Toward a sustainable research agenda on food eco-labelling in the business and management research domain

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Abstract

Purpose – This study aims to critically review the research on food eco-labels to identify research gaps and recommend future research directions in business and management.

Design/methodology/approach – A hybrid integrated review combines bibliometric analysis with an in-depth framework-based study of theory–context–characteristics–methodology (TCCM) and reviews quality research published over 21 years between 2002 and 2022.

Findings – We identify key research themes and the knowledge structure of food eco-label research. Future researchers should explore food eco-label dynamics and phenomena in areas related to consumer behaviour, information, consumer knowledge, environmental concerns, trust, packaging and willingness-to-pay as antecedent factors.

Research limitations/implications – This review contributes to the business and management literature by quantifying existing research and consolidating its evolution. The articles were sourced from the established Web of Science (WoS) database. Other databases should be included in future reviews. We also focus on research published in business and management. Further studies could include research beyond such specialised domains.

Practical implications – Consumers need more information on the objectives and meaning of food eco-labels. The dissemination of knowledge on eco-labels, as well as effective communication and information on eco-labels, are relevant to future research issues.

Social implications – The knowledge derived from this research holds significant potential in shaping policies and devising tools aimed at reducing the carbon footprint linked to food production and consumption. Considering the substantial impact of these activities on our planet's carbon footprint, addressing food security and sustainability emerges as a crucial concern for humanity. Recognising the importance of eco-label

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communication and information becomes particularly pertinent for future generations, who stand to bear the most substantial impact of climate change and sustainable development. These generations are also more inclined toward embracing and implementing sustainable practices.

Originality/value – There are no comprehensive, integrated reviews exploring the methods, variables and constructs used in studies on food eco-labels based on all articles published in WoS journals in the business and management domains. This is the first comprehensive literature review using a hybrid approach (bibliometric review with TCCM framework) in the field of food eco-label research.

Keywords Eco-label, Food, Sustainability, TCCM, Bibliometric analysis, Marketing

Paper type Research paper

1. Introduction

Environmental sustainability poses a critical challenge for humanity. Growing environmental initiatives align with public concern and consumer activism, pressuring politicians and businesses to prioritise responsible production and consumption. Food consumption, accounting for a third of households' environmental impact, plays a crucial role. Its production generates a similar share of human-caused greenhouse gases. Calls for agricultural sustainability and the significance of sustainable supplier selection for company performance are emphasised by various authors (Crippa *et al.*, 2021; Aliabadi *et al.*, 2022).

Eco-labels inform buyers about sustainability, impacting their choices. Few studies on food eco-labels exist. Manta *et al.* (2023) suggest exploring eco-label roles in local development. Dórea *et al.* (2022) emphasise consumer influence on environmental labels. Maesano *et al.* (2019) advocate examining social and economic sustainability. Notably, these studies cover diverse sectors but not specifically agri-food products.

The only study to focus on a research area is Maesano *et al.* (2019), who focused on social sciences. To fill these research gaps, this study focuses on food eco-labels in the business and management research domains.

We analyse food product eco-label research from business and management journals using the Web of Science (WoS) database. We scrutinise studies between 2002 and 2022 with keywords like "ecolabel*", "eco-label*", "sustainab* label*", "eco-friendly label*", "environmental label" and "food" in titles, abstracts or keywords. Results are refined based on business and management subject area, journal source and English language.

We performed a bibliometric analysis, reviewing 32 research papers using the theory–context–characteristics–methodology (TCCM) approach (Paul and Rosado-Serrano, 2019). This approach differs from previous studies by providing comprehensive insights beyond typical bibliometric descriptions. Our analysis delves into thematic and co-occurrence keywords, addressing future research challenges, in contrast to prior studies focussing on variables like authors, countries and keywords (Chen *et al.*, 2023; Lim *et al.*, 2021; Mandler *et al.*, 2021; Paul *et al.*, 2021).

Dórea *et al.* (2022) and Manta *et al.* (2023) explored environmental/sustainable labelling but not within the food sector or a specific research domain. In contrast, Maesano *et al.* (2019) exclusively studied the wine sector. This gap prompts overarching questions to be addressed.

RQ1. What is the structure of research on food eco-labels in the business and management research domains?

RQ2. What are the research gaps in the existing literature, and what are avenues for future research in the field of food eco-labels in these domains?

The paper's structure is as follows: Section 2 reviews relevant literature on eco-labels in food contexts. Section 3 details our hybrid review method and the bibliometric/TCCM approaches used. Section 4 reveals the findings. Section 5 consolidates our discussion, summarising state-of-the-art methods. Furthermore, it outlines future research paths, potential limitations and concludes by emphasising managerial and social implications.

2. Literature review

Participation in eco-labelling schemes, as noted by Gulbrandsen (2006), allows companies to address diverse stakeholders – environmental groups, governments, retailers and eco-conscious consumers. Eco-labels communicate qualities not evident during consumption (Rao *et al.*, 1999) and visually highlight a product's green attributes in business terms (Thøgersen *et al.*, 2010). The role of eco-labels varies based on stakeholders' perspectives (Bratt *et al.*, 2011), serving as a benchmark for improvement and competitiveness from a producer's viewpoint.

Consumer-focused eco-labels serve as information channels and tools for spreading awareness within the market. They communicate positive environmental and social impacts while reducing uncertainty in consumers' environmentally conscious purchases (Donato and Adıgüzel, 2022). Lee *et al.* (2020) highlighted that sustainable labels aim to prioritise environmentally friendly products, categorising their impact into three key areas: reducing environmental impact, influencing consumer awareness and attitudes, and changing consumption behaviour.

Despite various studies on ecolabel adoption and outcomes, comprehensive reviews in the food sector, particularly within business and management journals, are limited. Existing research primarily originates from journals focused on food policy, sustainability, environmental studies and government policy papers (Grunert *et al.*, 2014; Leach *et al.*, 2016; Riskos *et al.*, 2021; Stein and de Lima, 2022; Narciso and Fonte, 2021). Additionally, reviews by Asioli *et al.* (2020), Potter *et al.* (2021) and Prieto-Sandoval *et al.* (2016) encompass literature from diverse fields such as agricultural economics, environmental studies, psychology and environmental engineering.

Grunert *et al.* (2014) found sustainability labels don't significantly impact food choices. Leach *et al.* (2016) highlighted the need to understand consumer use of environmental impact labels, suggesting varying suitability across sectors. Prieto-Sandoval *et al.* (2016) noted a gap in understanding eco-labels' influence on technological development. Asioli *et al.* (2020) stressed the importance of understanding consumer values and enhancing eco-label comprehension. Narciso and Fonte (2021) advocated policy reforms for inclusive decision-making in promoting healthy diets. Potter *et al.* (2021) supported eco-labels' role but called for more research on their attributes. Riskos *et al.* (2021) emphasised the credibility of eco-labels in influencing green purchase behaviour. Lastly, Stein and de Lima (2022) endorsed comprehensive mandatory labelling for sustainability, encompassing multiple dimensions and evidence-based criteria.

Eco-labelling predominantly influences markets, but wider environmental goals rely on economic actors transitioning to sustainable business models. Managers and organisations drive eco-label decisions and sustainability initiatives. Dórea *et al.* (2022) highlighted market-driven articles on eco-labelling dimensions. Hence, focussing on business and management journals in our review seems crucial to shaping research agendas in this domain.

Three literature reviews on eco-labels in business and management journals – Dórea *et al.* (2022), Manta *et al.* (2023) and Maesano *et al.* (2019) – were identified in the WoS database. Dórea *et al.* (2022) conducted a broad analysis of environmental labelling across various products. Manta *et al.* (2023) examined eco-labelling certification approaches across different sectors, including tourism. Maesano *et al.* (2019) focused solely on wine-related purchasing behaviour within the specified timeframe of 2003–2018.

Dórea *et al.* (2022) highlighted the prevalence of eco-label studies within the food industry, especially regarding fish, rice and coffee, emphasising the sector's significance in eco-labelling due to its engagement with consumers, suppliers and the government. They noted a growing interest in sustainability after 2010, particularly in food, agriculture and seafood. Maesano *et al.* (2019) noted a research focus on the environmental aspect of sustainability and

identified gaps in understanding contextual impacts on consumer behaviour and persistent confusion surrounding sustainability concepts. Manta *et al.* (2023) emphasised territorial development and stakeholders' perceptions of labelling, highlighting the need to understand factors influencing label design and development.

3. Research methodology

This study utilises a hybrid review approach combining bibliometric analysis and a framework-based review, as proposed by Paul and Rosado-Serrano (2019) and Nicolas and Geldres-Weiss (2023). Employing the TCCM approach (Paul and Rosado-Serrano, 2019), this systematic analysis explores food eco-label literature in business and management domains.

Aligned with Paul and Rosado-Serrano (2019), our goal was to enhance comprehension of sustainability labels in the food and beverage sectors within business and management studies. Identifying key gaps in existing literature, we aimed to guide future research directions.

Although other databases like Scopus and Google Scholar exist, our study focused on WoS due to its renowned journal quality and analytical systems. WoS is recognised as a reliable global citation database for publishers (Valenzuela *et al.*, 2018) and is widely trusted in academic and scientific research worldwide (Clarivate, 2023).

3.1 Data collection and processing

The WoS database was used to identify all its published studies on food eco-label research between 2002 and 2022. The search query was built as a keyword search: ecolabel* AND food AND business, OR ecolabel* AND food AND management, OR eco-label* AND food AND business, OR eco-label* AND food AND management, OR "sustainab* label*" AND food AND business, OR "sustainab* label*" AND food AND management, OR "Eco-friendly label*" AND food AND business, OR "Eco-friendly label*" AND food AND management, OR "environmental label" AND food AND business; OR "environmental label" AND food AND management.

Subsequently, the only documents of interest were articles, review articles, letters and notes (Merigó *et al.*, 2015). Then, the final search criteria were filtered and redefined by selecting the criteria subject area set to "business" and "management", type of source set to "journal", and language "English" – in order to retrieve all relevant significant studies from all the available journals in the area of business and management research. A total of 79 documents were identified (Figure A1). The search was performed on 7 December 2022.

To ensure study relevance and quality, specific inclusion and exclusion criteria were set. Following protocols from prior systematic reviews in management (Martínez-López *et al.*, 2018), our search focused on peer-reviewed academic publications in the WoS scientific database, known for its top-tier business and management journals. Papers not aligning with business and management analysis were excluded, resulting in the removal of 25 papers. Additionally, 19 duplicates from the keyword search and three bibliometric reviews were also excluded. Refer to Figure A1 for the article selection process.

Out of the initially identified 60 papers, 25 were discarded after review for misalignment with our research focus. These excluded papers covered diverse topics such as eco-labelling organisations, organic markets, non-food products, carbon calculators, sustainable funds, seed licences and studies lacking label analysis, resulting in 35 papers remaining. Among these, three were literature reviews, leaving 32 papers for bibliometric analysis (see Figure A1). It's important to note that the exclusion of studies unrelated to food may limit the breadth of insights in eco-labelling beyond the food sector.

3.2 Study design

3.2.1 Bibliometric analysis. Following the research questions outlined in the Introduction, the study's structure was guided accordingly. To address RQ1, a bibliometric analysis was conducted, drawing from methodologies outlined by Valenzuela-Fernandez *et al.* (2019). This analysis, performed using VOSviewer software, aimed to uncover trends, citation patterns and influential aspects within the research field through keyword co-occurrence analysis.

A ranking was established based on several indicators, with the H-index as the primary criterion. The H-index, known for its simplicity and balance between publication volume and influence, signifies that a minimum of "x" articles have received at least "x" citations. This metric combines publication output and citation impact, focussing on primary citations and offering equal weight to both publications and citations (Valenzuela-Fernandez *et al.*, 2019).

The bibliographic review covered the following aspects:

(1) Annual scientific production: Reveals research trends and interest in the topic.

(2) Most-cited journal: Identifies influential journals based on total papers, citations, average citations per paper and H-index.

(3) Country citations: Identifies research productivity by country, considering total papers and citations.

(4) Most-cited papers: Ranks the top ten influential papers, detailing their citations, authors and average citations per year.

(5) Keyword co-occurrence analysis: Examines related topics within the study by analysing cited articles and establishing the topic's structure.

3.2.2 Theory–context–characteristics–methodology (TCCM). Addressing RQ2, we employed the TCCM analysis, previously used effectively in business research by Paul *et al.* (2021), Chen *et al.* (2021), Lim *et al.* (2021) and Mandler *et al.* (2021). This framework facilitated a comprehensive exploration of prevalent theories, constructs, methods and potential research directions within food eco-label studies, aiding in theory development, contextual understanding and methodological exploration for future research.

4. Results

4.1 Findings of bibliometric analysis

There's a notable upward trend in scientific interest and a significant surge in research on this topic, particularly evident from 2021. The publication of articles on this subject has seen a recent increase, averaging three articles per year over the past eight years (refer to Figure A2).

Based on the Journal Citation Report (JCR), the top five influential journals in the "Business" category of the social science citation index (SSCI) relate to our topic (refer to Table A.I). Each journal listed had a minimum of two publications for ranking, as per the WoS database.

Among journals publishing two or more articles on food eco-labelling, the top-ranking journals based on total publications are as follows: International Journal of Consumer Studies: 4 articles, 202 citations, Q2, JCR Category: Business in SSCI; Business Strategy and the Environment: 3 articles, 102 citations, Q1, JCR Category: Business in SSCI; Journal of Business Research: 3 articles, 60 citations, Q1, JCR Category: Business in SSCI and Journal of Retailing and Consumer Services: 3 articles, 12 citations, Q1, JCR Category: Business in SSCI (refer to Table A.I).

Regarding the total publications by country (see Table A.II) we consider the level of scientific effort in the respective countries or regions in relation to scientific publications and citations (Clarivate Analytics). These indicators tend to be closely associated with the gross domestic product (GDP) and other economic output measures. Clarivate Analytics accounts

for countries/regions based on the institutional associations represented in published articles, considering the affiliations of all authors.

We considered countries with a minimum of two WoS publications for analysis. The US, Denmark and the Netherlands emerged as the most influential based on citations, while the US, UK and Italy were frequently mentioned in published papers. Notably, Central America, South America and Africa lacked publications on this topic. From 2002 to 2022, 11 countries were mentioned in at least two papers, with the US leading with 13 papers and 682 citations. Strong interest in this research is evident in Nordic countries like Denmark, the Netherlands and, to a lesser extent, Norway. Europe and the EU show substantial involvement in this field (refer to Table A.III).

The most frequently cited paper, with 218 citations, is titled "Willingness to pay for organic products: Differences between virtue and vice foods," published in the International Journal of Research in Marketing in 2021. Table AII displays the top ten most-cited articles.

We aimed to identify primary keywords used by authors in the reviewed papers. Figure A3 and Table AIII present the visual and analytical results of keyword co-occurrences. Keyword co-occurrence clustering was generated using VOSviewer software (Figure A3). Nodes' sizes represent keyword frequency, while connecting lines indicate shared keywords. Thicker lines denote stronger co-occurrence relationships between keywords (see Table A.IV and Figure A3).

4.2 Findings of TCCM analysis

Theory development. Recent studies have incorporated several key theories: cue utilisation theory (Orlowski *et al.*, 2022), aiding understanding of consumer expectations for non-visible product attributes (Olson and Jacoby, 1972); the theory of planned behaviour (TPB) (Chen, 2020; Siraj *et al.*, 2022), comprising attitude, subjective norms and perceived behavioural control (Ajzen, 1991); and signalling theory (De Brabandere *et al.*, 2022; Sigurdsson *et al.*, 2022), addressing information asymmetry reduction in market exchanges (Karasek and Bryant, 2012) (refer to Table A.V).

Context. Although research predominantly targets food in general, specific studies have delved into distinct food items like chocolate chip cookies (Amos *et al.*, 2019), cereal bars (Ertz *et al.*, 2017), muesli cereals (De Brabandere *et al.*, 2022), yoghurt (Donato and Adıgüzel, 2022) and various commodities including coffee, rice, milk, fruit, meat, seafood and wine. Some studies have explored multiple food products.

Regarding the eco-labels featured or evaluated, most studies discuss eco-labels in generic terms such as "sustainable label", "eco-label", "eco-friendly label", "green label" or "environmental label". However, two prominent eco-labels often studied are the "organic label" and "carbon label." Geographic research primarily focuses on developed regions like the European Union, North America and Oceania.

We examined various antecedents, moderators and dependent variables in food eco-label research. Antecedents encompass consumer-related factors like attitudes toward sustainability labels, environmental and health concerns, preferences for eco-label products and knowledge about eco-labels (refer to Table A.VI). Labels and packaging were also significant factors influencing eco-label effectiveness, alongside information. Additional variables considered included healthy food, food safety, subjective norms and perceived behavioural control.

Some studies introduce moderating variables, notably environmental concerns, influencing consumers' attitudes (De Brabandere *et al.*, 2022; De Canio *et al.*, 2021; Hornibrook *et al.*, 2015; Siraj *et al.*, 2022). Additionally, various studies examine different mediator variables, with one variable acting both as a mediator and a moderator, such as the intention to purchase labelled products (Thøgersen *et al.*, 2010; Siraj *et al.*, 2022).

The most frequently studied consequences reflecting the effectiveness of an eco-label in the food sector are related to the following components of the TPB: attitude, purchase intention and purchase behaviour. Purchase intention and behaviour were the main constructs studied (see Table A.VII).

4.2.1 Analytical methods. Of the 32 papers analysed, three were focused groups (Eldesouky *et al.*, 2020; Hornibrook *et al.*, 2015; Sirieix *et al.*, 2013), and one was a conceptual proposition (Acuaye *et al.*, 2015). The most widely used methodology is regression analysis, which includes mediation regression analysis, moderation regression analysis and Tobit/Logit models (see Table A.VIII).

4.3 Future research agenda

4.3.1 Theory research agenda. Amos *et al.* (2019) suggested exploring the health halo effect in eco-label perceptions for more realistic product evaluations. Chen (2020) highlighted the importance of comparative studies in sustainable food consumption for deeper theoretical and managerial insights. D'Souza *et al.* (2021) underscored their contribution to consumer decision-making dynamics regarding eco-labels, offering groundwork for future studies on consumer self-confidence and green purchasing intent.

De Magistris *et al.* (2015) urged theoretical insights for stronger findings in their study on willingness to pay for canned tuna with corporate social responsibility (CSR) labelling. Van Doom and Verhoef (2011) echoed this need for more detailed studies with solid theoretical foundations. Zepeda *et al.* (2013) suggested a label consumer interaction framework for future research on consumer label choices.

4.3.2 Context research agenda. Recommendations emphasise the necessity for more research on diverse types or categories of labels, extending studies to different food and beverage products for comparative evaluations. Further exploration in various regional or cultural contexts and demographic differences is suggested. Addressing the growing array of eco-labels, future studies are urged to compare and study different types comprehensively. The global COVID-19 pandemic heightened environmental concerns, impacting perceptions and behaviours linked to eco-labelling, prompting the need for awareness in future research (Chen *et al.*, 2023; De Canio *et al.*, 2021).

4.3.3 Characteristics research agenda. Studies advocate exploring interactions between research variables like brand preferences and consumer behaviour, parental influence on purchase decisions, and the impact of manufacturers' policies and retailers" strategies. Additional areas include analysing attitudes, behavioural dispositions and aspects like scepticism, legitimacy, trust and confusion linked to eco-labels and certifying agencies.

4.3.4 Method research agenda. Studies have varied, with exploratory or experimental approaches aimed at understanding eco-labelling phenomena. There's a need for real-world validation of established assumptions and findings. Additionally, there are calls for diverse experimental, laboratory approaches, research instruments and analytical techniques.

5. Discussion

Our bibliometric analysis aligned with certain observations from prior reviews that overlapped with our focus. The growing motivation to research this topic resonates with trends found in studies by Dórea *et al.* (2022), Maesano *et al.* (2019), and Manta *et al.* (2023).

In analysing scientific output by country, our review mirrored findings from Dórea *et al.* (2022) regarding the prevalence of publications from the US and Europe in eco-labelling. In our focused study on food eco-labelling, the primary countries of research were the US, Italy and the UK This echoes Maesano *et al.*'s (2019) observation of extensive research in Italy (given its focus on wine) and predominantly in European countries and the US.

Based on our TCCM analysis, this study delineated the consumer-related antecedents, frequently studied consequences and moderator/mediator variables in food eco-label research spanning 2 decades. To our knowledge, this comprehensive investigation represents the first of its kind in this domain.

Our findings align with eco-labelling dimensions impacting consumer willingness to pay for environmentally conscious products (Dórea *et al.*, 2022). They underscore the TPB model's components – attitude, perception, purchase intention and behaviour – influencing eco-label effectiveness in the food sector. Our study sheds light on consumer purchase behaviour in the food context (Maesano *et al.*, 2019), emphasising the necessity for real-world research on labelled food purchase behaviour. Moreover, our findings echo concerns about sustainability comprehension and consumer confusion (Maesano *et al.*, 2019), prompting further exploration into consumer knowledge, understanding and clarity regarding food eco-labels. This study also prompts inquiry into how information on food eco-labels is effectively communicated and disclosed to consumers.

Based on our comprehensive literature review, numerous recommendations emerge for future research in this expansive field. The primary emphasis revolves around establishing more robust theoretical frameworks to comprehend the evolving dynamics. Additionally, the predominant suggestions advocate expanding research contextually, either through comparative studies or by exploring a wider array of food categories and diverse eco-label types.

5.1 Theoretical implications

While Dórea *et al.* (2022) highlighted an upsurge in theoretical applications of environmental labelling, our examination of food eco-labelling in the business and management domain unveils openings for advancing, broadening and scrutinising theories. These encompass areas such as consumer behaviour, information and knowledge, environmental concerns, trust, packaging and willingness-to-pay in eco-labelling domains.

Previous studies underscored the nuances of consumer behaviour, emphasising the necessity to appraise diverse eco-label attributes in real-life scenarios (Potter *et al.*, 2021). Understanding how consumers engage with footprint eco-labels (Leach *et al.*, 2016; Asioli *et al.*, 2020) and assessing context's impact on consumer behaviour (Maesano *et al.*, 2019) remains paramount. Future investigations should extend the TPB (Chen, 2020; Siraj *et al.*, 2022) to probe the effectiveness of various eco-label attributes in practical contexts.

Similarly, our findings on information align with Maesano *et al.* (2019), highlighting its sway on consumer behaviour. Therefore, scholars could leverage the signalling heory (De Brabandere *et al.*, 2022; Sigurdsson *et al.*, 2022) to explore how information about food eco-labels is conveyed to and absorbed by consumers.

Expanding on the knowledge aspect, Asioli *et al.* (2020) emphasised understanding consumers' comprehension levels of eco-labels. Our research echoes concerns about consumer confusion regarding food eco-labels, aligned with Manta *et al.* (2023) and Maesano *et al.*'s (2019) findings in business and management journals. Given these insights, future studies could leverage an extension of the cue utilisation theory. This theory explains how individuals gather and process information from their environment to make decisions or perform tasks. Utilising this framework can shed light on how the extent of consumers' knowledge, understanding and confusion regarding eco-labels influences their behaviour.

Certainly, our findings align with Maesano *et al.*'s (2019) conclusions about the influence of values and beliefs on consumers' attitudes toward sustainable food purchases. Grunert *et al.* (2014) also proposed this as a focal area for future research, highlighting that the usage of labels depends on consumers' overall sustainability concerns. To delve deeper, scholars could employ the attribution theory, which delves into how individuals perceive and explain the

reasons behind events or behaviours, especially in assigning credit or blame. This theory holds promise in understanding people's perceptions and explanations regarding sustainability issues.

Trust in the context of food eco-labels, as noted by Moon *et al.*'s (2017), and the significance of packaging, highlighted by De Brabandere *et al.* (2022), Ischen *et al.* (2022) and Orlowski *et al.* (2022), are intriguing areas. Scholars might find the information overload theory beneficial in assessing trust's impact on consumer decision-making, focussing on the challenges posed by excessive information availability in the digital era, as proposed by Moon *et al.* (2017). Additionally, the application of the signalling theory could offer insights into how brands utilise verbal and visual cues in their packaging to communicate their dedication to sustainability.

Finally, the willingness-to-pay aspect resonates with Maesano *et al.*'s (2019) and Dórea *et al.*'s (2022) findings, as well as Eldesouky *et al.*'s (2020) conclusions regarding positive consumer attitudes toward sustainability but limitations in actual purchasing behaviour. Utilising the TPB, as advocated by Chen (2020) and Siraj *et al.* (2022), could offer valuable insights into understanding consumers' willingness-to-pay for eco-labelled food products.

5.2 Managerial implications

This study pinpoints crucial topics vital for stakeholders in the food industry, notably focussing on eco-label information. Addressing consumer confusion, echoed in existing literature (Moon *et al.*, 2017; Maesano *et al.*, 2019), emphasises the necessity for enhanced efforts by companies, educational institutions and governments to disseminate accurate and understandable knowledge about eco-labels. Additionally, the escalating number of diverse food eco-labels at both national and global levels underscores the urgency for standardisation and harmonisation efforts. The EU's pioneering regulatory policy acts as a frontrunner, propelling international strides toward uniform front-of-pack food eco-labelling. This proactive pan-European strategy, spearheaded by certification standards (European Commission, 2020), is projected to potentially become mandatory in the future, curtailing the influx of new labels entering the market (European Commission, 2023).

5.3 Social implications

The knowledge derived from this research holds significant potential in shaping policies and devising tools aimed at reducing the carbon footprint linked to food production and consumption. Considering the substantial impact of these activities on our planet's carbon footprint, addressing food security and sustainability emerges as a crucial concern for humanity. Recognising the importance of eco-label communication and information becomes particularly pertinent for future generations, who stand to bear the most substantial impact of climate change and sustainable development. These generations are also more inclined toward embracing and implementing sustainable practices. Hence, any initiatives focused on effectively educating and empowering these future generations become integral in realising universal sustainable development goals.

6. Conclusions

Eco-labels in the context of food products have gained significant attention in the research domains of business and management. These labels serve as a way for consumers to make informed choices about the environmental and ethical impact of the products they purchase. Research in this area often explores the effects of eco-labels on consumer behaviour, supply chain management, and the business strategies of food companies. This study sought to critically review studies on food eco-labels published in the research domains of business and

management, identify the research gaps, and consolidate and propose a future research agenda. The first research question was: (1) What is the structure of research on food eco-labels in the business and management research domains? Building on our findings from that analysis and extending our research deeper, our second research question was: (2) What are the research gaps in the existing literature and what are avenues for future research in the field of food eco-labels in these domains?

In examining the structure of research in the business and management research domains, a noteworthy trend emerges concerning food eco-labels. There is a clear and progressive increase in scientific motivation to explore this topic, with a significant increase in this trend starting in 2021, which confirms its validity and the need for further research in the area of business and management. A lack of research in the Southern Hemisphere is evident, presenting the need to generate greater knowledge from countries on this side of the hemisphere and corroborate any similar results.

The research gaps in the existing literature present avenues for future research in the field of food eco-labels in the business and management research domains. An important consideration is for future research to contend with cross-country research and different cultural contexts or demographics, as most existing studies have been single-country studies. Nevertheless, country and cultural aspects impact many characteristics associated with perception, consumption, affluence and other facets associated with environmentalism, including eco-labelling (Johnson *et al.*, 2001). Country and cultural aspects shape how people perceive and respond to environmental challenges, influencing consumption choices, the affluence-environmental impact relationship, the effectiveness of eco-labelling and the development of environmental policies. Understanding these cultural and national influences is crucial for designing effective environmental strategies and initiatives that are relevant to the local context.

Other recommendations for future research, as expected, include various research characteristic proposals concerning variables and their associations used in the analyses, as well as methodological and sampling suggestions. Given the universal trends and dynamics associated with mounting policy pressures and sustainability regulations, and heightened environmental sensitivity, we believe that some key areas deserve particular attention to provide further insights into this evolving field of research. This domain will continue to garner increasing attention in the future. The proposed future research avenues are summarised in Table 1.

However, our study has limitations. First, despite the well-established and appropriate standing of this study, we limited the sample of articles to those featured in the WoS database.

Table 1. Future research avenues

Topic	Research question
Consumer behaviour	What are consumers' real purchase behaviours for eco-labelled foods in real contexts?
Information	How is information about food eco-labels communicated and disclosed to consumers?
Knowledge	What is the extent of knowledge, understanding as well as level of confusion of consumers in relation to food eco-labels?
Environmental concern	What are consumers' environmental concerns and values in relation to eco-labelled foods? Does this vary by generation, country or culture?
Trust	What are consumers' trust levels on eco-labelled foods? Does this vary by generation, country or culture?
Packaging	What is the attributed importance of verbal and visual sustainable cues in food packaging?
Willingness-to-pay	Under what conditions are consumers willing to pay extra for food with an eco-label?

Source(s): Authors' elaboration

Other databases, such as Scopus, should be included in future research. Second, we focused on research published only in the business and management domains. Future research could include other areas beyond such specialised outlets, as food topics extend beyond this research area. Third, our search and concomitant analysis were based on a group of keywords related to ecological labels. However, some potentially relevant keywords might have been overlooked. Fourth, some research papers were intentionally omitted from the analysis, such as those on eco-labelling organisations (Boström, 2006; Couckuyt and Van Looy, 2021).

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Appendices

The supplementary material for this article can be found online.

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