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THE FORM AND CONTENT OF ECOLABELS IN IMPROVING THEIR EFFECTIVENESS

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Purpose: The research objective of this thesis is to review the latest research in order to determine the form and content of ecolabels that will increase their effectiveness in environmental.
Design/methodology/approach: A qualitative literature review was used in this study. It served to identify, evaluate and synthesise research relevant to the problem under consideration. The study adopted a systematic literature review methodology in accordance with the guidelines set out by Moher et al. (2009).
Findings: The analysis of the research results identified during the systematic literature review process allowed us to identify elements related to the form and content of the ecolabel design. They were grouped into the following categories: visual design, scope of environmental information, accuracy of environmental information, adaptation to consumer segments, information relevant to the product, and presentation in online retail. These results indicate that designing an effective ecolabelling system requires treating it as a complex communication system. The effectiveness of ecolabels depends on many aspects and requires an integrated approach. However, any actions taken to achieve this are worth the maximum commitment of all market parties.
Research limitations/implications: A limitation of the study is that the literature review is based on only one database, Scopus.
Practical implications: The results of this study provide a valuable source of knowledge about the desired graphic and informational elements of ecolabels. This data may be relevant for regulatory bodies and certification bodies. This work has identified and described the components of ecolabels that are most desired by consumers, the practical implementation of which will contribute to increasing the effectiveness of environmental labelling.
Originality/value: The paper presents an original and unique approach to the problem of research on the effectiveness of ecolabels. Based on a well-established and described method of systematic literature review, the latest research on ecolabels was identified and analysed.
Keywords: ecolabels, effectiveness, sustainability, environment, systematic literature review.
Category of the paper: Literature review.

1. Introduction

For better health, wellbeing, and biodiversity, many social and political movements seek to promote and activate actions that will reduce the negative impact on global resources (Kuhlman, Farrington, 2010). However, these actions are insufficient, and there is a lack of conviction and commitment on many levels. The last decade has been characterised by the highest average temperature in the history of measurements. As a result of climate change, extreme weather events are becoming more frequent (Statistics Poland, 2022). These changes are generating significant financial losses. The European Environment Agency estimates that between 2010 and 2020, Poland incurred costs exceeding EUR 3 billion.

These circumstances are prompting governments to take action to protect the planet from degradation, mainly through sustainable consumption and production (Resolution..., 2015). Among the various concepts and tools for achieving these goals, many industry groups and social organizations identify the economic and environmental opportunities offered by environmental labelling systems (Aitken et al., 2024). However, despite the large number of labelling systems implemented, it appears that this effort is not producing proportional results.

Existing research on this topic is highly fragmented and scattered. It concerns various labelling and ecolabelling systems. Very often, individual research projects analyze and conduct experiments separately with, for example, colours, content or the location of ecolabels. There is a lack of studies that simultaneously take into account a combination of the elements mentioned above in their assumptions. There are many studies that analyse premises, trust, or pro-environmental attitudes. However, there is a lack of comprehensive studies that collect the most recent scientific research and provide concrete and solid evidence as to what form and content of ecolabels increase the effectiveness of environmental communication. Therefore, the objective of this thesis is to review the latest research in order to determine the form and content of ecolabels that will increase their effectiveness in environmental communication.

The study poses the research question RQ1: What form and content of ecolabels increase the effectiveness of environmental communication? The article consists of an introduction, literature review, methods, results, discussion, and summary.

2. Literature review

Ecolabelling is designed to generate significant economic incentives in the consumer decision-making process. It allows for more environmentally friendly decisions and creates sensitivity to pro-environmental aspects. An organised labelling system is an important tool in the pursuit of environmental commitments (Wessells et al., 2021). Above all, it communicates value and gives consumers a choice.

Environmental labelling programmes take into account: rules, minimum requirements, criteria, and procedures that must be applied to all interested market players (Guidelines..., 2009). The participation of countries in this process is required and should be implemented. This aspect is particularly important in the context of internationalisation of markets and the need to strengthen labelling systems at the international level (Prakash et al., 2020). The effectiveness of this action requires close dialogue, mutual recognition, and supporting measures within the framework of international cooperation.

However, studies highlight the limited effectiveness of environmental labelling. They point to a lack of sufficient awareness among consumers and little recognition from producers on the market (Prakash et al., 2020). When these results are combined with system barriers such as lack of recognition in public policy and compliance and verification costs, they have resulted in a low level of acceptance of environmental labelling (EU Commission, 2017). An important challenge in increasing the impact of labels on market participants is the creation of a system for their monitoring and evaluation. However, as many researchers point out, creating such a system that would be effective and efficient is no small challenge (Thidell, Leire, Lindhqvist, 2015). Significant difficulties include: lack of access to data on the market share of ecolabelled products, confidentiality of sales data, and the location of these documents in companies' internal resources. Due to these limitations, it is difficult to estimate the actual environmental benefits of this labelling.

Many studies show that ecolabelling has the potential to influence consumer behaviour, but this is conditional on consumers understanding and attaching importance to this information (Taufique et al., 2014; Prieto-Sandoval et al., 2016). For some time now, there have been calls for the standardisation of ecolabels in discussions on the labelling system. Standardizing labelling reduces confusion among buyers and builds trust (Nes, Antonioli, Ciaian, 2023; Policarpo et al., 2023). There could also be benefits for producers. For market participants responsible for product supply, standardizing labels could bring many benefits. Among other things, it would reduce legal requirements if the rules were implemented in all markets and geographical areas (Hay et al., 2024). This could have the additional effect of increasing the market capacity for certified products. If labelling systems are improved in line with consumer requirements and producer demands, future benefits may prove to be significantly higher than the costs incurred.

High-quality ecolabelling opens up access to new, developed markets and potential buyers with high purchasing power. In an era of ever-increasing market competition, the use of a reliable ecolabelling system provides an opportunity to maintain and strengthen market share (UNCTAD, 1994).

Ecolabelling systems provide consumers with important information so that they can make more environmentally friendly purchasing decisions (Potter et al., 2021). However, the state of research on best practices regarding the form and scope of ecolabels is not clear (Hay et al.,

2024). Another problem is determining which ecolabels are most effective and even which of their elements and components determine the best performance of the label (Potter et al., 2021).

For effective communication, environmental labelling should ensure product visibility and distinction. The clarity and accessibility of the information consumers need to make decisions is an essential element of an effective labelling system (Thogersen, Haugaard, Olesen, 2010). Research by Meis-Harris et al. (2021) indicate that more comprehensive and multiinformative environmental labels, despite a certain level of complexity, are also effective and important in consumer decision-making.

Research on the use of colors in presenting the environmental characteristics of a product is also very interesting. Colours enable quick visual communication. Their range of use, for example, the colour palette of traffic lights, can facilitate the interpretation of presented data on the extent of environmental impact (Feucht, Zander, 2018). There is also research that confirms that QR codes on packaging can be easily used by consumers to obtain additional information on the sustainability of a product (Nes, Antonioli, Ciaian, 2023). However, there is still no complete understanding of how effective individual elements of ecolabels are. Some researchers measure effectiveness in terms of consumer recognition. There is also no consistent approach to measuring the effectiveness of information delivery, which confirms that the subject matter is difficult. Despite these uncertainties, the objective of this study is to review the latest research to determine the form and content of ecolabels that will increase their effectiveness.

3. Methods

A qualitative literature review was used to achieve the research objective of this study. It serves as a method to identify, evaluate, and synthesize all studies relevant to a specific research question, topic, or phenomenon (Van Dinter, Tekinerdogan, Catal, 2021). This study adopted a systematic literature review methodology in accordance with the guidelines of Moher et al. (2009). This approach is preferred to classical reviews. The methodology of a systematic literature review, with its specific framework and guidelines, ensures a high level of repeatability, is transparent and well established (Cook et al., 1997). Therefore, it is a very good strategy for identifying studies related to the objective of this work.

The first step of the study focused on identifying manuscripts that addressed the impact of ecolabels and their form and content on their broadly understood effectiveness. The PRISMA procedure was used to select publications, in accordance with the guidelines proposed by Moher et al. (2009).

The search strategy involved using the Scopus database and searching for the term ‘ecolabel’. The term was searched for in titles, keywords, and abstracts. The study was conducted in November 2025. To ensure that the review was up to date, publications from 2024 and 2025 were analysed.

The following standards were adopted to ensure transparency:

- inclusion criteria: studies concern ecolabels, the article presents the results of empirical research, the article is available in full text and peer-reviewed,
- Exclusion criteria: ecolabels are not the main subject of the study, studies that are reviews or meta-analyses, non-English language literature, paid content without institutional access.

A total of 61 publications were identified in the first step. After reviewing them, eight unrelated studies were excluded. The abstracts and, where necessary, the full texts were subjected to a detailed evaluation. In the next stage, the following were rejected: publications in languages other than English, reviews, and those that did not focus on the form and content of the ecolabels. Ultimately, 11 studies met all the criteria. The procedure adopted and its individual stages are presented in Figure 1.

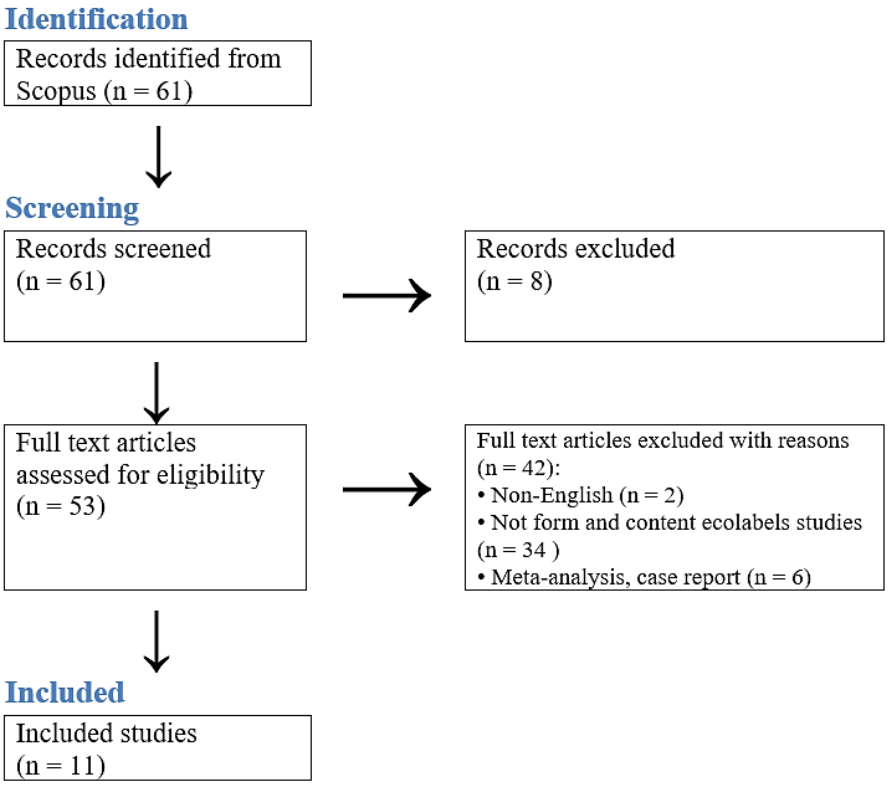

Figure 1. The procedure used to select manuscripts.

Source: own study based on (Moher et al., 2009).

Key empirical conclusions from the studied area were extracted from selected publications according to the adopted procedure. Subsequently, a qualitative content analysis and thematic categorisation were performed (Indulska, Hovorka, Recker, 2012). The results obtained were subjected to open coding, followed by division and grouping. In this way, a systematic review of the latest literature and a qualitative thematic analysis of its results allowed for the collection, identification and presentation of the most current and relevant research on the effectiveness of ecolabels. As a result of the adopted procedure, 11 high-quality manuscripts were selected, which were analyzed in detail, and the most important conclusions were synthesised according to the adopted objective of the study.

4. Results

The qualitative analysis of the research results identified during the literature review process allowed us to focus primarily on the following elements related to the form and content of the ecolabel design. Research findings were grouped into the following categories:

- visual design,
- scope of environmental information,
- accuracy of environmental information,
- adaptation to consumer segments,
- information relevant to the product,
- presentation in online retail.

Research by Hay et al. (2024) showed that the most effective graphic form to distinguish and promote products with a reduced environmental impact is an image of planet Earth. The analyses also took into account label forms such as dashboards, bar graphs, NIPS panels, star ratings, and carbon footprints. However, the scale that illustrates the strength of impact has the greatest effect when represented by colors. Traffic light colours proved to be the best for this purpose (Hay et al., 2024), as they are already sufficiently well coded and embedded in human existence. An example of such a label is shown in Figure 2. Empirical research by Hay et al. (2024) confirmed the high effectiveness of labels with this visual design. This research seems to reveal a very promising direction for future research and improvements in the effectiveness of ecolabels.

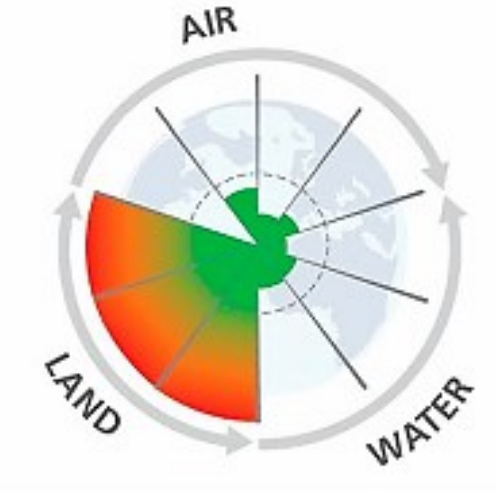

Figure 2. An example of an environmental label in the Earth project.

Source: own study based on (Hay et al., 2024).

The review of the form and content of ecolabels also identified studies on the scope of environmental information presented. It turns out that the effectiveness of ecolabels is also influenced by additional information related to the broadly understood sustainability of the product. The results of the review allowed us to determine that such examples of information include: region of origin and water management certification (Pablo-Cano et al., 2024), products not tested on animals (Völker et al., 2024), and the fishing method used (Fang, Gao, Zhanget, 2024).

Another category of research identified as important in the process of improving the effectiveness of ecolabels is the precision of the environmental information presented. The work of Tanaka, Dente and Hashimoto (2024) shows that the effectiveness of environmental communication can be increased by supplementing the ecolabel graphics with additional information, e.g. the percentage of recycled products. Examples of such labels, which include a planet in the graphics and additional percentage information about recycling, are presented in Figure 3. According to the results of Tanaka, Dente and Hashimoto (2024), this form of ecolabelling promotes eco-friendly purchasing behaviour to the greatest extent and improves the effectiveness of this communication tool.

Figure 3. An ecolabel showcasing the Earth and its share of recycled raw materials.

Source: own study based on (Tanaka, Dente, Hashimoto, 2024).

Another advantage of presenting environmental data in numerical form is the ability to compare the impact of different products. This is another identified benefit of improving the form and content of ecolabels, which increases their effectiveness. Consumers want to be able to refer to and compare specific values for a given environmental characteristic. This allows the presented value to be compared to the average product in the same category or to a set threshold or limit (Meyerding, Schaffmann, Lehberger, 2019). This enables consumers to see and understand the difference between products in terms of their environmental impact (Hay et al., 2024).

The latest literature also devotes considerable attention to the adequacy of the scope of information presented in the context of the effectiveness of the ecolabel. A study by Tanaka, Dente and Hashimoto (2024) suggests that the type of labelling may vary depending on the type and complexity of the product. If products are used for longer periods and have a greater impact on the environment, more information should be provided. In the case of simple and less complex products, such as disposable cups, the scope of information accompanying the ecolabel may be basic (Hay et al., 2024). Aitken et al. (2024) in their research. Comparing the effectiveness of two ecolabels for seafood products (Figure 4), they found that both variants received high ratings from consumers. However, the label without detailed data received slightly higher preference ratings. It should be noted that the average scores for both labels were high and the difference was small (Aitken et al., 2024). This result confirms that the average response to simpler labels was greater but less strongly associated with purchase intentions than the information label (Aitken et al., 2024).

Figure 4. Two variants of the ecolabel have been subjected to detailed consumer research.
Source: own study based on (Aitken et al., 2024).

Another interesting conclusion related to improving the effectiveness of ecolabels is their connection, via a QR code, to more comprehensive data available online (Hay et al. 2024). This proposal stems from the desire to convey as much data as possible while taking into account the physical limitations of ecolabels. According to the proposals of Hay et al. (2024), an environmental label should consist of a basic layer and an in-depth layer in the form of

a reference to online information. The existence of a more detailed database of environmental information on certified products would increase the chances that discerning and interested customers would obtain satisfactory environmental data (Hay et al., 2024).

A very important conclusion from the literature review is the need to tailor the form and content of labels to consumer segments and their diverse needs. The results of many studies confirm that the same format of environmental information will not be equally effective in all cases. Tanaka, Dente and Hashimoto (2024) found that increasing the effectiveness of ecolabelling requires changes in the type of information provided, which should consist of information that supports and stimulates consumer behaviour in favour of sustainable products. Information and the way it is presented can vary depending on consumer characteristics and personality. Characteristics that are relevant to environmental labelling may include sensitivity, awareness, willingness to pay, trust, age, etc. (Völker et al., 2024; Recio-Román, Recio-Menéndez, Román-González, 2024).

In turn, Houf, Szymkowiak and Shepherd (2024) draw attention to the challenges arising from the constantly growing volume of online sales. The increase in trade volume prompts reflection on the conditions and circumstances of presenting environmental information in this channel, which is undoubtedly much more specific than the traditional one. Research shows that the label should be prominently displayed when the product is presented on the store's website. This is an essential element in supporting pro-environmental purchasing behavior in this relatively new and very specific market situation (Houf, Szymkowiak, Shepherd, 2024). Figure 5 shows an example of an effective presentation of ecolabels in online commerce.

Figure 5. An example of the possibility of presenting ecolabels in online stores to improve their efficiency.

Source: own study based on (Houf, Szymkowiak, Shepherd, 2024).

It seems that the direction of research on the presentation of ecolabels in online commerce is very promising and will certainly require further study to develop more precise guidelines and recommendations. Therefore, the undertaking of this research will contribute to increasing the effectiveness of ecolabels.

All identified recommendations on the form and content of the ecolabels are presented in the form of a diagram in Figure 6.

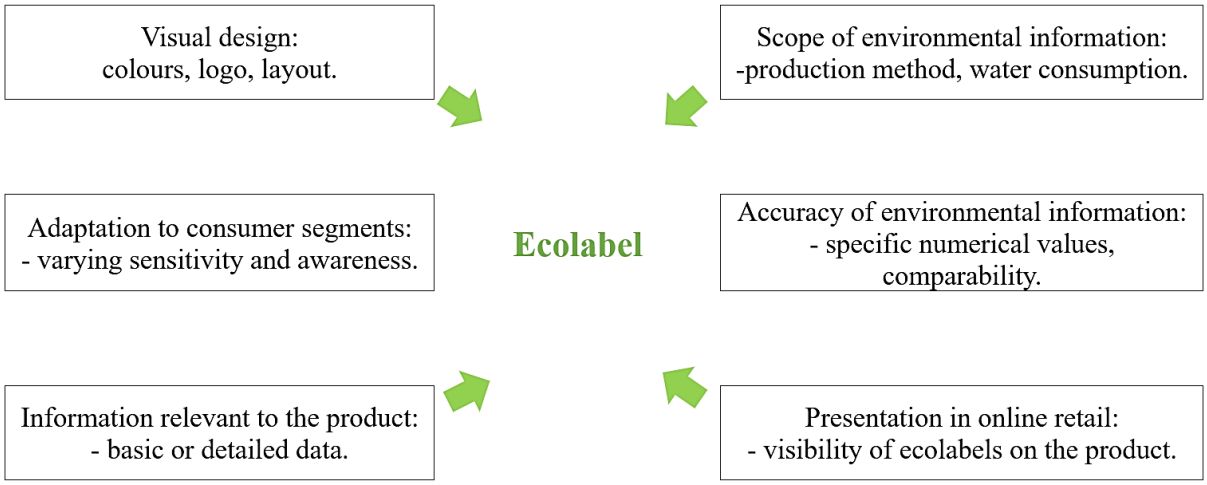

Figure 6. Identified recommendations regarding the form and content of the ecolabel.
Source: own study.

Figure 6 shows six groups of factors that influence the effectiveness of ecolabels. The research found that they contribute to and determine whether an ecolabel is noticeable, understood, and actually influences purchasing decisions.

5. Discussion

The high effectiveness of environmental environmental labeling systems and environmental communication poses a challenge for contemporary societies. Environmental labels are one of the central points of the policy to promote and increase the sales of products with a reduced negative impact on the environment. The study posed the research question RQ1: What form and content of ecolabels increase the effectiveness of environmental communication?

New knowledge in this area is very important. It can be useful for certification bodies, decision-makers, and policymakers. The study has filled a research gap in the highly fragmented and scattered research on ecolabels. In this study, the knowledge and research results of the latest literature have been collected and systematised in one place. The results obtained allowed us to conclude that the effectiveness of the labelling system is greatly influenced by factors grouped into the following analytical categories: visual design, scope of environmental information, accuracy of environmental information, adaptation to consumer segments, information relevant to the product and presentation in online retail.

There are few studies of this kind in the literature on the subject. Recently, reviews of the literature focusing on labels have been conducted by Ceballos-Santos et al. (2025), Rossi et al. (2024), Gonzalez-Torres et al. (2023), Bronnmann et al. (2023) and Garraud et al. (2023). However, the objectives of these publications varied. Ceballos-Santos et al. (2025) focused their research on ecolabels in the seafood sector, demonstrating that communication with consumers

is counterintuitive and that environmental impact assessments are incomplete. The specific issue of maritime sector labels was also the main topic of the work of Bronnmann et al. (2023) and Garraud et al. (2023). In turn, Rossi et al. (2024) focused their review on examining the socio-economic impact of ecolabels on biobased raw material producers. The research by Gonzalez-Torres et al. (2023) focused on energy efficiency. As can be seen, this review perfectly filled the gap by presenting the results of the latest research on ecolabels. This work has contributed to clarifying how the form and content of ecolabels can increase their effectiveness, which helps decision-makers and market participants to optimise the information message. The results presented seem very promising in the context of achieving sustainable development goals in the areas of environmental protection, the economy, and society.

6. Conclusions

A review of the latest research on the form and content of ecolabels, in the context of improving their effectiveness, has made it possible to collect, systematise, and standardise the most important recommendations in this area. The research area related to environmental behaviour is extremely difficult to explore. First and foremost, the main problem is the gap between consumers' intentions and their behaviour (Nguyen, Nguyen, Hoang, 2019).

The identified groups of factors related to the form and content that determine the effectiveness of ecolabels include visual design (graphics and use of colors), the scope of environmental information presented on the label, the accuracy of the environmental information presented, the adequacy of the scope of information to the nature of the product, the matching of labels to consumer segments and their diverse needs, and the specificity of the presentation of online retail labels. These results indicate that designing an effective ecolabelling system requires treating them as part of a more complex communication system. The presented recommendations will significantly facilitate the decoding of environmental messages and influence consumer decision-making processes. The effectiveness of ecolabels depends on many aspects and requires an integrated approach. However, any actions taken to this end are worth the maximum commitment of all parties.

The recommendations and directions for improving the effectiveness of ecolabels identified in this study are sufficiently relevant and effective that their widespread implementation in practice could influence consumer preferences in terms of sustainable behaviour.

It is also worth noting here the other elements of environmental communication strategies, which should include effective education (Iraldo, Barberio, 2017). Pro-environmental purchasing responses from consumers to labelled products can be achieved through information and targeted education of future buyers (Fang, Gao, Zhang, 2024). Kitano, Horie and Yamamoto (2025) focus on administrative bodies and industry entities, which very often

concentrate on supporting the production side through subsidies and financing. On the other hand, few of them focus their activities and provide support on the consumer side.

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