. This scenario has made it necessary to find methods that use strategies to filter and absorb the most relevant information (Maral, 2024).

In this sense, bibliometric studies provide valuable insights that help researchers identify new

trends in publications, assess the impact of scientific journals, identify prominent authors, and understand the dynamics of collaboration in the academic field (Farooq, 2021; Maral, 2024). Specifically, “A science map is used to represent the cognitive structure of a research field” (Cobo et al., 2011, p. 146).

Initially, a search of scientific publications was conducted in the Web of Science (WoS) database using the keywords listed in Table 1 across the Title, Abstract, Keyword Plus, and Author Keywords fields, yielding a total of 1 015 publications. Next, the results were screened by document type to include only articles, which resulted in 767 studies and excluded books, book chapters, editorials, letters to the editor, reviews, theses, essays, and technical reports. Subsequently, filtering for English-language publications reduced the sample to 743, and delimiting the publication period from 2014 to 2023 resulted in a final set of 367 articles.

**Table 1.** Keywords used to search in the WoS

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TS= (“consumer education” or “education for consumption” or “education for conscious consumption” or “education for responsible consumption” or “educate for consumption” or “educate to consume” or “education about consumption”)

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Source: Prepared by the authors (2024).

Following this, a manual screening of titles, abstracts, and keywords of the 367 articles was performed to ensure thematic alignment with the study’s scope, research focusing directly on education for consumption. Articles addressing strictly commercial, industrial, or purely financial dynamics without an educational or pedagogical framework were excluded. This qualitative selection excluded 242 records, resulting in a final dataset of 125 highly relevant articles. Representative examples of studies excluded during this stage, along with the respective exclusion criteria, are summarized in Table 2.

Table 2. Publications excluded from the search scope

| Title                                                                                                                                                     | Objective                                                                                                                                                                                                                                                                                                                                                              | Authors/year of publication |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Campylobacter, a zoonotic pathogen of global importance: Prevalence and risk factors in the fast-evolving chicken meat system of Nairobi, Kenya           | To determine the prevalence of Campylobacter spp. in Nairobi's small-scale chicken farms and meat retailers, and to identify potential risk factors associated with its presence in those sites.                                                                                                                                                                       | Carron et al., 2018         |
| Comparative oesophageal cancer risk assessment of hot beverage consumption (coffee, mate and tea): the margin of exposure of PAH vs very hot temperatures | The aim of this study was to quantitatively assess the risk of PAH in comparison with the risk of the temperature effect using the margin of exposure (MOE) methodology.                                                                                                                                                                                               | Okaru et al., 2018          |
| Knowledge of and Attitudes Toward Evidence-Based Guidelines for and Against Clinical Preventive Services: Results from a National Survey                  | to produce population-based national data that could assist in the design of communication strategies to increase knowledge of and positive attitudes toward evidence-based guidelines for clinical preventive services (including the US Preventive Services Task Force, USPSTF) and to reduce uncertainty among patients when guidelines change or are controversial | Lantz et al., 2016          |
| Characterizing the Processes for Navigating Internet Health Information Using Real-Time Observations: A Mixed-Methods Approach                            | Our aim was to describe the processes by which users navigate the Internet for information about a hypothetical acute illness and to identify individual characteristics predictive of their information-seeking strategies.                                                                                                                                           | Perez et al., 2015          |

Source: Prepared by the authors (2024).

A scientific mapping of the 125 selected articles was carried out to identify the main themes based on co-word analysis using SciMAT software. “This technique illustrates associations between keywords by constructing multiple networks which highlight associations between keywords, and where associations between networks are possible” (López-Herrera et al., 2010, p. 18).

To analyze the thematic evolution of consumer education using SciMAT, the 10-year period (2014–2023) was divided into three distinct chronological phases: Period 1 (2014–2017), representing the emerging phase of the literature; Period 2 (2018–2020), reflecting the consolidation phase of consumer education research; and Period 3 (2021–2023), corresponding to current state-of-the-art developments and frontier topics. This

three-periodization follows established science mapping guidelines (Cobo et al., 2011; Moral-Pajares et al., 2023) to ensure a balanced distribution of documents per period, avoiding data sparsity while allowing an effective tracking of thematic continuity, fusion, and fission across time.

Overall, this research chose to follow the methodological approach developed in the studies by Santana and Cobo (2020), and Rampasso et al. (2022). Figure 1 represents the flow diagram of this research strategy.

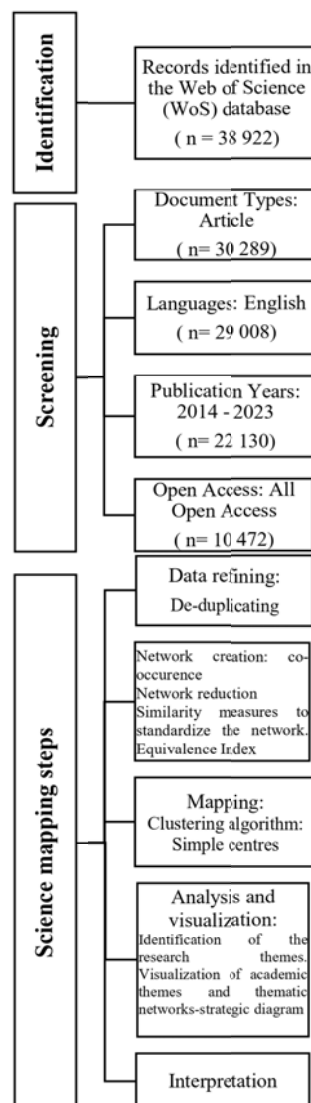


Figure 1. Search strategy flow diagram

Source: Prepared by the authors (2024), adapted from Rampasso et al. (2022), and Santana and Cobo (2020).

The scientific mapping analysis stage begins with refining and reducing the data to identify incorrect, duplicate, or misspelled items, such as grouping words in singular and plural forms or merging terms with identical meanings (e.g., unifying British and American spelling variants such as *behaviour* and *behavior*).

The analysis periods were then selected by dividing them into 2014–2017, 2018–2020, and 2021–2023. In the following steps, the co-occurrence network was used, the equivalence index was standardized, simple centrality algorithms were applied to obtain the scientific map and its clusters, and the *h-index* and sum of citations were selected as quality measures presented in the strategic diagram (Cobo et al., 2011; Rampasso et al., 2022; Santana & Cobo, 2020).

Regarding analysis and visualization, for each of the three periods, the identified themes are presented through strategic diagrams and thematic networks (Cobo et al., 2011; Santana & Cobo, 2020). Figure 2 shows the strategic diagram classified into four quadrants (Q) in terms of centrality and density: Quadrant I (QI) refers to the motor themes, considered important and well-developed, which form the focus of this research; Quadrant II (QII) to “highly developed and isolated themes”; Quadrant III (QIII) to “emerging or declining themes”; and Quadrant IV (QIV) to “basic and transversal themes,” which are important for the research field but not yet fully developed (Cobo et al., 2011).

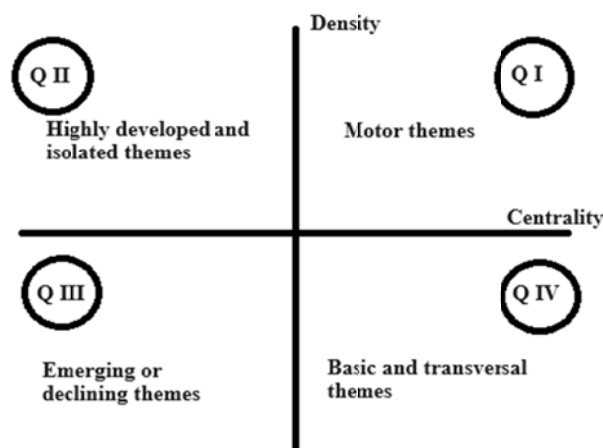


Figure 2. Strategic diagram

Source: Adapted from Moral-Pajares et. al (2023, p. 146).

Finally, the results are interpreted, showing the conceptual structure through the strategic diagrams and thematic network over the three periods.

### 3. Results and discussion

A bibliometric analysis carried out in July 2024 selected 125 articles for the scope of this study. Accordingly, this section presents the quantitative and impact analysis for the three periods (2014-2017, 2018-2020, and 2021-2023), since the quantitative performance analyzes the number of associated documents belonging to each theme and subject area, while the impact shows the citations and the *h-index* of each detected theme and subject area (Cobo et al., 2011).

From a temporal perspective, Figure 3 displays the distribution of the 125 selected articles across the three analyzed periods. Rather than exhibiting linear growth, document production

shows a temporary contraction in Period 2 (2018–2020, with 27 publications) following Period 1 (2014–2017, with 37 articles), before experiencing a substantial surge in Period 3 (2021–2023, reaching 61 documents). This non-linear pattern reflects the structural shifts and evolving maturity of consumer education research across the decade, where nearly half of the analyzed literature was published in recent years.

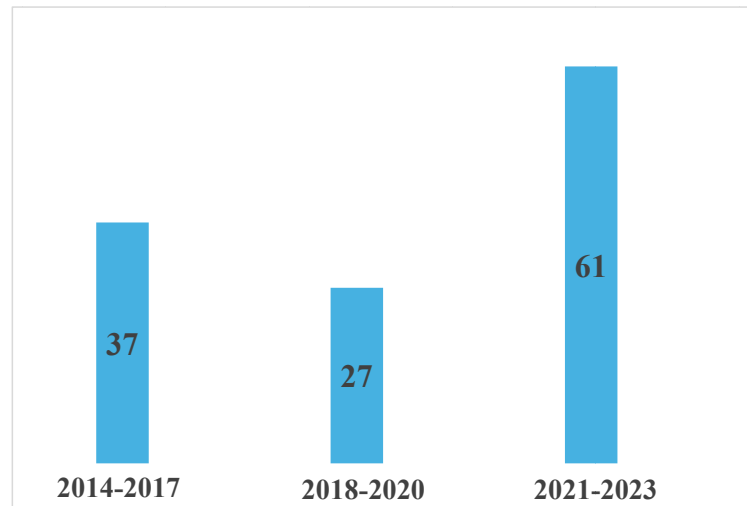


Figure 3. Number of documents per period.

Source: Prepared by the authors (2024), based on articles from the Web of Science database.

After analyzing the number of publications per period in the selection of 125 articles, Table 3 shows the fourteen most cited studies.

Table 3. The fourteen most cited articles (data from the research)

| Title                                                                                                    | Author/year           | Journal                                           | Number of citations |
|----------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------|---------------------|
| Reducing single-use plastic shopping bags in the USA                                                     | Wagner, 2017          | Waste Management                                  | 109                 |
| Less is more: Consumer education in a closed-loop supply chain with remanufacturing***                   | Zhou et al., 2021     | Omega-International Journal of Management Science | 86                  |
| From quantity to quality: understanding slow fashion consumers for sustainability and consumer education | Jung & Jin, 2016      | International Journal of Consumer Studies         | 60                  |
| Nutrition Label Viewing during a Food-Selection Task: Front-of-Package Labels vs Nutrition Facts Labels  | Graham et al., 2015   | Journal of the Academy of Nutrition and Dietetics | 53                  |
| The role of psychological                                                                                | Hartmann et al., 2018 | European Journal of                               | 51                  |

|                                                                                                                                  |                           |                                           |    |
|----------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------------------------|----|
| empowerment in climate-protective consumer behaviour: An extension of the value-belief-norm framework                            |                           | Marketing                                 |    |
| Financial literacy and fraud detection                                                                                           | Engels et al., 2020       | European Journal of Finance               | 45 |
| Message framing and individual traits in adopting innovative, sustainable products (ISPs): Evidence from biofuel adoption        | Moon et al., 2016         | Journal of Business Research              | 41 |
| Macro and Exogenous Factors in Computational Advertising: Key Issues and New Research Directions                                 | Helberger et al., 2020    | Journal of Advertising                    | 39 |
| Understanding Consumer Preference and Willingness to Pay for Improved Cookstoves in Bangladesh                                   | Rosenbaum et al., 2015    | Journal of Health Communication           | 39 |
| Friend or foe: Stakeholder attitudes towards biodegradable plastic packaging in food waste anaerobic digestion                   | Kakadellis et al., 2021   | Resources Conservation and Recycling      | 38 |
| Consumer knowledge and behaviors regarding food date labels and food waste                                                       | Kavanaugh & Quinlan, 2020 | Food Control                              | 38 |
| Fostering reverse logistics in India by prominent barrier identification and strategy implementation to promote circular economy | Dutta et al., 2021        | Journal of Cleaner Production             | 37 |
| Materialist values, financial and pro-environmental behaviors, and well-being                                                    | Helm et al. (2019)        | Young Consumers                           | 33 |
| Modelling household conservation behaviour among ethnic consumers: the path from values to behaviours                            | Segev, 2015               | International Journal of Consumer Studies | 33 |

Source: Prepared by the authors (2024).

The data contained in Figure 3 and Table 3 can be of great value to researchers studying this topic. They offer a route to the literature and important publications in the field, serving as a valuable resource for further study and research (Cobo et al., 2011).

Figure 4 depicts the evolution of the keywords in Table 1, as conducted by SciMAT. The figure depicts the evolution of the keywords over four distinct analysis periods: 2014 to 2017, 2018 to 2020, and 2021 to 2023. The number of keywords present within each period is represented by the respective circle. The arrow linking one period to another expresses the number of keywords shared between them, while the similarity index (overlapping fraction) is shown in brackets (Moral-Pajares et al., 2023).

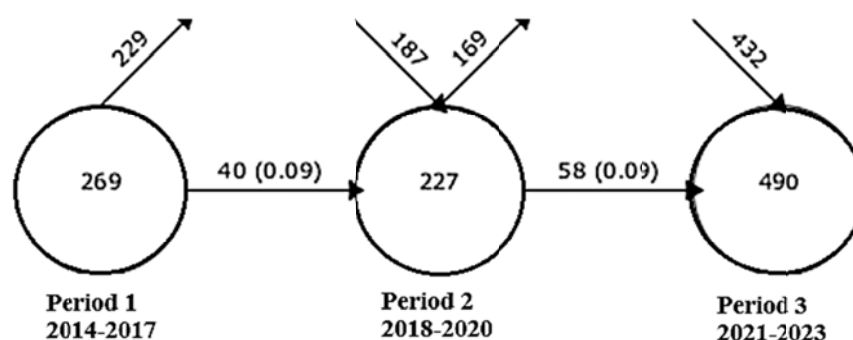


Figure 4. Evolution of the number of keywords

Source: Adapted from SciMAT analysis (Cobo et al., 2012).

According to Moral-Pajares et al. (2023, p. 157) “The top outgoing arrow responds to keywords that are no longer present (i.e., discontinued) in the subsequent period, and the top incoming arrow represents the number of new keywords in the period.” Thus, during the 2014-2017 period, there were 269 keywords, 40 of which will persist in the subsequent period under examination (2018-2020). The number of keywords shared between periods 1 and 2 exhibited a variation of 82 between the 2014-2017 period and the 2018-2020 period.

The 2018-2020 period began with 227 terms, but 169 were excluded, so the 2021-2023 period began with 58 keywords from the previous period. To these initial terms, 432 keywords were added and their importance increased, so that there are currently 490 keywords being used in research on the topic of consumer education. From this analysis, it can be understood that the topic has evolved significantly over the periods studied, and the results show that publications in this area are evolving.

### 3.1 Overview of consumer education topics and performance analysis

Three strategic diagrams, covering the periods 2014 to 2017, 2018 to 2020, and 2021 to 2023, illustrate the main themes in consumer education (see Figures 5, 7, and 9). The size of the sphere is proportional to the number of published documents related to each research topic.

While the performance analysis, “used to identify the most prolific and highest impact sub-fields. The number of published documents, the number of citations and the different

types of h-index are some of the bibliometrics” (Santana & Cobo, 2020, p.849).

Below, for each period, we present their respective strategic chart and performance analysis, which will focus on motoring topics.

### 3.1.1 Period 2014 to 2017

In the 2014-2017 period, as shown in Figure 5, the leading research theme (a well-developed and important theme due to its high centrality) was BEHAVIOR, but it had fewer documents than CONSUMER-EDUCATION, a basic and transversal theme (important for the field of research, but not fully developed).

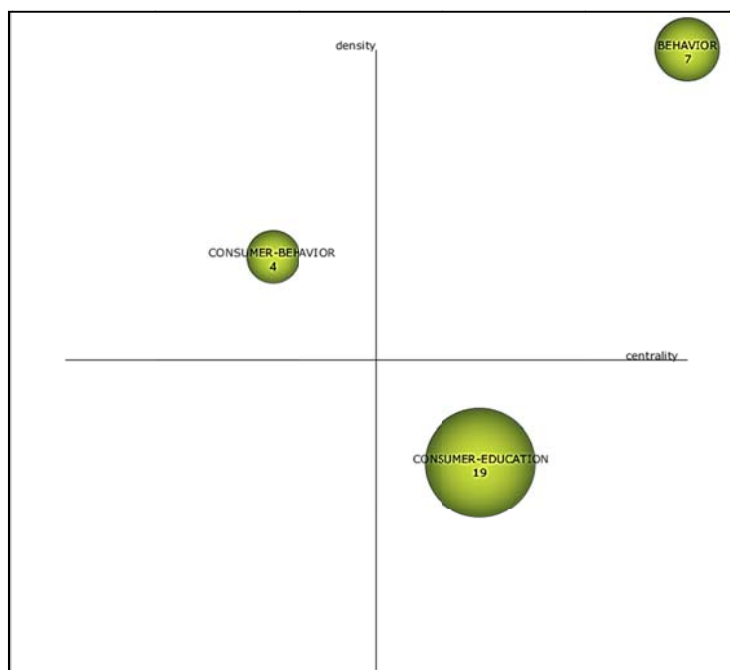


Figure 5. Strategic diagram from 2014 to 2017 (documents count)

Source: Created in SciMAT.

Figure 6 illustrates the clusters generated by the SciMAT software, which are based on the keywords with the highest frequency in the studies. The term BEHAVIOR is related to ATTITUDES, KNOWLEDGE, CONSUMER-INFORMATION, and ENVIRONMENTAL-CONCERN. These are all worthy of further attention. While CONSUMER-EDUCATION stands out in its cluster, the composition of its thematic network is worthy of note. This includes FINANCIAL-LITERACY, SUSTAINABILITY, CONSUMER PROTECTION, CONSUMPTION, and CONSUMER.

These thematic areas reinforce the relevance of consumer education and establish the necessity for continued research on this topic. In this sense, Castillejo et al. (2011) raise concerns about overconsumption, in which the irresponsible behavior of consumers implies a need to educate consumers in a way that addresses these concerns. They argue that such education should include access to information, the ability to analyze and be sensitive to the

consequences of consumerism, and an understanding of the impact of consumerism on the maintenance of life on the planet.

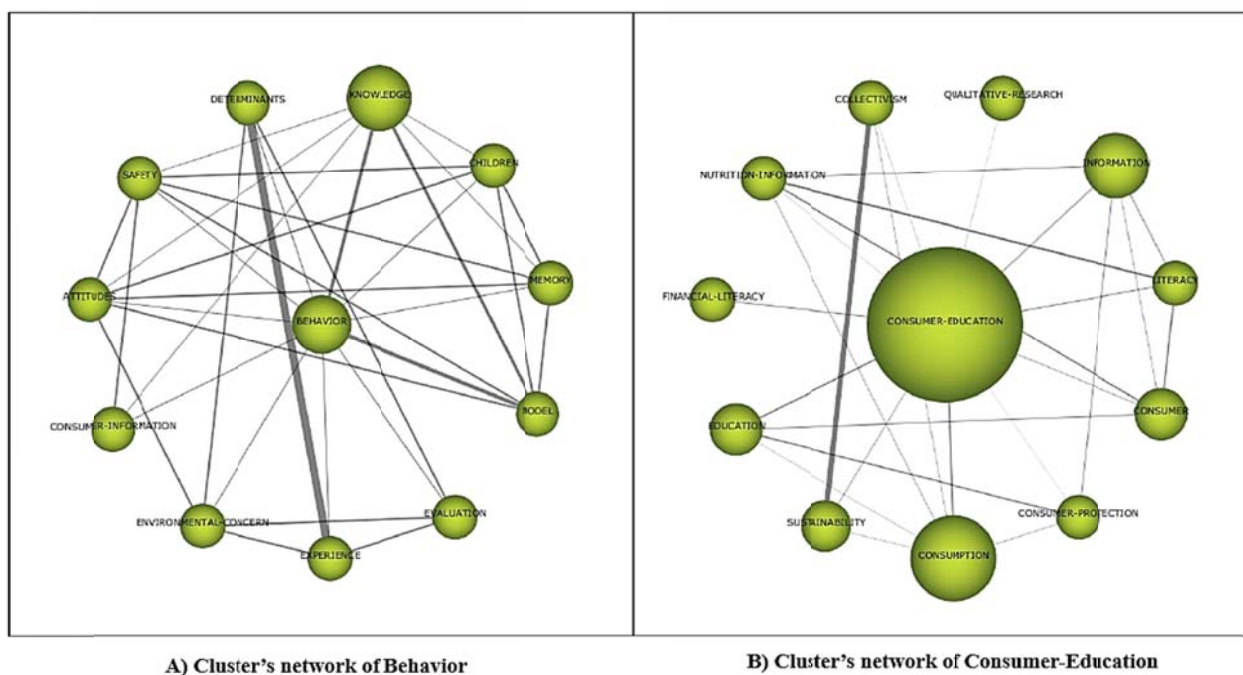


Figure 6. Cluster's network of themes BEHAVIOR and CONSUMER-EDUCATION for the period 2014-2017.

Source: Created in SciMAT.

These thematic areas reinforce the relevance of consumer education and establish the necessity for continued research on this topic. In this sense, Castillejo et al. (2011) raise concerns about overconsumption, in which the irresponsible behavior of consumers implies a need to educate consumers in a way that addresses these concerns. They argue that such education should include access to information, the ability to analyze and be sensitive to the consequences of consumerism, and an understanding of the impact of consumerism on the maintenance of life on the planet.

Following on from this, Wagner (2017) presents as an environmental concern the negative impact caused by the free distribution of plastic and disposable bags, which even harm the marine environment. The author points out that there is a need to ban the free distribution of these bags to consumers – it conditions an automatic behavior in the context of purchasing – in order to reduce these environmental impacts, in addition to increasing the price with taxes or fees, and increasing the use of reusable bags.

However, education is fundamental to this reduction in the use of plastic bags, since it disseminates information about environmental damage and promotes increased recycling, while the imposition of taxes and fees, and a ban on free distribution, is intended to regulate consumer behavior (Wagner, 2017).

Simanjuntak and Mubarakah (2021, p.1233) reflects that access to information provides

convenience to consumers when it comes to obtaining goods or services, but these consumers become victims of commercial practices that advertise dishonest promotions, causing them financial losses, which is why he emphasizes the relevance of consumer education as a means of empowering consumers' rights and protecting them from fraud.

In their research, Engels et al. (2019) pointed to the importance of FINANCIAL-LITERACY in providing individuals with the ability to make financial decisions and process economic information, so that they can behave financially in a way that prevents them from being the target of fraud.

In addition, the analysis of performance measures (Table 4) shows the number of documents, citations and h-index by topic from 2014 to 2017.

Table 4. Performance measures for the themes of the period 2014-2017

| Theme name         | Number of documents | Number of citations | Average of citations | h - Index |
|--------------------|---------------------|---------------------|----------------------|-----------|
| Consumer-Education | 19                  | 273                 | 14.37                | 9         |
| Behavior           | 7                   | 112                 | 16                   | 5         |
| Consumer-Behavior  | 4                   | 84                  | 21                   | 4         |

Source: Analyzed by SciMAT, adapted by the authors (2024).

Based on the strategic diagram (Figure 5) and performance measures (Table 4), it can be seen that the driving theme, BEHAVIOR, has been cited less often and has had a lower h-index than the basic and transversal theme, CONSUMER-EDUCATION, which has been cited 273 times and had 19 more documents, having more impact than the driving theme.

Accordingly, Gombert-Courvoisier et al. (2014), point out that consumer education is a growing theme that educates individuals to be conscious and informed consumers, capable of making responsible decisions in the market, including their rights and responsibilities, as well as reflecting on their role as consumers, in addition to maintaining attitudes and behaviors with environmental responsibility, sustainability and conscious consumption, regardless of the region of the world.

However, these authors suggest that population numbers are still limited, due to different cultures and lifestyles, as well as the economic crisis which makes it impossible to continue the attitudes and behaviors necessary for responsible consumption and quality of life on the planet (Gombert-Courvoisier et. al., 2014).

Consumer education therefore represents the efforts made to guide and socially integrate people into the market economy (locally, nationally and internationally), raising awareness of their role as responsible consumers with environmental integrity to promote sustainable development (McGregor, 2015).

### 3.1.2 Period 2018 to 2020

In the period 2018 to 2020, BEHAVIOR and CONSUMER represent the driving themes in the field of consumer education, which are well developed and important for this area (see Figure 7).

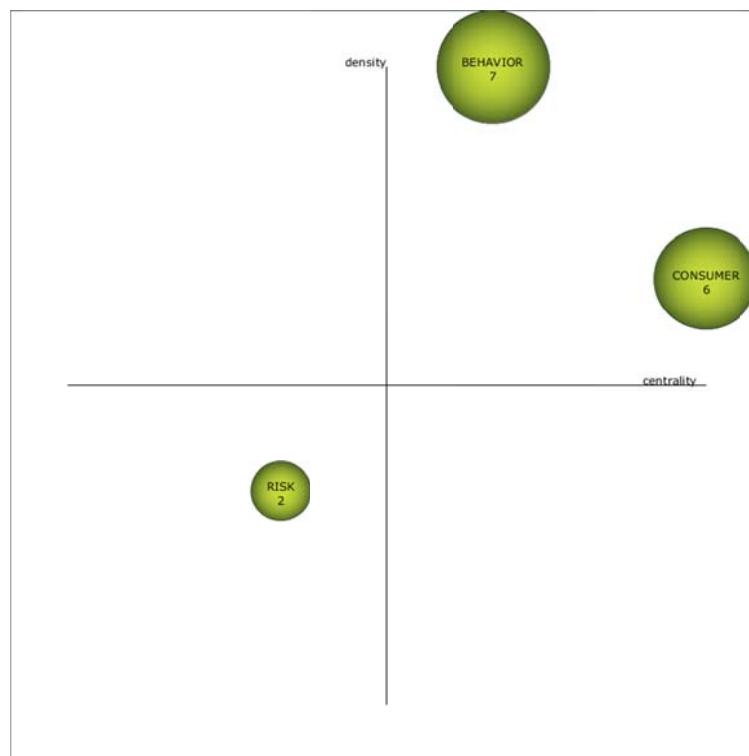


Figure 7. Strategic diagram from 2018 to 2020 (documents count)

Source: prepared in SciMAT.

In the Behavior theme, with 115 citations (see Table 5), there is growing interest in the sub-themes of Consumer-Education, Consumer-Behavior, Education, Materialism, Financial-Education, Sustainability (see Figure 8). Thus, Helm et al. (2019) emphasize that sustainability refers to both the ability to maintain economic viability over time and the responsible management of limited natural resources. Therefore, they point out that behavior establishes a relationship between materialism and financial education, where certain levels of materialism tend to lead to higher risk financial decisions, such as impulsive spending and indebtedness, negatively affecting the individual's well-being (Helm et al., 2019).

Table 5. Performance measures for the themes of the period 2018-2020

| Theme name | Number of documents | Number of citations | Average of citations | h – Index |
|------------|---------------------|---------------------|----------------------|-----------|
| Behavior   | 7                   | 115                 | 16.43                | 7         |
| Consumer   | 6                   | 90                  | 15                   | 4         |
| Risk       | 2                   | 23                  | 11.5                 | 2         |

Source: Analyzed by SciMAT, adapted by the authors (2024).

In addition, the authors also point out that, with the perceived aggravation of the climate change impacts, there is growing scientific interest in the effects of materialism on the excessive consumption of natural resources. However, this environmental concern is not always reflected in changes in consumption habits, due to consumers not yet realizing how their individual choices affect the environment (Helm et al., 2019) and seeing the

consequences of unbridled consumption as a distant problem with no short-term impact (Helm et al., 2019; Velasco-Martínez et al., 2020).

The driving theme CONSUMER, with 90 citations (see Table 5), is associated with sub-themes, of which the following stand out: CONSUMPTION, ENVIRONMENTAL-EDUCATION, SUSTAINABLE-DEVELOPMENT, GREEN-CONSUMPTION (see Figure 8). In this regard, Velasco-Martínez et al. (2020) show that the act of consuming transcends the act of buying, the simple acquisition of goods, pointing out that everyday choices, from dawn onwards, imply the use of various resources such as water, energy, transportation and waste generation, culminating in CO2 emissions due to human dependence on fossil fuels such as coal, oil and natural gas.

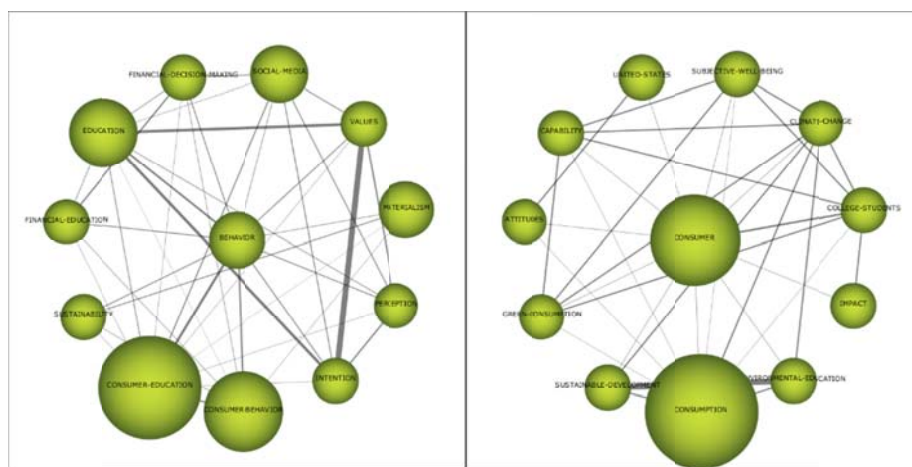


Figure 8. Cluster's network for the period 2018-2020

Source: Prepared in SciMAT.

These authors show that environmental education is essential in the transition to a socio-economic system that is sustainable and environment-friendly, given that unsustainable factors in the current pattern of production and consumption have a significant environmental and social cost for the planet, such as: exploitation of child labor, an increase in global poverty, disparities in the living conditions of many people, environmental degradation, global warming, natural disasters and the emergence of diseases (Velasco-Martínez et al., 2020).

As for green consumption, the research published by Velasco-Martínez et al. (2020) found that consumers are not guaranteed to adopt sustainable consumption practices, as they often don't see a direct connection between buying green products and caring for the environment, and are still very skeptical about organic products, seen by some as simply marketing strategies. These perceptions can therefore have a negative impact on the adoption of sustainable practices (Velasco-Martínez et al., 2020).

Therefore, Estrada-Vidal et al. (2020) reinforces that awareness and personal behavior are essential to benefit the environment, as a result of social responsibility through sustainable development, contributing to the defense against the deterioration of the environment,

whether through daily practices or education.

### 3.1.2 Period 2021 to 2023

From 2021-2023, INNOVATION and PRODUCT were the driving themes (see Figure 9).

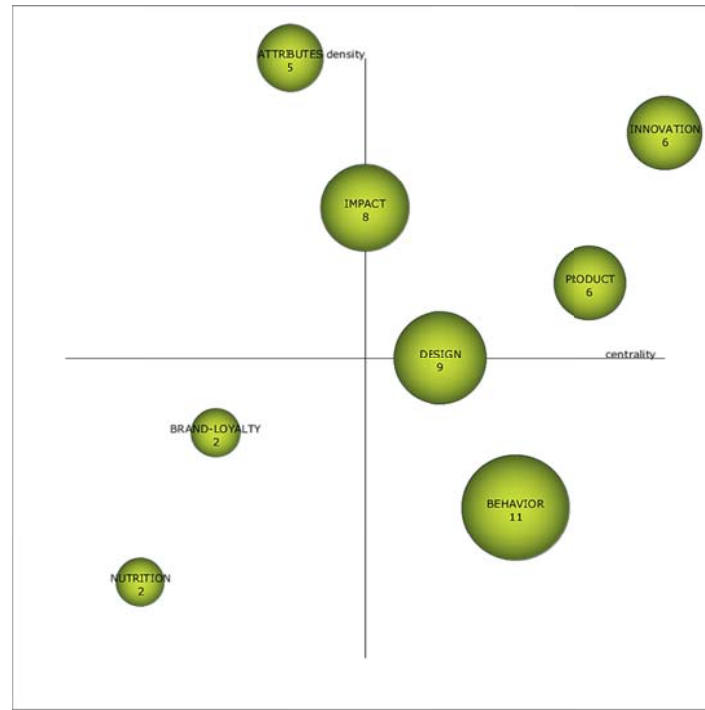


Figure 9. Strategic diagram from 2021 to 2023 (documents count)

Source: Prepared in SciMAT.

However, the basic and transversal themes, DESIGN and BEHAVIOR combined, were the most cited, with 158 and 124 citations respectively (see Table 6).

Table 6. Performance measures for the themes of the period 2021-2023

| Theme name    | Number of documents | Number of citations | Average of citations | h - Index |
|---------------|---------------------|---------------------|----------------------|-----------|
| Behavior      | 11                  | 124                 | 11.27                | 6         |
| Design        | 9                   | 158                 | 17.55                | 5         |
| Impact        | 8                   | 98                  | 12.25                | 5         |
| Product       | 6                   | 155                 | 25.83                | 4         |
| Innovation    | 6                   | 40                  | 6.67                 | 4         |
| Attributes    | 5                   | 40                  | 8                    | 2         |
| Brand-Loyalty | 2                   | 11                  | 5.5                  | 1         |
| Nutrition     | 2                   | 2                   | 1                    | 1         |

Source: Analyzed by SciMAT, adapted by the authors (2024).

The INNOVATION theme highlights the sustainable-consumption sub-theme, while PRODUCT highlights the FOOD-WASTE sub-theme (see Figure 10). In this context, Shariatmadary et al. (2023) emphasize that the hyperproduction of traditional food systems

contributes to social and environmental unsustainability, resulting in nutrient depletion, climate change, biodiversity loss, soil degradation, and the loss of nearly a third of all food produced. Within consumer education, mapping this sub-theme demonstrates how educational frameworks increasingly address food waste awareness and sustainable consumption practices as critical pedagogical tools to mitigate these broader impacts.

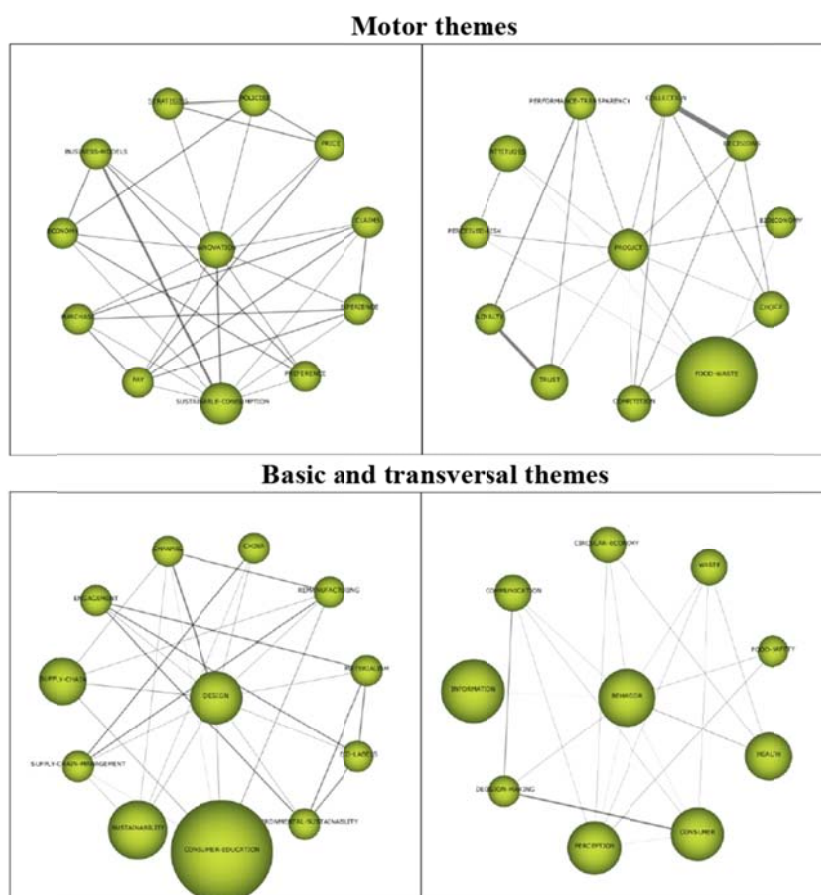


Figure 10. Cluster's network for the period 2021-2023

Source: Prepared in SciMAT.

Following on from this, Kavanaugh and Quinlan (2020) support the idea that food waste is a social and environmental concern, as the natural resources used to produce food, such as fresh water, are wasted when this production is not taken to market or the leftovers become waste, or the opportunity to feed a population of more than 820 million is lost.

Kakadellis et al. (2021) discuss the growing environmental impact of the use of plastic packaging in the food supply chain, as its use represents hygiene standards and a reduction in food waste for consumers, and is a way of guaranteeing the quality of food from production to consumption.

The fact that environmental challenges are escalating with the population increase and the commercialization of human activities in the modern urban context, as this leads to greater consumption of resources, increases the risk of unrestrained exploitation with few social,

economic and environmental repercussions (Al-Nuaimi & Al-Ghamdi, 2022).

As a result, there are problems such as global pollution, rising carbon emissions, deforestation, and food and water insecurity. In addition, there are low recycling rates for plastic food packaging, resulting in the most waste being found in marine environments, so sustainable consumption becomes fundamental to promote the responsible use of resources and minimize negative environmental impacts (Al-Nuaimi & Al-Ghamdi, 2022; Kakadellis et al., 2021).

The sub-themes that emerge most prominently in relation to the overarching theme of DESIGN are as follows: The sub-themes of CONSUMER-EDUCATION, SUSTAINABILITY, and SUPPLY-CHAIN (see Figure 10) warrant particular attention. Regarding the theme of BEHAVIOR, as illustrated in Figure 10, the sub-themes that emerge as the most prominent are: INFORMATION, CONSUMER, and PERCEPTION are particularly noteworthy. In this sense, consumer behavior has a direct impact on the environment, whether through their purchases, products or services used, or waste produced. This establishes that in order to foster societies that value conscious consumption, environmental education is essential. The objective of such education is to develop skills and knowledge that enable consumers to make sustainable choices, based on concrete and procedural information (Al-Nuaimi & Al-Ghamdi, 2022; Betzler & Kempen, 2024).

During this period, CONSUMER-EDUCATION is also undergoing significant growth. Traditionally, consumer education has focused on the transmission of information with the objective of fostering the development of conscious and responsible individuals. This approach has emphasized the importance of individuals being aware of their rights and obligations, understanding the meaning of the information presented on product labels, and recognizing the tactics used in advertising. However, consumer education that is limited to providing precise instructions is insufficient to adequately prepare citizens for the imminent global and environmental challenges (Calafell et al., 2019).

Given the above, encouraging responsible consumer behavior is essential to achieving global sustainability goals, as education plays a crucial role in this mission. The key objective is to train conscious consumers who can use information to make informed purchases that promote responsible and sustainable business practices (Al-Nuaimi & Al-Ghamdi, 2022; Betzler & Kempen, 2024; UNESCO, 2005).

In this regard, Restrepo-Santiesteban et al. (2022) posit that the concept of responsible consumption describes a contemporary, well-informed consumer who makes purchases with an awareness of the impacts they have on the environment and society, both locally and globally. The authors assert that this consumer evaluates products and services not only in terms of their intrinsic quality or price, but also in consideration of the externalities they may generate, seeking to minimize adverse impacts and promote beneficial outcomes at the national and international levels.

Furthermore, the practice of build-in obsolescence, employed by manufacturers, entails the creation of products that become obsolete or unusable after a designated period. This forces

consumers to purchase new models or versions, thereby boosting sales and leading to unsustainable consumerism that is detrimental to the environment (Restrepo-Santiesteban et al., 2022).

One suggestion to resolve this situation would be remanufacturing, e.g. the remanufacturing of products, promoting global sustainability benefits, as it is a low-cost production alternative, generating profit for industry, creating local community jobs, providing lower prices for consumers and benefiting the environment, as it reduces the disposal of used products, uses fewer of nature's resources and redirects materials away from landfills (Zhou et al., 2021).

In this way, consumer education stands out as an essential tool aimed at increasing individuals' perception of the importance of their role as consumers, seeking to promote a better understanding of rights and responsibilities in the consumer market, contributing to more conscious and sustainable choices, that is, the consumer is a person who recognizes in their consumption habits the opportunity to protect the environment and improve the quality of life of the community at a specific and regional level (Restrepo-Santiesteban et al., 2022).

### *3.2 Viewing the evolution mapa*

Figure 11 shows the main keywords related to consumer education, illustrating how they have evolved over the periods 2014-2017, 2018-2020, and 2021-2023, where each column in the figure represents one of these periods. Note that across the three analyzed periods, three themes were detected in Period 1 (2014-2017), three themes in Period 2 (2018-2020), and eight themes in Period 3 (2021-2023). The green circles represent the keywords and the lines show the relationship between them, so that the more intense the line (solid line, not dotted), the greater the relationship between the keywords.

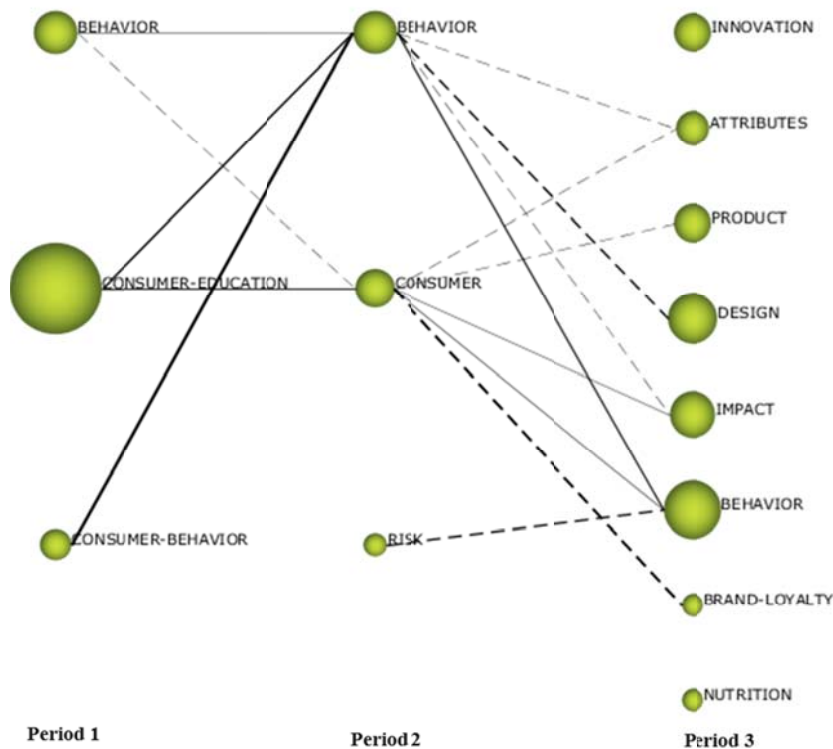


Figure 11. Thematic evolution.

Source: Analyzed by SciMAT, adapted by the authors (2024).

It is observed that Figure 11 presents the bibliometric map of thematic evolution, where solid lines represent related themes sharing the same name, or are labeled with the same keywords, or the label of one theme is part of the other theme. Meanwhile, the dotted line represents the themes that share elements that do not have the same name as the themes. The size of the spheres is proportional to the number of published documents associated with each theme (Cobo et al., 2011).

#### 4. Conclusions, future research and limitations

In conclusion, the objective of this article has been achieved, since the analysis of the evolution of the theme of CONSUMER-EDUCATION, through the scientific mapping carried out with the SciMAT software, has made it possible to identify the most important themes (driving themes), indicated in each of the three periods verified in the strategic diagrams. In this way, these results contribute to future research.

It was also noted that the topic of CONSUMER-EDUCATION is still under development, making it a literary gap for this research, due to the scarcity of data found in scientific productions from 2014 to 2023. However, it should be noted that this study was limited to a single database, Web of Science, although it is the one with the greatest coverage of publications and brings together high-impact journals, WoS showed that there are still no articles specifically focused on the topic of consumer education.

Another limitation was the selection of keywords and time filters used as search criteria in the database, where articles may have been overlooked. In this sense, this research is far from exhausting the literature on the subject, and it is suggested that future work consult other databases, for example: Scopus, Eric, etc. They could also explore the sub-themes related to the driving themes, known as basic and transversal themes, which could make it possible to write a theoretical framework on consumer education.

## References

- Al-Nuaimi, S. R., & Al-Ghamdi, S. G. (2022). Sustainable Consumption and Education for Sustainability in Higher Education. *Sustainability*, 14(12), 7255. <https://doi.org/10.3390/su14127255>
- Betzler, S., & Kempen, R. (2024). Strengthening sustainable consumption behavior in high school students: Evaluation of an experiential training intervention targeting psychological determinants. *Environmental Education Research*, 31(2), 413-431. <https://doi.org/10.1080/13504622.2024.2383751>
- Calafell, G., Banqué, N., & Vicianá, S. (2019). Purchase and Use of New Technologies among Young People: Guidelines for Sustainable Consumption Education. *Sustainability*, 11(6), 1541. <https://doi.org/10.3390/su11061541>
- Carron, M.; Chang, Y. M.; Momanyi, K.; Akoko, J.; Kiiru, J.; Bettridge, J.; Chaloner, G.; Rushton, J.; O'Brien, S.; Williams, N.; Fèvre, E. M.; & Hasler, B. (2018). Campylobacter, a zoonotic pathogen of global importance: Prevalence and risk factors in the fast-evolving chicken meat system of Nairobi, Kenya. *PLOS Neglected Tropical Diseases*, 12(8), e0006658. <https://doi.org/10.1371/journal.pntd.0006658>
- Castillejo, J. L., Colom, A. J., Pérez-Geta, P. M. A., Neira, T. R., Sarramona, J., Touriñán, J. M., & Vázquez, G. (2011). Educación para el consumo. *Educación XX1*, 14(1), 35-58. <https://www.redalyc.org/articulo.oa?id=70618224002>
- Cobo, M. J., López-Herrera, A. G., Herrera-Viedma, E., & Herrera, F. (2011). An Approach for Detecting, Quantifying, and Visualizing the Evolution of a Research Field: A Practical Application to the Fuzzy Sets Theory Field. *Journal of Informetrics*, 5(1), 146-166. <https://doi.org/10.1016/j.joi.2010.10.002>
- Dutta, P.; Talaulikar, S.; Xavier, V.; & Kapoor, S. (2021). Fostering reverse logistics in India by prominent barrier identification and strategy implementation to promote circular economy. *Journal of Cleaner Production*, 294, 126241. <https://doi.org/10.1016/j.jclepro.2021.126241>
- Engels, C., Kumar, K., & Philip, D. (2019). Financial Literacy and Fraud Detection. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3308537>
- Estrada-Vidal, L. I., Olmos-Gómez, M. d. C., López-Cordero, R., & Ruiz-Garzón, F. (2020). The Differences across Future Teachers Regarding Attitudes on Social Responsibility for Sustainable Development. *International Journal of Environmental Research and Public Health*, 17(15), 5323. <https://doi.org/10.3390/ijerph17155323>

- Farooq, R. (2024). A review of knowledge management research in the past three decades: a bibliometric analysis. *VINE Journal of Information and Knowledge Management Systems*, 54(2), 339-378. <https://doi.org/10.1108/VJIKMS-08-2021-0169>
- Gombert-Courvoisier, S., Sennès, V., & Ribeyre, F. (2014). An analysis of viewpoints on education for responsible consumption in higher education. *International Journal of Sustainability in Higher Education*, 15(3), 259-269. <https://doi.org/10.1108/IJSHE-12-2011-0080>
- Graham, D. J; Heidrick, C; & Hodgins, K. (2015). Nutrition Label Viewing during a Food-Selection Task: Front-of-Package Labels vs Nutrition Facts Labels. *Journal of the Academy of Nutrition and Dietetics*, 115(10), 1636-1646. <http://doi.org/10.1016/j.jand.2015.02.019>
- Hartmann, P., Apaolaza, V., & D'Souza, C. (2018). The role of psychological empowerment in climate-protective consumer behaviour: An extension of the value-belief-norm framework. *European Journal of Marketing*, 52(1-2), 392-417. <https://doi.org/10.1108/EJM-01-2017-0080>
- Helberger, N.; Huh, J.; Milne, G.; Strycharz, J.; & Sundaram, H. (2020). Macro and Exogenous Factors in Computational Advertising: Key Issues and New Research Directions. *Journal of Advertising*, 49(4), 377-393. <https://doi.org/10.1080/00913367.2020.1811179>
- Helm, S., Serido, J., Ahn, S. Y., Ligon, V., & Shim, S. (2019). Materialist values, financial and pro-environmental behaviors, and well-being. *Young Consumers*, 20(4), 264-284. <https://doi.org/10.1108/YC-10-2018-0867>
- Jung, S., & Jin, B. (2016). From quantity to quality: understanding slow fashion consumers for sustainability and consumer education. *International Journal of Consumer Studies*, 40(4), 410-421. <https://doi.org/10.1111/ijcs.12276>
- Kakadellis, S., Woods, J., & Harris, Z. M. (2021). Friend or foe: Stakeholder attitudes towards biodegradable plastic packaging in food waste anaerobic digestion. *Resources, Conservation & Recycling*, 169, 105529. <https://doi.org/10.1016/j.resconrec.2021.105529>
- Kavanaugh, M., & Quinlan, J. J. (2020). Consumer knowledge and behaviors regarding food date labels and food waste. *Food Control*, 115, 107285. <https://doi.org/10.1016/j.foodcont.2020.107285>
- Lantz P. M.; Evans, W. D.; Mead, H.; Alvarez, C.; & Stewart, L. (2016). Knowledge of and Attitudes Toward Evidence-Based Guidelines for and Against Clinical Preventive Services: Results from a National Survey. *The Milbank Quarterly*, 94(1), 51-76. <https://doi.org/10.1111/1468-0009.12181>
- López-Herrera, A. G., Cobo, M. J., Herrera-Viedma, E., & Herrera, F. (2010). A bibliometric study about the research based on hybridating the fuzzy logic field and the other computational intelligent techniques: A visual approach. *International Journal of Hybrid Intelligent Systems*, 7(1), 17-32. <https://doi.org/10.3233/HIS-2010-0102>

- Maral, M. (2024). A Bibliometric Analysis on Academic Integrity. *Journal of Academic Ethics*, 22, 665–687. <https://doi.org/10.1007/s10805-024-09519-6>
- McGregor, Sue L. T. (2015). Framing consumer education conceptual innovations as consumer activism. *Journal of Consumer Studies & Home Economics*, 40(1), 35-47. <https://doi.org/10.1111/ijcs.12208>
- Moon, S.; Bergey, P. K.; Bove, L. L.; & Robinson, S. (2016). Message framing and individual traits in adopting innovative, sustainable products (ISPs): Evidence from biofuel adoption. *Journal of Business Research*, 69(9), 3553-3560. <https://doi.org/10.1016/j.jbusres.2016.01.029>
- Moral-Pajares, E., Cobo-Martín, M. J., Caviades-Conde, Ángela A., & Gallego-Valero, L. (2023). Análisis temático y conceptual de la Revista de Economía Mundial mediante SciMAT. *Revista de Economía Mundial*, (65), 141-167. <https://doi.org/10.33776/rem.vi65.7946>
- Okaru, A. O.; Rullmann, A.; Farah, A.; Gonzalez de Mejia, E.; Stern, M. C.; & Lachenmeier, D. W. (2018). Comparative oesophageal cancer risk assessment of hot beverage consumption (coffee, mate and tea): the margin of exposure of PAH vs very hot temperatures. *BMC Cancer*, 18(1), 236. <https://doi.org/10.1186/s12885-018-4060-z>
- Perez, S. L.; Paterniti, D. A.; Wilson, M.; Bell, R. A.; Chan, M. S.; Villareal, C. C.; Nguyen, H. H.; & Kravitz, R.L. (2015). Characterizing the Processes for Navigating Internet Health Information Using Real-Time Observations: A Mixed-Methods Approach. *Journal of Medical Internet Research*, 17(7), e173. <https://doi.org/10.2196/jmir.3945>
- Rampasso, I. S., Santana, M., Serafim, M. P., Dibbern, T., Rodrigues, E. A., Filho, W. L., & Anholon, R. (2022). Trends in remote work: A science mapping study. *Work* (Reading, Mass.), 71(2), 441–450. <https://doi.org/10.3233/WOR-210912>
- Restrepo-Santiesteban, M. J., Tocarruncho-Parra, L. X., & Ortiz-Riaga, M. C. (2022). Consumo responsable en estudiantes de pregrado de tres universidades públicas en Bogotá, Colombia. *Revista de Investigación, Desarrollo e Innovación*, 12(1), 7-20. <https://doi.org/10.19053/20278306.v12.n1.2022.14201>
- Rosenbaum, J.; Derby, E.; & Dutta, K. (2015). Understanding Consumer Preference and Willingness to Pay for Improved Cookstoves in Bangladesh. *Journal of Health Communication*, 20(1), 20-27. <https://doi.org/10.1080/10810730.2014.989345>
- Santana, M., & Cobo, M. J. (2020). What is the future of work? A science mapping analysis. *European Management Journal*, 38(6), 846-862. <https://doi.org/10.1016/j.emj.2020.04.010>
- Segev, S. (2015). Modelling household conservation behaviour among ethnic consumers: the path from values to behaviours. *International Journal of Consumer Studies*, 39(3), 193-202. <https://doi.org/10.1111/ijcs.12167>
- Simanjuntak, M., & Mubarakah, Ulfah. (2021). Investigating how consumer education and lifestyle influence the consumer empowerment: case in rural and urban areas, Indonesia. *Independent Journal of Management & Production*, 12(5), 1232-1249.

<https://doi.org/10.14807/ijmp.v12i5.1395>

Shariatmadary, H., O'Hara, S., Graham, R., & Stuiver, M. (2023). Assessing Sustainability Priorities of U.S. Food Hub Managers: Results from a National Survey. *Foods*, 12(13), 2458. <https://doi.org/10.3390/foods12132458>

UNESCO. (2005). *UN decade of education for sustainable development 2005–2014: Draft international implementation scheme* (Document No. ED/2005/PEQ/ESD/3). United Nations Educational, Scientific and Cultural Organization. <https://unesdoc.unesco.org/ark:/48223/pf0000140372>

Velasco-Martínez, L.-C., Martín-Jaime, J.-J., Estrada-Vidal, L.-I., & Tójar-Hurtado, J.-C. (2020). Environmental Education to Change the Consumption Model and Curb Climate Change. *Sustainability*, 12(18), 7475. <https://doi.org/10.3390/su12187475>

Wagner, T. P. (2017). Reducing single-use plastic shopping bags in the USA. *Waste Management*, 70, 3–12. <http://dx.doi.org/10.1016/j.wasman.2017.09.003>

Zhou, Y., Xiong, Y., & Jin, M. (2021). Less is more: Consumer education in a closed-loop supply chain with remanufacturing. *Omega*, 101, 102259. <https://doi.org/10.1016/j.omega.2020.102259>