

# EFFECTIVENESS OF PRODUCT LABELLING SCHEMES FOR THE CIRCULAR ECONOMY

A Rapid Evidence Review for  
Behavioural Public Policy

An output of the  
Waste and Circular Economy Collaboration

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# EXECUTIVE SUMMARY

## A circular economy will transform how consumers and producers interact, and how they are governed.

Jurisdictions across Australia and globally are exploring Circular Economy (CE) policies. Accordingly, the BWA Waste and Circular Economy Collaboration conducted this rapid review of evidence on the potential role of ecolabels in supporting CE policy implementation. The aims are to inform the policy dialogue, and identify relevant behavioural public policy<sup>1</sup> experiments.

Using a rapid review methodology, of 4,875 papers evaluated for relevance, 10 reviews were suitable for inclusion and in-depth analysis. According to the two review quality standards we applied, there is room to improve reporting and synthesis of existing evidence on this topic. Three included systematic reviews had a high risk of bias, primarily as none adequately reported key scope decisions. Of seven included narrative reviews, only two rated moderately to good quality. Positively, the fact that multiple reviews reported converging findings increases confidence in the validity of the key findings summarized in this report.

While all reviews reference a label's role as a visual signifier of a broader scheme, the definitions, scope and intended outcomes of schemes vary. Most reviews focused on impacts on consumer purchasing. Some extended to production practices, and two discussed supporting policy and/or standards. Although CE requires changes to consumer-producer interactions past the point of purchase, none of the reviews extensively explored how labels support appropriate use, care, sharing, leasing and disposal. None addressed circular economy directly, rather practices and outcomes relevant to it.

All reviews addressed (largely) consumer drivers and barriers to the adoption and/or support of ecolabelling schemes. Converging themes included **participant trust** (particularly that consumers purchase, and businesses produce, in accordance with the label's requirements, and that scheme administrators are impartial, consistent and effective). Trust in schemes in turn depends on a base level of **knowledge and awareness** about the scheme, and its visibility. Finally, the evidence suggests that it is a sub-segment of consumers, with **aligned values and beliefs**, who are more likely to purchase eco-labelled items. Other consumers must **overcome concern about perceived and actual negative differences** signified by labels on products, e.g. quality, price, purity, reliability. Also, once formed, **habits and the associated attitude-behaviour gap**<sup>2</sup> in purchasing (and possibly post-purchase) behaviour are likely to be unconscious, requiring targeted intervention around disruptions.

Business drivers/barriers are less reviewed, but include: **Social/interpersonal** (brand, reputation, consumer, and shareholder pressure); **Economic** (market penetration of label, market access, cost/benefit of certification and assurance,); **Operational** (supply chain control and assurance; vertical integration); **Credibility** (veracity of scheme/openness to false claims from competitors, clarity of label claims/definitions of outcomes); and **Policy** (e.g. where mandatory, or via providing access to green procurement markets). To the extent that there is evidence of scheme impacts on business and consumers, our review finds that changes in consumer purchasing of labelled items may be limited to specific sectors/products, and large-scale market penetration is rare. Rather than transforming business models, labels are more likely to be used by business, sometimes disingenuously, to target niche consumers. Further, the overall environmental benefit of labelling schemes is unproven.

In short, a CE eco-label will not work in isolation. An effective scheme should be: **trustworthy and transparent** (clearly distinguishing certified products); **influential at key decision points** for both consumers and businesses; **understood and valued** regarding the intent and execution of the scheme; integrated with **complimentary policy tools**. Finally, **market penetration** must be sufficient to achieve both environmental and profit benefits. Policy experiments could examine critical points in these requirements, for example how to address less engaged consumers' purchasing decisions; or more prospectively, explore whether or not a CE label with "all the right characteristics" is helpful in any way to influence post-purchase behaviours. How label characteristics interact with business behaviour and scheme governance also needs to be better understood. The BWA Collaboration program will deliver trials, and insights will be explored via policy forums bringing together key stakeholders in mid 2020.

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<sup>1</sup> Behavioural public policy explores policy problems from an interdisciplinary behavioural science perspective. Analysis is grounded by examining human behaviour and decision making in context, focusing on contributions to the policy problem, and possible solutions. There is a strong emphasis on evidence and applied experimentation.

<sup>2</sup> The attitude-behaviour gap describes the well-documented finding that (changes in) values and attitudes will not always translate to actual behaviour (change).

# INTRODUCTION

In Australia, various State government agencies are in the early stages of developing and/or implementing circular economy (CE) policies. These policies include aims such as extending the lifetime of consumer products either by stimulating producers to shift towards designing products for durability, ability to reuse, repair, upgrade, disassemble or recycle, or by fostering changes in the purchase, use, care, sharing, and disposal of products by consumers.

One factor that will contribute to the success of CE policies will involve consumers making informed choices when it comes to purchasing products and services that support CE outcomes. For example, a real or perceived lack of consumer demand and interest for CE products was highlighted as one key barrier in our related review on business drivers, barriers, and interventions<sup>3</sup>. While there has been a long history in consumer research and practice of trying to encourage people to buy “green” products, especially when there is a real or perceived price premium, there often remains a reluctance among consumers to pay more for such products. Studies have also highlighted a disconnect or inconsistency in consumer intentions to purchase green products and actual purchasing behaviour (as previous purchasing habits remain intact), a distrust in the social and environmental claims of products (and the sources of these claims), feeling overwhelmed by overly complex information, and perceptions of compromise where the green credentials of a product may somehow detract from other valued qualities.



To address this gap, product labelling schemes, and particularly third-party certified labels, are regularly offered as a solution. Their aim is to provide credible information to persuade and inform consumer decision-making without the need for individuals to exert significant cognitive effort to interrogate the green credentials of products.

There are a wide range of consumer product labels in Australia claiming environmental benefits (e.g. the Good Environmental Choice (GECA) ecolabel), as well as others focusing on pro-social outcomes such as fair trade and sustainable development. While these labelling schemes offer the potential to support circular economy outcomes, their credibility and effectiveness in influencing behaviour remains an ongoing question, especially given that the benefits and attributes they promote may only have indirect impacts on the purchaser and what they value.

Furthermore, the link between consumption choices and production processes is important when we consider that environmental labelling programs often seek to encourage a move towards more environmentally friendly consumption patterns, while at the same time provide a platform for businesses, governments and other agents to increase the environmental standards of products and services. This could also include attempting to trigger post-purchase behaviours related to use, sharing, care and disposal that labels could potentially support. Similarly, organisational hesitancy, supply chain inertia, and perceived lack of consumer engagement were highlighted as key barriers to business adoption of CE practices in our parallel literature review<sup>4</sup>. These are, in parts, due a real or perceived lack of consumer demand in CE products and trust in environmental claims. It is therefore possible that eco-labelling schemes, through providing credible information, could play a role in overcoming these barriers and supporting behaviour

<sup>3</sup> Kaufman, S., Curtis, J., Saeri, A., Kunstler, B., Slattery, P., Wild, A., Bragge, P. and Downes, J. (2019). The drivers, barriers and interventions that influence business uptake of circular economy approaches: A rapid evidence review. BehaviourWorks Australia, Monash University.

<sup>4</sup> Ibid.

change across key CE policy stakeholder groups. Note that this is not limited to mass consumers – in the circular economy, business-to-business transactions, and government procurement, will depend on the ability to clearly identify trustworthy characteristics of products and services. In short, eco-labels have the potential to play a role as part of the suite of CE policies being developed and implemented in Australia, but many questions must be answered to ensure it is a positive one.

With this in mind, the objective of this project was to synthesise the evidence on the effectiveness of product labelling schemes targeting circular economy outcomes on behaviour and practice. This includes labels related to whole of life cycle environmental impacts as well as to the use, care, sharing, and disposal (recycling) of products.

# METHOD

## RAPID EVIDENCE REVIEW

A rapid review methodology was employed for the project. Rapid reviews are an emerging method of efficiently synthesising evidence in policy where a broad overview of research evidence is required within a short timeframe (e.g., 6-8 weeks). Rapid reviews are different to systematic reviews, which aim to identify all primary studies or trials pertaining to a particular intervention and can take from nine months to two years to complete.

Rapid reviews can be completed in a short time frame because they are an “overview of reviews” – that is, they focus on identifying and summarising existing systematic reviews, reports or other consolidated information on a topic. In the absence of available systematic reviews, a rapid review can instead look for high impact, highly cited studies. Finally, rapid reviews can also gather information from the grey literature, such as industry, government reports or websites.

### Search strategy

The following review question guided the current study “What is the effectiveness of product labelling schemes targeting circular economy outcomes on behaviour and practice?”.

For review-level studies to be included, they needed to examine the effectiveness of product labelling schemes focusing on the CE properties of a product, and/or how these influence CE behaviours and practices (among either consumers or businesses). These properties might include, for example, avoidance/sharing, recycling/reuse information, resource (material/energy/water) efficiency of extraction/processing/production, product lifespan/durability, ability to repair/refurbish, or ability to modularise/remanufacture. The scope included mandatory, third-party operated and voluntary schemes. Product labelling schemes that did not directly relate to CE (e.g. labelling about genetically modified ingredients, vegan-friendly) were excluded

The CE definition that we applied for the purpose of this project involved: *an economy in which the waste of materials and energy from production, use and discarding of products is either designed out or kept in use for as long as possible within the economy, extracting the maximum value out of them and recovering them into new products and/or resources at the end of their life. The aim is to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations.* This definition was based on widely held and published elements and definitions of a CE<sup>5</sup>.

A comprehensive search using a variety of keywords and databases was conducted based on the guiding review question (see Appendix 1). Three databases were searched to identify relevant studies: *Scopus*, *Proquest Environmental Sciences Collection*, and *Business Source Complete*. These databases were chosen for their large size and relevant disciplinary focus.

Search terms, which were identified in collaboration with the government partners on this project, included combinations of keywords (and associated synonyms) that covered labelling schemes and CE outcomes. Examples of these keywords (which were typically combined with “label” as part of the search strategy) included “eco”, “green”, “sustainable”, “sharing”, “recycling”, “reuse”, and “end-of-life”.

Broad searches with all terms were initially used and were later narrowed by removing less relevant terms to improve the identification of the most relevant studies. Forward and backward citation searching of the most relevant studies was completed to increase the chance that all relevant studies were found. Database and Google Scholar alerts were established to ensure studies published after searches were completed were also found.

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5. Kirchherr, J., Reike, D., Hekkert, M., 2017. Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling* 127, 221–232. <https://doi.org/10.1016/j.resconrec.2017.09.005>

## Screening and selection

All studies were uploaded into the Covidence online software system for title, abstract and full text review by two independent reviewers. Studies were considered for inclusion if they:

1. Were review-level studies (i.e., not primary studies)
2. Described product labelling schemes that focused on CE product properties
3. Described drivers/barriers of labelling scheme adoption (among consumers or businesses), supporting interventions, and/or evaluation techniques/measures
4. From first-world countries comparable to Australia
5. Were published since 2000.

## Data extraction

Data extracted from relevant studies included: author name/s, year published, context (e.g., labelling scheme definitions, label type, geographical/population setting), review type/questions, drivers/barriers to adoption of labelling schemes, interventions to promote adoption, outcomes from adoption, policy learnings, and author conclusions. All data is presented in tables in Appendix 2 and are synthesised and discussed in the following paragraphs.

## Search results

Overall, 4,875 studies were identified using database searching and supplemental methods, which was reduced to 3,286 after removing duplicates. After screening titles and abstracts, 72 studies remained for full text review. The inclusion criteria were used to quickly screen studies and, if the inclusion criteria appeared satisfied, the entire study was read in detail to establish eligibility for review inclusion. After screening, 10 remained for inclusion in the final review (see Figure 1).

## Quality appraisal

Assessing risk of bias allows the ability to establish trustworthiness, or confidence, in the findings of the included reviews. Two quality assessment frameworks were used for this task:

- A Measurement Tool to Assess Systematic Reviews (AMSTAR)<sup>6</sup> is a tool that can be used to appraise the quality of systematic reviews and establish the level of confidence one should have in the findings from that systematic review
- The Scale for the Assessment of Narrative Review Articles (SANRA)<sup>7</sup> is a brief critical appraisal tool for the assessment of non-systematic articles

Depending on the review type, each was given a numerical score to allow for direct comparisons between reviews. This allowed the findings of each review to be classified based on the amount of confidence that should be had in their findings; the higher the confidence level (and overall score), the more likely the review influenced the final conclusions made in this rapid review. The risk of bias of all reviews informed the overall interpretation of the available evidence base.

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<sup>6</sup> Shea, B.J., Grimshaw, J.M., Wells, G.A., Boers, M., Andersson, N., Hamel, C., Porter, A.C., Tugwell, P., Moher, D. and Bouter, L.M., 2007. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. *BMC medical research methodology*, 7(1).

<sup>7</sup> Baethge, C., Goldbeck-Wood, S., & Mertens, S. (2019). SANRA - A scale for the quality assessment of narrative review articles. *Research Integrity and Peer Review*, 4, (5).

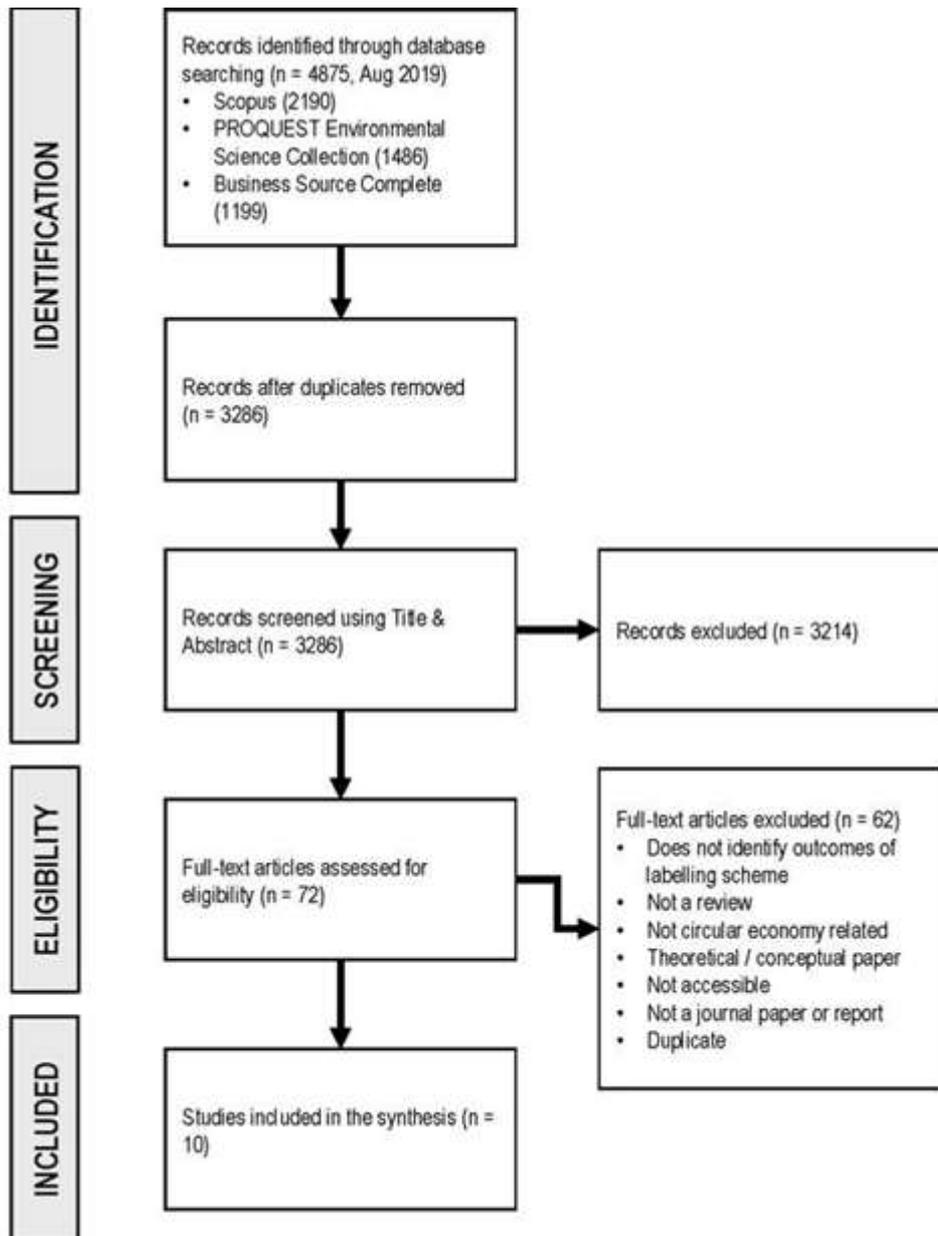


Figure 1: PRISMA flow chart outlining the search process and inclusion of studies

# RESULTS

Table 1 provides a quick reference guide of the included studies. All the studies made some reference to drivers and barriers underlying the adoption or support of labelling schemes, either from the consumer or business perspective. In contrast, only about half the studies extended their focus on discussing the impacts of labelling schemes (on behaviour, the environment or on businesses), or interventions to support the adoption of such schemes. To this end, the body of research (at least at a review-level) still requires some maturing to provide robust and synthesised accounts of the effectiveness of labelling schemes and supporting interventions (beyond discussions around drivers and barriers). Nevertheless, all the studies make recommendations for policymakers, businesses and other stakeholders on how labelling schemes can be implemented and supported to achieve aspirations around more CE-related products, services and consumer choices.

In terms of the quality of the included studies, the systematic reviews rated poorly based on AMSTAR. This was mainly due to the review authors not being transparent in their reporting of, for example, the bias risk among the included studies, not considering this bias risk in their conclusions, and not presenting a list of excluded studies. Due to the high risk of bias, a low level of confidence was had in their overall findings. However, the presence of overlapping findings between studies (i.e. two or more reviews reporting the same result) reinstated some confidence.

With the exception of two studies, narrative reviews that were appraised using SANRA also rated poorly. But again, the presence of overlapping findings between studies reinstated some degree of confidence in the reported findings.

## Definitions of labelling schemes

Table 2 provides a selection of labelling scheme definitions that were encountered during the review process. Due to the search strategy that was used for this review, most focused on definitions on “eco-labels”, and described dual aspirations around demand (e.g., consumers making more informed “green” choices) and supply (e.g., businesses offering products and services that meet certain “eco” credentials). Given that our search terms included post-use elements like “repair”, “sharing”, etc, it would appear that, at the review level at least, there does not appear to be a great deal of coverage about the potential role of eco-labels in supporting post-purchase consumer behaviour nor business models relying on the same (as discussed later in this report), despite the steady growth of literature on circular economy since 2005.

Table 1: Summary reference guide of included studies

Paper	Research question	Impacts / outcomes			Implementation	Quality	
	Drivers and barriers	Environmental	Business	Behaviour	Interventions	AMSTAR	SANRA
Dangelico, R. M., & Vocalelli, D. 2017	✓					5/9	
de Boer, J. 2003	✓				✓		3/12
Gallastegui, I. G. 2002	✓						4/12
Grolleau, G., Ibanez, L., Mzoughi, N., & Teisl, M. 2016	✓	✓	✓	✓	✓		4/12
Leire, C., & Thidell, A. 2005	✓			✓	✓		4/12
Prieto-Sandoval, V., Alfaro, J. A., Mejía-Villa, A., & Ormazabal, M. 2016	✓					3/10	
Rex, E., & Baumann, H. 2007	✓	✓	✓	✓	✓		7/12
Rubik, F., Frankl, P., Pietroni, L., & Scheer, D. 2007	✓	✓	✓	✓	✓		5/12
Taufique, K. M. R., Siwar, C., Talib, B., Sarah, F. H., & Chamhuri, N. 2014	✓			✓		4/9	
Yokessa, M., & Murette, S. 2019	✓	✓		✓			8/12

Table 2: Examples of eco-labelling scheme definitions

Paper	Featured definitions of labelling schemes supporting circular economy outcomes
Dangelico & Vocellelli, 2017	“Green Marketing”: the integration of environmental sustainability into marketing; words like green, greener, eco, ecological, environmental, sustainable, and sustainability (linked with the word “marketing”) are considered synonyms.
de Boer 2003	“Sustainability labelling”: These schemes refer to qualities of products or production processes that are not only relevant from a private perspective, such as human health issues, but also from a public perspective, such as issues of biodiversity and social justice.
Gallastegui, 2002	"Eco-labelling" seeks to inform consumers about the effects on the environment of the production, consumption and waste phases of the products/services consumed.
Grolleau et al 2016	The aim of “eco-labelling” is to harness the power of markets to pursue environmental objectives.
Leire & Thidell, 2005	Informative instruments which provide product-related environmental information
Prieto-Sandoval et al, 2019	<p>An “eco-label” is a claim which indicates the environmental aspects of a product or service according to the clause 2.1 in ISO 14020 (ISO and ICONTEC, 2002). This straightforward description is consistent with the original basic concept first developed by the German Institute for Quality Assurance and Certification, which stated that environmental labels inform consumers about the positive environmental aspects of a product (Hemmelskamp and Brockmann, 1997).</p> <p>An “eco-label” is defined as a tool that is dedicated to influencing demand by informing consumers about the environmental implications associated with all elements in the product's life cycle (Global Ecolabeling Network, 2007).</p> <p>“Eco-labeling” is conceived as an eco-innovation process because it promotes the emergence of new green products and it improves production methods, supply sources and combinations (Hellstrom, 2007).</p>
Rex & Baumann 2007	“Eco-labels” are intended as a means for consumers to make choices that will reduce environmental impact and enable them to influence how products are made.
Rubik et al, 2007	<p>“Eco-labelling” provides a positive statement that identifies products and services as being less harmful to the environment than products in the same product category without a label.</p> <p>“Eco-labels” claim to have two general objectives: (1) providing consumers with the information they desire and thereby increasing market efficiency (information policy instrument) (2) reducing (negative) environmental impacts by offering environmentally less harmful products and services in the market (environmental policy instrument) (Piotrowski and Kratz, 1999).</p>
Taufique et al, 2014	An “eco-label” is a visual communication tool indicating environmentally preferable products, services or companies that are based on standards or criteria
Yokessa & Murette, 2019	An “eco-label” can be defined as a simple signal that can be posted by several competitors to induce consumers to purchase eco-friendly products (Teisl et al., 1999).

## DRIVERS AND BARRIERS

All of the included reviews (10) addressed drivers and barriers to some degree when it comes to adopting or supporting product labelling schemes (among consumers or businesses). Again, the majority of the focus was on consumer purchases, not post-purchase behaviours. Similarly, there was less coverage of the drivers and barriers of business, broader society and governments when it comes to supporting eco-labelling schemes. While the significance of individual drivers and barriers will vary across different contexts, there was a noticeable converging of key themes among the reviews. These are summarised under the following headings.

### Trust

Trust was one of the most commonly mentioned drivers/barriers when it comes to adopting or supporting eco-labels to inform consumer choices and/or providing certified products and services. Trust in the claims associated with a label can be achieved through third-parties where the certification criteria is perceived as transparent, accurate and uses well established methodological approaches (e.g., Life Cycle Assessment). A balance needs to consider offering enough information to consumers and businesses to demonstrate credibility, accuracy and transparency without becoming too cognitively or administratively burdensome to hinder understanding, acceptance and adoption. In the absence of trust, eco-labels will have little or no impact on purchasing choices, including consumers' willingness to pay a premium for certified eco-products. Similarly, business's perception of the costs of complying with the obligations (both in terms of process and for verification/reporting) outweighing the benefits may also be driven by trust – in consumers' behaviour, in third party and government enforcement of obligations, and the behaviour of competitors (e.g., concerns of level playing fields, greenwashing and undercutting).



### Knowledge and awareness

For labels to be trusted (or not) assumes a level of knowledge and awareness in the first place. Such knowledge and awareness can stem from a combination of information and communications about the label, as well as visibility (e.g., on products, in stores, in business or government policies). Based on the studies included in this review, the evidence on mass consumer behaviour suggests that such knowledge and awareness is somewhat limited to “greener” consumers, meaning that eco-labels typically provide information and/or purchase “nudges” to already convinced audiences of the need to consume more sustainably. This can have implications for the overall market share of eco-labelled products and interested consumers, which will remain limited if only a small proportion of the market is sensitised to the information conveyed by the label through aligned values and preferences. In mandatory schemes (e.g., government procurement), labels may simplify compliance with regulations and guidelines, providing they align with the relevant policy.

### Consumer preferences

Unsurprisingly, support and purchase of eco-labelled products was more widespread among consumers with altruistic, social and/or environmental values. They may also appreciate the public “visibility” (and reputational benefits) that such eco-labels offer. But it was also apparent in the evidence that the criteria applied within labelling schemes may create tension with other product qualities that consumers value. For example, while a product might possess sound environmental

credentials (e.g., in terms of recycled content; energy and water use), consumers may question what implications this might have on the overall quality and durability of the product. Adding to the challenge of trying to persuade consumers to purchase more environmentally sustainable products are consumers' (un)willingness to pay a premium (whether real or not) for certified products above regular products, and well-entrenched purchasing habits (where consumers have happily purchased the same product time and time again without the need for conscious deliberation).

Habits may also present a challenge to post-purchase consumer behaviour changes as well. Routines of use, disposal, care, etc are all likely to be heavily habituated. With this in mind, it is conceivable that the efforts of businesses to trigger these behaviours, and build aligned value exchanges with their customers, might be enabled by labels. Creative product activations, customer relationship interactions and marketing all might “disrupt” post-purchase habits, and will probably need to.



## Business influences

While many of the drivers and barriers described so far talk mainly about consumers, the evidence also discussed a range of influences that might impact on businesses supporting, adopting, or producing new products and services to qualify for eco-label certification. These influences are summarised as follows:

- **Social influences:** brand reputation, societal and customer expectations, shareholder pressures
- **Economic influences:** examination of whether eco-labels and certified products have sufficient market penetration (and differentiation from more mainstream products and services) to justify costs of (ongoing) certification processes and investing in different material streams and production processes (among other things) to deliver products that qualify for certification. Eco-labels may also provide opportunities to enter new markets if they extend beyond specific jurisdictional boundaries, or maintain a presence in existing markets under new (mandatory) CE requirements.
- **Operational influences:** whether businesses have sufficient influence or control over their supply chain to ensure they can continue to meet the requirements of the labelling scheme (while also protecting their brand reputation). Conversely, businesses may benefit from encouraging or requiring suppliers to participate in a given labelling scheme, providing it aligned with their needs.
- **Environmental influences:** judgements based on whether specific labelling schemes actually deliver on what they promise (e.g., based on CE outcomes), and are not simply a form of “greenwashing” that encourages less-environmentally focused competitors to adopt. This can be complicated by the multi-faceted and undefined nature of CE, and sustainability more broadly. Different consumers, and different businesses, may disagree with what CE attributes and outcomes a given label should, or does, guarantee.
- **Government policy influences:** Some evidence suggests that businesses may not be interested in meeting voluntary or environmental targets outlined in certification programs unless they are linked to mandatory (legislated) labelling requirements or supported through green procurement policies.

## IMPACTS AND OUTCOMES OF LABELLING SCHEMES

### Behavioural

When it comes to behaviour change, a number of the included studies point to the intention-behaviour gap. That is, while eco-labels might be successful in raising awareness and creating intentions to purchase products that are more environmentally sustainable, this will not always translate to actual purchases in real shopping situations (where other factors, such as costs, become more tangible). However, some studies do suggest evidence of actual behaviour change, especially when there is a clear connection between the certified product and an environmental (or other) outcome that the consumer values (although our impression is that these situations apply to specific causes/sectors – e.g., fisheries, timber products – rather than a broader range of products, causes and contexts).

### Environmental

Tangible evidence of measurable improvements to the environment stemming from the adoption of eco-label schemes is scarce (with the possible exception of when specific products or product groups are involved). Studies instead tend to focus on changes in attitudes and behaviours, as trying to distinguish environmental impacts from a range of other possible influences remains a significant challenge.

### Business

There is little evidence or reliable data to suggest that sufficient market penetration of eco-labelling schemes and associated products (beyond the more environmentally conscious consumer) has occurred to result in widespread market shifts or changes to product portfolios. Instead, there is a suggestion that labelling schemes can be manipulated for competitive advantage, to increase product prices, and alleviate consumer guilt for purchasing products that may have negative environmental implications.

## INTERVENTIONS TO SUPPORT THE ADOPTION OF LABELLING SCHEMES

Eco-labels on their own are an information-based intervention tool and are therefore unlikely to create significant shifts in consumer choices or production without other complementary policy tools. Based on the studies included in this review, two categories of interventions were identified that can support the adoption of product labelling schemes. The first involves holistic marketing strategies (and associated certification and assurance) to communicate the meaning, intentions, and value of a label and certified products, which must be visible and relevant to a broad-section of consumers and businesses (not just those that are already eco-orientated). Such marketing strategies need to be ongoing and adaptable, as labelling schemes may evolve and innovate based on technological advancements<sup>8</sup>. Some of the reviewed evidence suggests that comprehensive marketing and education endeavours have been successful in raising awareness of labelling schemes and sales of some labelled products. Lab-based studies have also shown that awareness and intentions to purchase labelled products can improve when issues of personal relevance and known decision-making biases are incorporated into communications (e.g., loss aversion, status quo bias, social norms, status seeking, hyperbolic discounting).

The second category of interventions that can assist in the adoption of product labelling schemes involves regulatory or policy approaches, where mandatory labelling laws and/or procurement standards are imposed on products and businesses, including legal and enforceable definitions of key certification criteria. Other regulatory tools can involve the restriction or banning of “polluting products”, and taxes and subsidies that support the production and purchase of greener products and services. However, mandatory labelling has also been known to have unintended consequences, such as potentially signalling to consumers a lower quality product (if, for example, recycled content is used in production), or impede the entry into the market of smaller but innovative enterprises. Providing financial or expert support for undertaking product certification processes may assist in overcoming such barriers.

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<sup>8</sup> In the EU's energy and resource efficiency labelling scheme for computers (2016), it has been reported that performance has improved so much that some of the worst performers of the present would receive an A+++ rating of the past.

# IMPLICATIONS AND CONCLUSIONS

A key focus of this review was to explore the opportunities and challenges that product labelling schemes may offer in the context of broader government policies related to CE aspirations. The proliferation of labelling schemes across a number of different sectors and product ranges (which can be their own worst enemy in causing confusion on both the demand and supply sides) are based on a belief that they can inform and empower stakeholders (both consumers, producers and governments), increase shared responsibility and accountability, and encourage actual behaviour change based on widely accepted and desired societal and environmental goals.

It was apparent within the reviewed evidence however, that a number of conditions must be in place for a labelling scheme to have any chance of making a difference. These include:

1. Labelling schemes must be **trustworthy and transparent**, involving accurate and defensible product evaluations based on agreed criteria and methods.
2. Product labelling criteria must be associated with **tangible environmental credentials that distinguish them** from other products (otherwise, any differences between certified and non-certified products may be marginal at best).
3. Information on the labelling schemes must be **disseminated and visible** to consumers and producers, particularly at key decision-making moments (e.g., points of sale; start of a new production process).
4. Consumers and producers must **understand and value** the intention and objectives of labelling schemes to encourage informed (and potentially different) production, purchasing and post-purchase choices. With this in mind, labelling schemes must appeal to a multitude of consumer and business values.
5. Labelling schemes must be implemented in conjunction with **other policy tools** (e.g., mandatory labelling, competing product restrictions, procurement standards, taxes/subsidies). By themselves, labelling schemes are unlikely to make any impact on consumption or production decisions beyond those who are already environmentally-inclined.
6. Labelling schemes and certified products must achieve **sufficient market penetration** to remain sustainable and viable.

In the absence of any of these conditions, we suspect that the impact of product labelling schemes on CE policy objectives will be limited. Despite these recommended conditions, the studies included in this review repeatedly mentioned the need for more research to explore the impact, opportunities and ongoing challenges of product labelling schemes, as the evidence on their behavioural, business and environmental impacts remain limited (or overly specialised to a specific product, cause or context). While integrating behavioural insights into eco-label communications and promotions was seen as one avenue for overcoming the overtly green-focused and rational consumer undertones of labels, future research should expand beyond the consumer. It also needs to explore how eco-labels can integrate with other **regulations and policies** (e.g., procurement, taxes, penalties), **organisational strategy** (e.g., under what conditions can labels contribute to changes in business structure and processes; market entry barriers and opportunities), and **technological developments** (e.g., can labels contribute to innovation; can they keep up with technological advancements to remain relevant). It was clear from the reviewed studies that product labelling schemes operate in a cyclic environment involving interactions between consumers, businesses and governments, and so future efforts need to consider these demand, supply and institutional influences.

Furthermore, the transition from a linear to a circular economy is already extending consumer engagement with products and companies well beyond initial purchase decisions. CE business models focusing on disposal and recycling may seek to prompt consumers to take action to dispose

of a product correctly - by mailing back (e.g., Nescafe pods), delivering items to a location (e.g., Country Road or H&M clothes, Red Cycle soft plastics), or seek to guide correct disposal of component parts or packaging (e.g. e-waste, or the Australian Recycling Label). Service-based models may ask consumers to lease, rent-to-buy (e.g., some high end jeans and leather jackets), or return for discount, sale and/or upgrade (e.g., Ikea furniture). A small but emerging cohort of companies identifying with notions of “sufficiency” and even “degrowth” may also ask customers to buy less overall (but favour their products, e.g., Patagonia, Bio Company, Germany), or co-produce, self-construct or even self-manufacture items (e.g., artisanal DIY, service/experience-based and platform based micro-manufacture – including 3D printing and related technologies). While it is conceivable that labelling schemes could support consumption and production behaviours and models associated with CE that extend beyond the point of purchase, the state of knowledge, at least in terms of reviews of primary studies, is limited. As labels and certification with post-purchase behavioural and business model implications proliferate (e.g., EU Ecolabel, planned French durability label, Australian Recycling Label for correct packaging recycling), there is a need to better understand to what extent drivers and barriers of eco-labels at the point of purchase apply, or not, to post-purchase behaviours.

Keeping in mind that the current review is part of a broader body of work linked to waste and CE, this project may progress to examine how labels may influence consumer awareness and purchasing decisions in a small-scale lab (more feasible but less rigorous and relevant to policy) or possibly field-based trials (the converse). With this in mind, we acknowledge one study from the current review that outlines ten parameters as a framework for future empirical research on eco-labels targeting consumer purchasing and business production practices. These include consumer awareness, consumer knowledge, consumer involvement, consumer trust, design and visibility, credibility of the source, type and level of information, clarity of meaning, persuasiveness, and private benefits. This tentative, yet inclusive, set of parameters is thought to be useful as a list of relevant factors to incorporate when designing future empirical research. Nevertheless, any results would need to be contextualised or considered in light of the broader case for policy intervention – i.e. what problems they potentially solve - for labelling schemes to offer strategic value for government CE policies. Note identified characteristics are unlikely to apply to post-purchase behaviours and business models in the same way. If such “extended” models of CE production-consumption relationships were a focus for future research, the goal of experimental research might be to test whether or not a label with “all the right characteristics” was helpful in any way to encourage desired post-purchase behaviours or not, and how it supports or conflicts with associated activities by businesses, third parties and governments around the desired behaviour.

# APPENDICES

# APPENDIX 1: SEARCH STRATEGY

Review Question	
What is the effectiveness of product labelling schemes targeting circular economy outcomes on behaviour and practice?	
Key Definitions	
<p><i>Circular Economy:</i> A 'circular economy' is one in which waste of materials and energy from discarded products are either designed out or kept in use for as long as possible within the economy, extracting the maximum value out of them and recovering them into new products/and/or resource at the end of their life. The aim is to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations.</p>	
Example search string	
<p>TITLE-ABS-KEY ( eco-label* OR ecolabel* OR eco-logo* OR ecologo* OR "environmental product label*" OR "environmental label*" OR "environmental choice label*" OR "green label*" OR "sustainab* label*" OR "sustainable label*" OR "sharing label*" OR "renting label*" OR "recycling label*" OR "re-use label*" OR "reuse label*" OR "end of life label*" OR "end-of-life label*" OR "dispos* label*" ) AND PUBYEAR &gt; 1999 AND ( LIMIT-TO ( LANGUAGE , "English" ) )</p>	
Data sources	
<ul style="list-style-type: none"> <li>• A comprehensive search of the following academic databases will be undertaken: <ul style="list-style-type: none"> <li>– Scopus</li> <li>– Proquest Environmental Sciences Collection</li> <li>– Business Source Complete</li> </ul> </li> <li>• Forward and backward citation search (e.g., reference lists of included reviews may be used to identify further relevant reviews)</li> <li>• Reports from government, industry and other relevant sources will be procured through the commissioning agency and other networks. Snowball sampling from these reports, combined with web-based searching, will be used to identify further reports.</li> </ul>	
Screening and Selection	
Two reviewers will independently screen citations against the following inclusion and exclusion criteria, with discrepancies resolved through discussion.	
Aim / Focus	<p>Included publications must examine the effectiveness of product labelling schemes focusing on the circular economy properties of a product, and how these influence behaviour and practice. These properties might include, for example, avoidance/sharing, recycling / reuse information, resource (material/energy/water) efficiency of extraction/processing/production, product lifespan/durability, ability to repair/refurbish, ability to modularise/remanufacture. The scope includes mandatory, third-party operated and voluntary schemes.</p> <p>Product labelling interventions that do not relate to circular economy (e.g. labelling about genetically modified ingredients, vegan-friendly) will be excluded</p>
Population	<p>Included:</p> <ul style="list-style-type: none"> <li>• Interventions targeting the general public and businesses / industry</li> </ul> <p>Excluded:</p> <ul style="list-style-type: none"> <li>• Nil</li> </ul>
Setting	<p>Included:</p> <ul style="list-style-type: none"> <li>• First-world countries comparable to Australia</li> </ul> <p>Excluded:</p> <ul style="list-style-type: none"> <li>• Third-world countries and those not comparable to Australia (e.g. non-democratic)</li> </ul>

Evaluation outcome	Studies examining any outcome measures / program evaluation techniques will be included
Publication Type	<p>Included:</p> <ul style="list-style-type: none"> <li>• Systematic reviews (SRs), defined as "...an overview of primary studies (e.g. natural experiments, policy impact assessments) which contains an explicit statement of objectives, materials and methods and has been conducted according to explicit and reproducible methodology (p. 672).<sup>2</sup> SRs of quantitative or qualitative studies will be included.</li> <li>• Narrative reviews</li> <li>• Government, industry or other relevant authority reports</li> </ul> <p>Excluded:</p> <ul style="list-style-type: none"> <li>• Theory/conceptual arguments with little empirical evidence</li> <li>• Primary studies. Note: If no relevant articles from the above are identified, high-level primary studies (for example Natural experiments, policy impact assessments, Randomised Controlled Trials, Comparative trials) may be sourced upon agreement with the commissioning agency</li> </ul>
Publication Status	<ul style="list-style-type: none"> <li>• English-language reports (any year) or peer-reviewed journal publications published from 2000 onwards. Depending on search yield and resource availability, this year range may alter. If an alteration to the year range is proposed, this will be discussed and agreed with the review commissioners</li> </ul>
<b>Data extraction</b>	
Data extraction	<p>Data will be extracted (where provided) from relevant studies as follows:</p> <ul style="list-style-type: none"> <li>• Author(s)</li> <li>• Year</li> <li>• Title</li> <li>• Source</li> <li>• DOI</li> <li>• Quality rating</li> <li>• Abstract</li> <li>• Context <ul style="list-style-type: none"> <li>– Geographical setting</li> <li>– Population of interest</li> <li>– Definition of ecolabel (schemes)</li> <li>– Type of label</li> </ul> </li> <li>• Review information <ul style="list-style-type: none"> <li>– Review type</li> <li>– Review questions</li> </ul> </li> <li>• Drivers and barriers to adoption</li> <li>• Interventions used to promote adoption</li> <li>• Outcomes <ul style="list-style-type: none"> <li>– Behavioural</li> <li>– Environmental</li> <li>– Business impacts</li> </ul> </li> <li>• Implementation and policy learning <ul style="list-style-type: none"> <li>– Factors influencing success/failure of intervention</li> <li>– Unintended consequences</li> <li>– Recommendations</li> </ul> </li> <li>• Author conclusions</li> <li>• Reviewer comments</li> </ul>

## Quality appraisal

Methodological quality of included systematic reviews will be evaluated using the AMSTAR tool, an 11-item tool with well-established validity and reliability that is extensively used to evaluate quantitative systematic reviews. Other appropriate quality appraisal tools may be considered appropriate to study design; for example, a tool for evaluating primary studies if there are no review publications identified. Two reviewers will independently screen citations against the following inclusion and exclusion criteria, with discrepancies resolved through discussion. Similarly, narrative reviews will be assessed against the SANRA checklist.

## APPENDIX 2: REVIEWED STUDIES

Authors / Date	DOI	Title
Dangelico & Vocalelli, 2017	10.1016/j.jclepro.2017.07.184	“Green Marketing”: An analysis of definitions, strategy steps, and tools through a systematic review of the literature
de Boer, 2003	10.1002/bse.362	Sustainability labelling schemes: The logic of their claims and their functions for stakeholders
Gallastegui, 2002	<a href="http://dx.doi.org/10.1002/eet.304">http://dx.doi.org/10.1002/eet.304</a>	The use of eco-labels: A review of the literature
Grolleau, et al., 2016	10.1080/14693062.2015.1033675	Helping eco-labels to fulfil their promises
Leire & Thidell, 2005	10.1016/j.jclepro.2004.12.004	Product-related environmental information to guide consumer purchases - A review and analysis of research on perceptions, understanding and use among Nordic consumers
Prieto-Sandoval et al. 2016	10.1016/j.jclepro.2016.06.167	ECO-labels as a multidimensional research topic: Trends and opportunities
Rex & Baumann, 2007	10.1016/j.jclepro.2006.05.013	Beyond ecolabels: what green marketing can learn from conventional marketing
Rubik et al. 2007	10.1504/IJISD.2007.016932	Eco-labelling and consumers: Towards a re-focus and integrated approaches
Taufique et al. 2014	10.3390/su6042176	Synthesis of constructs for modeling consumers' understanding and perception of eco-labels
Yokessa & Marette, 2019	10.1561/101.00000107	A review of eco-labels and their economic impact

<b>Author(s)</b>	Dangelico, R. M., & Vocalelli, D.		
<b>Year</b>	2017		
<b>Title</b>	"Green Marketing": An analysis of definitions, strategy steps, and tools through a systematic review of the literature		
<b>Source</b>	Journal of Cleaner Production		
<b>DOI</b>	10.1016/j.jclepro.2017.07.184		
<b>AMSTAR</b>	5/9	<b>SANRA (/12)</b>	N/A
<b>Abstract</b>			
<p>Over the past decades, environmental sustainability has raised at the top of the international political agenda and has been recognized as a key driver of innovation. As a result, the number of companies developing green products has been rapidly growing and consumers have shown an increasing interest for these products. Thus, understanding the main characteristics of green products, identifying factors affecting their price and consumers' willingness to pay more for them, sales channels and promotional tools (the 4Ps of Green Marketing) would be very useful for companies aiming at designing, developing and marketing green products. For this reason, deeply understanding Green Marketing would foster, on the one hand, cleaner production through the development of green products and, on the other hand, sustainable consumption through the successful marketing of them. To this aim, this study reviews the body of knowledge on the topic, through a systematic review of the literature. Specifically, this paper analyzes: 1) the dominant definitions of Green Marketing (and related concepts) and their evolution over time, 2) the different steps to build a Green Marketing Strategy, and 3) the characteristics of Green Marketing Mix elements. After searching for academic publications in three databases (EBSCO, Scopus, and Web of Science) and selecting publications based on their relevance for the stated aims, 114 studies have been included in the review. Results show that the definition of Green Marketing has changed over time according to the growing relevance of environmental sustainability. Regarding the Green Marketing Strategy, several ways of segmenting consumers have been identified; studies converge in giving greater relevance to green brand positioning rather than to green product positioning and many of them see it as a chance of differentiation. Referring to the Green Marketing Mix, results show that: many types of green products exist; consumers are willing to pay a premium price according to products' functional attributes or their responsibility towards the natural environment; closed-loop supply chain and reverse logistics play a key role; a careful definition of advertisement contents is essential and ecolabels can be important tools. This study provides an in-depth analysis and synthesis of the body of knowledge so far produced in the field of Green Marketing and, as such, it has important implications for managers, scholars, and students.</p>			
<b>Context</b>			
<p><b>Definition of ecolabel (schemes):</b>  Review of "Green Marketing": the integration of environmental sustainability into marketing; words like "green", "greener", "eco", "ecological", "environmental", "sustainable", and "sustainability" (associated with the word "marketing") are considered synonyms.</p>			
<b>Geographical setting:</b>	<b>Population of interest:</b>	<b>Label type:</b>	
Not specified	Not specified	ISO Type I, ISO Type II, and ISO Type III - Note: focus is on 'Green Marketing' more generally	
<b>Review information</b>			
<b>Review type (# studies):</b> Systematic (114)			
<b>Review questions:</b>			
RQ1: Which are the main definitions of Green Marketing (and related concepts) and their evolution over time?			
RQ2: Which are the peculiarities of the different steps to build a Green Marketing Strategy?			
RQ3: Which are the characteristics of the Green Marketing Mix elements?			

Drivers/barriers to adoption
Perceived effectiveness, environmental concern, and altruism predict environmentally conscious consumer behavior. Knowledge
Interventions used to promote adoption
Not specified
Outcomes/impacts
<p><b>Behavioural outcomes:</b> Not specified</p> <p><b>Environmental outcomes:</b> Not specified</p> <p><b>Business impacts:</b> Not specified</p>
Implementation and policy learning
<p><b>Factors influencing success/failure of intervention:</b> Some research found that consumers want more information so they can completely understand sustainability dimensions of a product, i.e. about the whole product life cycle rather than to single categories of impacts.... Consumers also consider sustainability claims more favourably if they highlight the personal impact on them.</p> <p><b>Unintended consequences:</b> Type I ecolabels might reduce innovation because they are based on current standards</p> <p><b>Recommendations:</b> Ecolabels' effects on consumer behaviour is a complex phenomenon that requires future research.</p>
Author conclusions
"Specific attention should be devoted by companies to choose or design environmentally friendly packaging that uses environmentally friendly materials (recycled, recyclable, biodegradable, compostable) and/or minimizes the amount of materials used (eventually making packaging unneeded, such in the case of draft detergents) and that clearly communicates the environmental friendliness of the product." p1275
Reviewer comments
Moderate quality SR but the focus is on eco-marketing with ecolabels as one outcome of interest (nested under 'promotion'). Might not be worth including in analysis given the weak focus on labels.

<b>Author(s)</b>	de Boer, J.		
<b>Year</b>	2003		
<b>Title</b>	Sustainability labelling schemes: The logic of their claims and their functions for stakeholders		
<b>Source</b>	Business Strategy and the Environment		
<b>DOI</b>	10.1002/bse.362		
<b>AMSTAR</b>	N/A	<b>SANRA (/12)</b>	3/12
<b>Abstract</b>			
<p>In this paper the author examines the role of labelling and certification schemes in the pursuit of policies to make production and consumption processes more sustainable. From a logical point of view, labels are conceived as claims put forward by sellers to inform buyers about certain characteristics of their products. In the case of sustainability, labels might identify relevant 'ideals' to approach and/or significant 'ills' to escape. Toulmin's argumentation theory is used to show how claims can be substantiated and challenged. Based on literature on the behaviour of the main stakeholders, the author discusses what labelling means for producers, consumers, policymakers and other groups in society. In the conclusions, attention is drawn to the way in which societal pressure might interact with market forces to shape the information environment for products and services. As a result, the role of sustainability labels might become more differentiated, varying from direct shopping aids to background quality assurances.</p>			
<b>Context</b>			
<p><b>Definition of ecolabel (schemes):</b> Sustainability labelling: "these schemes refer to qualities of products or production processes that are not only relevant from a private perspective, such as human health issues, but also from a public perspective, such as issues of biodiversity and social justice." p254-255</p>			
<b>Geographical setting:</b>	<b>Population of interest:</b>	<b>Label type:</b>	
Not specified	Companies, consumers, policymakers, and other groups in society	Not specified	
<b>Review information</b>			
<b>Review type (# studies):</b> Narrative			
<b>Review questions:</b>			
"My aim in the present paper is to highlight the role of sustainability labelling schemes by combining a logical analysis of labels with a behavioural analysis of their functions for stakeholders." p255			
<b>Drivers/barriers to adoption</b>			
<p>Businesses: pressure from government agencies, shareholders, customers, business associations and other organizations; public criticism, image, costs. Consumers: price, trust, mixed motivations, understanding, values, functional/ aesthetic features, Policymakers: regulatory context, socio-cultural tradition, international trade</p>			
<b>Interventions used to promote adoption</b>			
Policy interventions: Mandatory labelling laws, regulating claims through legal definitions of specific terms, providing services to support voluntary labelling.			
<b>Outcomes/impacts</b>			
<b>Behavioural outcomes:</b>			

<p>Not specified</p> <p><b>Environmental outcomes:</b></p> <p>Not specified</p> <p><b>Business impacts:</b></p> <p>Not specified</p>
<p>Implementation and policy learning</p>
<p><b>Factors influencing success/failure of intervention:</b></p> <p>Government interventions will complement or substitute other policy tools because labelling will be insufficient to achieve sustainability objectives alone. To optimize the design of labels, policymakers should adapt the intervention to the developments in the market, including standardization and differentiation of claims.</p> <p><b>Unintended consequences:</b></p> <p>Government interventions may be contested through legal disputes over the description of claims and appropriate disclaimers. Where regulation is in dispute, labelling may be an attractive compromise because of its market-based character.</p> <p><b>Recommendations:</b></p> <p>Change is more likely through a combination of societal pressure and market forces (with policy as a supporting mechanism).</p>
<p>Author conclusions</p>
<p>Sustainability labelling is closely connected with the pressure that is generated in society to change consumption patterns to be more sustainable. Because this pressure is not the same everywhere, it is not feasible to generalize the effectiveness of labelling and certification schemes. Labelling might at least help us learn more about the arguments used to substantiate or to challenge a claim. This requires a transparent organization of labelling schemes with opportunities for stakeholders to participate in the design of sustainability standards.</p>
<p>Reviewer comments</p>
<p>Borderline commentary paper, very argumentative rather than synthesising evidence.</p>

<b>Author(s)</b>	Gallastegui, I. G.		
<b>Year</b>	2002		
<b>Title</b>	The use of eco-labels: A review of the literature		
<b>Source</b>	European Environment		
<b>DOI</b>	<a href="http://dx.doi.org/10.1002/eet.304">http://dx.doi.org/10.1002/eet.304</a>		
<b>AMSTAR</b>	N/A	<b>SANRA (/12)</b>	4/12
<b>Abstract</b>			
<p>Labelling programs seek first to encourage a move towards more environmentally friendly consumption patterns, and second to induce productive structures, governments and other agents to increase the environmental standards of the products and services in the economy. This paper is devoted to revising the relevant literature on the issue. We divide the topic into three areas: (i) the study of demand, where most of the information available on the demand for labelled goods is presented; (ii) the study of supply, devoted to the analysis and summary of the information available in the literature and finally (iii) the market and trade impacts of labelling programmes, where the research carried out so far is carefully presented. The paper reveals the lack of proper and conclusive research to date, as well as the complexity of the topic of research.</p>			
<b>Context</b>			
<p><b>Definition of ecolabel (schemes):</b>  "Eco-labelling seeks to inform consumers about the effects on the environment of the production, consumption and waste phases of the products/services consumed." p316</p>			
<p><b>Geographical setting:</b>  Europe, North America (typically UK &amp; US)</p>	<p><b>Population of interest:</b>  Consumers, retailers &amp; markets</p>	<p><b>Label type:</b>  Type I: based on a criterion set by third parties, voluntary, identify products with less environmental impact throughout their entire life cycle.</p>	
<b>Review information</b>			
<p><b>Review type (# studies):</b> Narrative</p>			
<p><b>Review questions:</b>  "The rest of the paper tries to justify the judgement that the literature on the topic is relatively scarce and mainly descriptive, and lacks a systematic analysis of the problems." p319</p>			
<b>Drivers/barriers to adoption</b>			
<p>Consumers: Satisfaction, Values, Identification, Costs, Availability, Visibility for purchase, Visibility of consumption, Durability, Perishability.  Retailers: Customer pressure, shareholder pressure, government regulatory pressure, and neighbourhood and community pressure (other lobby groups are negative influences)</p>			
<b>Interventions used to promote adoption</b>			
Not specified			
<b>Outcomes/impacts</b>			
<p><b>Behavioural outcomes:</b>  Not specified</p> <p><b>Environmental outcomes:</b></p>			

<p>Not specified</p> <p><b>Business impacts:</b></p> <p>Not specified</p>
<p>Implementation and policy learning</p> <p><b>Factors influencing success/failure of intervention:</b></p> <p>Not specified</p> <p><b>Unintended consequences:</b></p> <p>Welfare could be reduced directly and indirectly but it is too early to conclusively assess the effects that labelling might have on welfare.</p> <p><b>Recommendations:</b></p> <p>More research into the legislation e.g. ISO legislation and regulation of words such as 'green' and 'bio' that may confuse consumers.</p> <p>More research into a typology to classify types of eco-labels.</p>
<p>Author conclusions</p> <p>"This paper has dealt with the existing literature on eco-labelling. It presents a review and a summary of the most relevant issues. The review reveals the complexity of the topic as well as the lack of conclusive research to date. Some other important conclusions are also included in the text. All in all, there is no doubt that more research is needed in many areas and, in particular, in the demand and supply side, in welfare analysis and in specific industry certification." p329</p>
<p>Reviewer comments</p> <p>Very subjective narrative. Mostly commentary and descriptive no real synthesis. Take with a grain of salt. Not much empirical research. No intervention research.</p>

<b>Author(s)</b>	Grolleau, G., Ibanez, L., Mzoughi, N., & Teisl, M.		
<b>Year</b>	2016		
<b>Title</b>	Helping eco-labels to fulfil their promises		
<b>Source</b>	Climate Policy		
<b>DOI</b>	10.1080/14693062.2015.1033675		
<b>AMSTAR</b>	N/A	<b>SANRA (/12)</b>	4/12
<b>Abstract</b>			
<p>The economic literature has devoted relatively strong attention to eco-labelling schemes. Nevertheless, while succeeding in some markets, they often fall short of their promises. We analyse the gap between the academic design of eco-labelling schemes and their real implementation. We contend that providing information is not enough. We then use recent advances in behavioural economics to inform policy makers on the potential of behavioural interventions in order to design better eco-labelling schemes. Policy relevance Many public policies, including eco-labelling schemes, are still based on an inaccurate description of human decision making, mainly borrowed from standard economics. However, numerous psychological and behavioural studies show that people regularly behave in ways that contradict some standard assumptions of economic analysis. Departing from the conventional view that information-based policies such as eco-labelling schemes will quasi-automatically help mitigate issues such as climate change by guiding consumers' and firms decisions, we argue that information provision is necessary but not sufficient. Admitting that consumers' decisions are guided by factors other than price and information, and, taking systematically into account behavioural biases can offer to policy makers low-cost levers with first-order effects in order to increase the environmental performance of eco-labels, or at least decrease the likelihood of counterproductive effects.</p>			
<b>Context</b>			
<p><b>Definition of ecolabel (schemes):</b> Not explicitly defined but recognises that "The aim of eco-labelling is to harness the power of markets to pursue environmental objectives."</p>			
<p><b>Geographical setting:</b> Not specified</p>	<p><b>Population of interest:</b> Consumers, firms, policymakers</p>	<p><b>Label type:</b> "For ease of exposition, we do not distinguish between different categories of labels (third party versus second or first party, voluntary versus mandatory, private versus public, etc.)" p799</p>	
<b>Review information</b>			
<p><b>Review type (# studies):</b> Policy analysis</p>			
<p><b>Review questions:</b> To "use recent advances in behavioural economics to inform policy makers regarding (1) the gap between academic design and real implementation, (2) the unintended and adverse effects of some eco-labelling schemes, and (3) the potential of behavioural interventions." p793</p>			
<b>Drivers/barriers to adoption</b>			
<p>Willingness to pay Knowledge (but not alone) Biases Trust Third party certification</p>			

Interventions used to promote adoption
<p>Proposed intervention techniques (Table 2):</p> <ul style="list-style-type: none"> <li>• Loss aversion</li> <li>• Status quo bias</li> <li>• Social norms</li> <li>• Status seeking</li> <li>• Hyperbolic discounting</li> <li>• Spatial optimism</li> <li>• Providing cumulative life cycle assessment costs</li> </ul>
Outcomes/impacts
<p><b>Behavioural outcomes:</b></p> <p>Purchase likelihood increased for some eco-labelled products life cycle costs were provided. The choices made by other consumers can affect women's choice of eco-labelled products.</p> <p><b>Environmental outcomes:</b></p> <p>Because ecolabels are more likely applied to low hanging fruit they often lead to small or no changes in production practices or environmental improvements.</p> <p><b>Business impacts:</b></p> <p>Eco-labelling schemes can be manipulated to create competitive distortions. Manufacturers can use eco-labels to increase the total demand for their suite of products (and pollution -due to the 'halo effect') and by alleviating consumers' guilt. Price changes driven by ecolabels can increase environmental externalities.</p>
Implementation and policy learning
<p><b>Factors influencing success/failure of intervention:</b></p> <p>Market type (e.g. clothing, fishing, energy) Credibility and relevance of green claims are frequently challenged. Information provision works better with those already sensitive and involved, when the organization supporting the eco-label is trustworthy, and when paired with other interventions like green procurement and regulation.</p> <p><b>Unintended consequences:</b></p> <p>Eco-labelling can lead to increased environmental degradation &amp; investment in 'brown goods'. Most likely to be placed on products that are easy to certify which does not foster change in practices.</p> <p><b>Recommendations:</b></p> <p>There is a clear need to calibrate information to consumers' situations, deliver value (e.g. private benefits) beyond environmental benefits, and account for strategic manipulation. More research required to test the author's proposed behavioural interventions in controlled &amp; experimental settings.</p>
Author conclusions
<p>Information-based policies can help but not in isolation. Behavioural insights can reinforce existing policies to achieve policy objectives by addressing how consumers really behave. Behavioural interventions are not a universal solution but they could offer an inexpensive option for eco-labels to fulfil their promises. Evidence for ecolabelling schemes is scarce but similar labelling experiments based on behavioural insights have been effective. Eco-labelling schemes are not a miracle cure to encourage environmentally friendly consumption. But, under some circumstances, they can help achieve goals such as improving the environmental performance of products, fostering innovation, and increasing awareness of consumers. Behavioural insights can encourage development of innovative interventions beyond eco-labelling but more research is necessary to consider scalability issues and robustness over time, and in various real-world settings. Government regulations can have a strong role in changing behaviours but are often not supported politically. Mixing behavioural approaches with more traditional ones may increase public acceptance.</p>

#### Reviewer comments

This article presents as a policy analysis rather than a typical literature review. They focus on drawbacks of eco-labels and propose using behavioural insights to improve outcomes. Might not be a great fit for this review.

<b>Author(s)</b>	Leire, C., & Thidell, A.		
<b>Year</b>	2005		
<b>Title</b>	Product-related environmental information to guide consumer purchases - A review and analysis of research on perceptions, understanding and use among Nordic consumers.		
<b>Source</b>	Journal of Cleaner Production		
<b>DOI</b>	10.1016/j.jclepro.2004.12.004		
<b>AMSTAR</b>	N/A	<b>SANRA (/12)</b>	4/12
<b>Abstract</b>			
<p>Informed product choices are a prerequisite for the greening of consumption. Nordic consumers are subject to an ever-growing amount of product-related environmental information that is available in a number of formats. The degree to which they use information is disputed. This paper reviews Nordic research on consumer perceptions, understanding and use of product-related environmental information. The majority of the publications point to a great number of consumers, who recognise, know and possess sufficient confidence in the main eco-labels and should therefore, be able to use them. However, this is not always the case. How the product-related environmental information works in the market place is dependent upon many determinants related to the purchasing moment. Therefore, in contrast to the majority of research on the topic, studies of the use of product-related environmental information suggests that the focus should be on the purchasing decision and take into account the dynamic context of the diverse purchasing situations.</p>			
<b>Context</b>			
<p><b>Definition of ecolabel (schemes):</b>  Informative instruments which provide product-related environmental information.</p>			
<b>Geographical setting:</b>	<b>Population of interest:</b>	<b>Label type:</b>	
Nordic countries	Consumers, retailers	ISO Type I (third-party certified and independent), Type II (voluntary self-declared claims), and Type III (environmental declarations) - but no Type III studies identified	
<b>Review information</b>			
<p><b>Review type (# studies):</b> Literature (54) &amp; Practice review (structured literature search supplemented by expert interviews)</p>			
<p><b>Review questions:</b>  "How [do] consumers in the Nordic markets perceive, understand and use voluntary environmental information on products." p1062-1063</p>			
<b>Drivers/barriers to adoption</b>			
<p>Consumer awareness, consumer acceptance, price, quality, habits, time, credibility.  Retailers/sales staff are 'ecological gatekeepers' but have limited knowledge of ecolabels.</p>			
<b>Interventions used to promote adoption</b>			
<p>"Simple information carriers, such as eco-labels, seem to be desired by most consumers and are sufficient for decision-making.... Detailed information provided by [environmental] declarations is perceived as far too complex to be useful in making purchase decisions." p1066</p>			
<b>Outcomes/impacts</b>			
<b>Behavioural outcomes:</b>			

Discrepancy between intentions and actual behaviour (high intention to purchase green but lack of follow through)

**Environmental outcomes:**

Not specified

**Business impacts:**

Not specified

Implementation and policy learning

**Factors influencing success/failure of intervention:**

Proposed factors:

- Available time and money;
- External stimuli like campaigns and other information;
- Availability of eco-labelled products;
- Trust in the information provided; and
- Motivation and understanding of the relevance of different product choices.

**Unintended consequences:**

Research methods might be the reason for inconsistent findings

**Recommendations:**

The discrepancy intentions and actual behaviour, and the limited impact of product-related environmental information outside green consumer segments, indicate that information is a limited policy instrument. p1066

Author conclusions

Despite the fact that environmental information about products is generally lacking, available information could be used for consumer guidance. The problem is not a lack of information. Consumers often consider eco-labels but decide against the product, or they do not use the information to the extent they claim in surveys. There is a need for more insight into determinants for consumer acceptance of environmental product information (e.g. trust and motivation) and for factors that result in behaviour change.

Reviewer comments

Focus on Nordic countries might be less comparable to Australia. Inadequate referencing in analysis section is problematic. Reviews 'product related environmental information' which includes ecolabels as a major component

<b>Author(s)</b>	Prieto-Sandoval, V., Alfaro, J. A., Mejía-Villa, A., & Ormazabal, M.		
<b>Year</b>	2016		
<b>Title</b>	ECO-labels as a multidimensional research topic: Trends and opportunities		
<b>Source</b>	Journal of Cleaner Production		
<b>DOI</b>	10.1016/j.jclepro.2016.06.167		
<b>AMSTAR</b>	3/10	<b>SANRA (/12)</b>	N/A
<b>Abstract</b>			
<p>This study analyzes the importance of ecolabels as an eco-innovation tool that can contribute to the sustainable design, production and consumption of products. Our research has a dual objective. The first is to build a theoretical framework that explains the relationship between ecolabels and eco-innovation, their determinants (demand, supply, and institutional and political influences) and the dimensions that arise from them. Second, according to this framework, a systematic literature review was carried out to identify the trends and opportunities in ecolabeling as a multidimensional topic, from empirical, geographical and sectorial perspective. The main contributions of this paper are a proposal for cyclical ecolabeling innovation process, an understanding of the ecolabeling dimensions according to the studies analyzed, and ecolabel performance in the market. Additionally, the systematic literature review revealed that ecolabels have been mainly explored in food sectors and, developed countries, and researchers tend to assess their performance from the dimension of market dynamics</p>			
<b>Context</b>			
<p><b>Definition of ecolabel (schemes):</b></p> <p>"...an ecolabel is a "claim which indicates the environmental aspects of a product or service" according to the clause 2.1 in ISO 14020 (ISO and ICONTEC, 2002). This straightforward description is consistent with the original basic concept first developed by the German Institute for Quality Assurance and Certification, which stated that "environmental labels inform consumers about the positive environmental aspects of a product" (Hemmelskamp and Brockmann, 1997, p. 67)." P.810</p> <p>"From the perspective of governmental organizations, an ecolabel is defined as a tool that is dedicated to influencing demand (Salzman, 1994) by informing consumers about the environmental implications associated with all elements in the product's life cycle (Global Ecolabeling Network, 2007)." P.811</p> <p>"According to Dangelico and Pujari (2010) and Wagner (2008), ecolabeling is conceived as an eco-innovation process because it promotes the emergence of new green products and it improves production methods, supply sources and combinations (Hellström, 2007)." p. 809</p>			
<b>Geographical setting:</b>	<b>Population of interest:</b>	<b>Label type:</b>	
Search was worldwide but studies were mainly from US, Europe, and Asia	Consumers, firms, government and institutes	No differentiation. Most identified studies looked at food, fisheries and forests	
<b>Review information</b>			
<b>Review type (# studies):</b> Systematic (152)			
<b>Review questions:</b>			
"undertake a systematic literature review to determine the current situation of academic research on ecolabels and thereby identifying trends and opportunities for future explorations" p. 807			
<b>Drivers/barriers to adoption</b>			
<i>Supply and demand interactions</i>			
Barrier: price or information consumers received about the label			

<p>Driver: ecolabels require a complete marketing strategy to communicate their meaning and their added value, which must be obvious to the customer at the point of sale.</p> <p><i>Environmental regulation and policy (how are ecolabels implemented in different regions and countries)</i></p> <p>Barrier: ecolabels are implemented differently in different countries and regions. Lack of convergence regarding legal issues, which should be included in the label's schemes locally and globally</p> <p><i>Social environmental awareness:</i></p> <p>Barrier: Transparency of ecolabeling process</p> <p>Driver: Use of Life Cycle Assessment, regulations in order to define how to introduce LCA in regional, national or transnational norms are needed</p> <p><i>Organizational strategy dimension</i></p> <p>Barrier: lack of interest in the business applications of the technological tools used to develop ecolabeling</p> <p>Driver: environmental management initiatives need to be supported by the natural and applied sciences to develop effective and innovative sustainable products</p>
Interventions used to promote adoption
Not specified
Outcomes/impacts
<p><b>Behavioural outcomes:</b></p> <p>Not specified</p> <p><b>Environmental outcomes:</b></p> <p>Not specified</p> <p><b>Business impacts:</b></p> <p>Not specified</p>
Implementation and policy learning
<p><b>Factors influencing success/failure of intervention:</b></p> <p>Not specified</p> <p><b>Unintended consequences:</b></p> <p>Not specified</p> <p><b>Recommendations:</b></p> <p>Future analysis and literature reviews should carry out more in-depth research about the strategies that can capitalize on the value of ecolabeled products. There is a gap in the knowledge about the possible scientific applications that can improve ecolabeling practices.</p> <p>Reviewing geographical focus of studies could guide the spread and implementation of ecolabels, taking into account that not all consumers have been exposed to the same ecolabels at the same time.</p> <p>Research on ecolabels is needed in other dimensions, such as environmental regulation and policy, organizational strategy, and technological development.</p> <p>"Future studies should propose strategies for overcoming the barriers to extending ecolabeling in emerging economies, considering local factors like ecolabeling implementation costs, the culture and social features. Furthermore, future research in developing countries could help encourage eco-innovation processes through ecolabeling in order to meet worldwide environmental expectations." p.817</p>
Author conclusions
<p>"The theoretical framework...revealed that ecolabeling necessarily involves a cyclic innovation process with interaction between consumers, firms, governments and institutions. In this way, this paper also proposes a wider ecolabeling definition from eco-innovation, which can be addressed according to three eco-innovation determinants: supply, demand, and institutional influences.... Moreover, the cross-analysis relating economic sectors and</p>

geographical regions showed that the message of sustainability has not been transmitted equally in all economic sectors around the world. One of the biggest challenges for researchers and practitioners is to look for the best way to make ecolabels visible and useful to all consumers across economic sectors, not only to the “greener customers” of the most developed regions.” p. 816

SR Conclusion:

- research methods oriented towards modelling of 'green' and 'brown' markets
- focus on consumers' behaviour in the market instead of analysing the environmental management strategies in organisations
- academics more interested in the analysis of market dynamics in productive sectors instead of service

#### Reviewer comments

The first part is a theoretical model about ecolabels as eco-innovation processes. Dimensions identified in the ecolabeling cycle are not empirically tested. Only search for ecolabel and similar in title not abstracts I did not include this information as it is not part of the systematic review. The review finds that ecolabels are most prominent for food, fish and forestry products, and in the US.

<b>Author(s)</b>	Rex, E., & Baumann, H.		
<b>Year</b>	2007		
<b>Title</b>	Beyond ecolabels: what green marketing can learn from conventional marketing		
<b>Source</b>	Journal of Cleaner Production		
<b>DOI</b>	10.1016/j.jclepro.2006.05.013		
<b>AMSTAR</b>	N/A	<b>SANRA (/12)</b>	7/12
<b>Abstract</b>			
<p>Ecolabels have emerged as one of the main tools of green marketing. Although a great deal of effort has been invested in making them more effective and efficient, the market share of ecolabelled products is still low, partly because they have been addressed mainly to 'green' consumers. In a theoretical exposition of marketing theory, we find that green marketing could learn from conventional marketing in discovering other means than labelling to promote green products. Examples include addressing a wider range of consumers, working with the positioning strategies of price, place and promotion and actively engaging in market creation.</p>			
<b>Context</b>			
<p><b>Definition of ecolabel (schemes):</b>  Ecolabels are intended as a means for consumers to make choices that will reduce environmental impact and enable them to influence how products are made.  In marketing: "A label is considered part of the technical information attached to the product" p573</p>			
<b>Geographical setting:</b>	<b>Population of interest:</b>	<b>Label type:</b>	
Not specified	Consumers and marketers	Mandatory and voluntary (including ISO Type I, II & III)	
<b>Review information</b>			
<b>Review type (# studies):</b> Narrative			
<b>Review questions:</b>			
"We conducted a literature survey, comparing conventional marketing literature with marketing literature that has an expressed aim to account for aspects of relevance to the impact of products on the environment." p568			
<b>Drivers/barriers to adoption</b>			
<p>Perceived effectiveness &amp; experiences of environment-related problems predict 'green' buying behaviour.  Perceptions of cost, existing behaviours and habits, perceptions of alternative products; recognition, understanding and trust in ecolabels; desire for environmentally-friendly products.</p>			
<b>Interventions used to promote adoption</b>			
Positive vs negative labels: positive labels appeal to people with strong environmental interests, & those with less environmental concern are more sensitive to negative labels (that signal the product is bad for the environment).			
<b>Outcomes/impacts</b>			
<p><b>Behavioural outcomes:</b>  Intention action gap.  Lower willingness to pay in real shopping environments.</p> <p><b>Environmental outcomes:</b></p>			

"the effect of ecolabels in terms of environmental performance has not been the subject of much research... However, for specific products or product groups, assessments can be found showing environmental improvements thanks to the introduction and use of ecolabels." p570

**Business impacts:**

"For companies, the main motivation for using labels is often said to be competitive advantages or improved market shares." p570

Implementation and policy learning

**Factors influencing success/failure of intervention:**

"The market for green products is either non-existent or saturated and the environmental information given needs to produce more efficient results." p571 - predicted by environmental awareness.

"Environmental product information systems such as ecolabels need to be better interlinked and also linked to national and international policies" p571

**Unintended consequences:**

Green products (in the 1990s) were launched in response to "media hype about the environment", not demand from consumers.

Ecolabels may only be informing already green consumers.

**Recommendations:**

Introduce positive and negative labelling schemes (e.g. mandatory energy labels which rate all products on the same scale).

Author conclusions

There are diverging ways of understanding the green market and diverging views on the potential of ecolabelling. Effort has been invested in trying to make ecolabels more effective but green products will not have a high market share for if marketers rely only on ecolabels and already green consumers. Ecolabelling is seen as technical information to the product (from a marketing perspective) which will not make all products greener. Greener production and consumption relies on a wider range of consumers than the 'green segment'. The means of green marketing needs to be broadened.

Reviewer comments

Author's compare green marketing and ecolabels from a marketing perspective. There's a lot of irrelevant content about marketing principles but also a lot of useful summary information about ecolabels.

<b>Author(s)</b>	Rubik, F., Frankl, P., Pietroni, L., & Scheer, D.		
<b>Year</b>	2007		
<b>Title</b>	Eco-labelling and consumers: Towards a re-focus and integrated approaches		
<b>Source</b>	International Journal of Innovation and Sustainable Development		
<b>DOI</b>	10.1504/IJISD.2007.016932		
<b>AMSTAR</b>	N/A	<b>SANRA (/12)</b>	5/12
<b>Abstract</b>			
<p>The paper deals with voluntary environmental product information schemes, especially with eco-labels (ISO-type I labels). It distinguishes direct (i.e., effects attained through the application of eco-labelling on products and services) and indirect (i.e., effects induced by eco-labelling schemes on surrounding policy, businesses and society without their visible application) effects of eco-labels. It presents an overview on the state on assessment and evaluation studies. Based on this broad picture a set of key influencing factors are introduced, two of them are general; the others are dependent on the product group. It is argued that if all factors are positive, this very likely determines the success of an eco-label Finally an integrated approach is introduced which is needed to develop effective schemes.</p>			
<b>Context</b>			
<p><b>Definition of ecolabel (schemes):</b>  "Eco-labelling provides a positive statement that identifies products and services as being less harmful to the environment than products in the same product category without a label" p. 177  - "Environmental labelling, and in particular eco-labels, claim to have two general objectives (Piotrowski and Kratz, 1999, p.430): (1) providing consumers with the information they desire and thereby increasing market efficiency (information policy instrument) (2)reducing (negative) environmental impacts by offering environmentally less harmful products and services in the market (environmental policy instrument)". p. 177</p>			
<b>Geographical setting:</b>	<b>Population of interest:</b>	<b>Label type:</b>	
Not specified	Consumers, firms, government and institutes	ISO Type I: Criteria-based certification programmes ISO Type II: Self-declared environmental claims ISO Type III: Applicable to quantified product information that is based upon independent verification using present indices	
<b>Review information</b>			
<b>Review type (# studies):</b> Narrative			
<b>Review questions:</b>			
1) What evidence exists that eco-labels contribute to changing production and consumption patterns? 2) Which factors influence the success and/or failure of an eco-label? 3) Which future strategy could refocus the eco-labelling concept and embed it into a path towards sustainable development?			
<b>Drivers/barriers to adoption</b>			
Consumer awareness of specific labels in the EU and nationally. Confidence in labels: (problematic, because consumer first need to know the label, which is already low, and then also need to have trust in it, which is also low). Emphasise link between technological and environmental improvement if consumer associates green products with lesser quality.			

Firms: companies tend not to be interested in meeting voluntary and environmental targets set by public authorities not linked with legislation and/or green public procurement

#### Interventions used to promote adoption

Approach to increase the awareness of consumers for eco-labelling through campaigns (e.g., Danish EPA launched a major campaign aimed at increasing the recognition and knowledge about the two official eco-labels and at increasing the sales of eco-labelled washing powder and textiles; doesn't say what the campaign was, only that it was successful to increase recognition of the Swan and EU flower, increased knowledge about eco-label meaning. Sales seemed to have increased for washing powders but not for textiles).

A lab study showed that information about environmental outcomes provided by eco-labels influenced product preference.

#### Outcomes/impacts

##### **Behavioural outcomes:**

Eco-labelling lead to less information search

EU eco-label contributes to an increase of consumers' general environmental awareness

##### **Environmental outcomes:**

Lack of empirical data on the environmental effectiveness of eco-labelling, studies rather look at the effects on attitudes and behaviour rather than concrete environmental effects, because they are difficult to measure and to distinguish from effects of other measures

##### **Business impacts:**

Important indicator of market penetration is the market share of eco-labelled product's in relation to all other products sold belonging to the same group -->"research on market shifts is rare and reliable statistical data is missing", p. 178

Not much evidence that eco-labelling influences a company's product portfolio besides:

- eco-labels could indirectly force producers to produce/offer eco-labelled products
- negotiation of eco-labels criteria may improve the environmental performance of a whole market sector
- eco-labels could be used by companies as benchmarks for their own products or as a target to improve their environmental performance
- ecolabels have the potential for market transformation in the way of a changing customer -client relationship
- for some SMEs eco-labelling pose a threat as it may affect their business if a competitor adopts eco-labels and take over customers.
- eco-label as an effective competitive marketing tool

#### Implementation and policy learning

##### **Factors influencing success/failure of intervention:**

Eco-labelling schemes have greater impact when the labels are a requirement imposed by retailers for their procurement and/or when they are used as tools to identify green products for government procurement and institutional purchasing. p.182

Key factors which determine success or failure:

1) Costs, fees and verification

2) Credibility and trust in scheme; criteria elaboration (considering all-life-cycle phases and best performed by an independent and competent institute)

Key factors depending on product group:

1) Determination of the main environmental impacts; 2) Role of stakeholders (e.g., champions, first movers --> agents for change); 3) Consumer awareness: strongly differs depending on country and product group; 4) Market structure: strongly influences the motivation and strategy with respect to voluntary EPIS; 5) Format of the eco-label: depending

on product group, type of product, target group, impact of the life-cycle phase. Format must be an appropriate compromise between conciseness and clarity

Criteria of ecolabels: need to find a good balance between strict and to easy met criteria of an eco-label; need to reflect local conditions and the issue of harmonisation in an increasingly global market; products with rapid technological development classical ISO-type I timing for criteria elaboration and revision is too long, which is one of the main reasons for failure of eco-labels in the particular category of products

Quality and price: quality/price ratio is main factor for consumers purchase decision (no decrease in product quality or increase in price excepted that goes over a particular limit).

**Unintended consequences:**

Not specified

**Recommendations:**

Recommendation to link eco-labelling with other policy instruments (e.g., product testing, public and private procurement etc).

“A more intense strategic discussion of the potentials and constraints of eco-labels in the context of sustainable development policies, consumer policy, and thematic environmental strategies (such as waste, recycling or hazardous substance polices) seems to be rather neglected.” p 181

"An integrated strategy is needed to develop effective EPIS that can: (1) inform and empower stakeholders to act (all stakeholders, not just consumers), pushing them to change their behaviour and to act positively with regard to the environment; (2) increase shared responsibility; (3) respond to common environmental priorities agreed at the national and/or the international level."

"We propose an integrated screening approach, which we call the 'path-dependent model', which should be taken into account a priori, before any new EPIS are developed for a product group. This process includes different levels of integration in a multi-stakeholder approach; that is, it features the integration of IPP tools and of different EPIS."

Goes into specific recommendations for six product categories:

Non- vs recoverable consumable goods; energy-consuming vs passive durable products; simple vs complex services.

**Author conclusions**

EPIS inc. eco-labels lack an assessment of their environmental impacts.

Success or failure of an EPIS depends on a series of key influencing factors, many have never been taken into account

EPIS criteria include a variety of environmental aspects without really focusing on the major environmental ones in product or service life-cycle

Major stakeholders have not always been involved in the establishment of EPIS. EPIS should be embedded in a broader framework (propose a path dependent model (Figure 3)), to clarify the role of eco-labels and their relationship with consumers.

**Reviewer comments**

Looks at 2 types of effects of eco-labels:

1) direct environmental benefits meaning environmental improvements attained through the application of eco-labelling on products/services

2) indirect environmental benefits meaning environmentally positive impacts induced by eco-labelling schemes on surrounding policy, businesses and society.

Narrative review to be taken with caution as it is often not clear on what type of information and studies they draw their conclusions from. It seems to me a bit opinionated and driven by their own research.

(ELIS = Environmental product Information Schemes)

(IPP = Integrated Product Policy)

<b>Author(s)</b>	Taufique, K. M. R., Siwar, C., Talib, B., Sarah, F. H., & Chamhuri, N.		
<b>Year</b>	2014		
<b>Title</b>	Synthesis of constructs for modeling consumers' understanding and perception of eco-labels		
<b>Source</b>	Sustainability (Switzerland)		
<b>DOI</b>	10.3390/su6042176		
<b>AMSTAR</b>	4/9	<b>SANRA (/12)</b>	N/A
<b>Abstract</b>			
<p>The term "eco-labeling" has become a buzzword in today's sustainable business world. The use of eco-labeling in various forms has been increasing notably for past many years, sometimes as an environmental "requirement" and sometimes merely as a marketing tool. Questions arise about how well these eco-labels are attended and understood by consumers. However, though mentionable studies are found on various aspects of eco-labels, gaps exist in exploring an inclusive set of parameters for investigating consumer perceptions of eco-labels. This paper aims at preparing a synthesis of all the possible factors to be incorporated for measuring consumer perceptions of eco-labeling of products. For making such synthesis, all major works in the field have been thoroughly reviewed. The paper comes up with a total of 10 parameters that include consumer awareness, consumer knowledge, consumer involvement, consumer trust, design and visibility, credibility of the source, type and level of information, clarity of meaning, persuasiveness, and private benefits. This tentative, yet inclusive, set of parameters is thought to be useful for designing large scale future empirical researches for developing a dependable inclusive set of parameters to test consumer understanding and perceptions of eco-label. A framework is proposed for further empirical research.</p>			
<b>Context</b>			
<p><b>Definition of ecolabel (schemes):</b>          "An eco-label is a "visual communication tool indicating environmentally preferable products, services or companies that are based on standards or criteria"" p2180</p>			
<p><b>Geographical setting:</b>          Not specified</p>	<p><b>Population of interest:</b>          Consumers</p>	<p><b>Label type:</b>          ISO Type I (third-party certified and independent), Type II (voluntary self-declared claims), and Type III (environmental declarations) - but no Type III studies identified</p>	
<b>Review information</b>			
<p><b>Review type (# studies):</b> Systematic (51)</p>			
<p><b>Review questions:</b>          "Do these increasing numbers of eco-labels create confidence or confusion in the minds of the consumers?...The paper identifies an all inclusive set of factors to be used in investigating consumer perception of eco-labels and thus, propose a model of consumer perception of eco-labels." p2179</p>			
<b>Drivers/barriers to adoption</b>			
<p>From Table 1:</p> <ul style="list-style-type: none"> <li>• Consumer awareness,</li> <li>• Consumer knowledge,</li> <li>• Consumer involvement,</li> <li>• Consumer trust,</li> <li>• Design and visibility,</li> <li>• Credibility of the source,</li> <li>• Type and level of information,</li> </ul>			

<ul style="list-style-type: none"> <li>• Clarity of meaning,</li> <li>• Persuasiveness,</li> <li>• Private benefits,</li> <li>• Socio-demo factors: levels of education, gender, income and age</li> </ul>
Interventions used to promote adoption
Not specified
Outcomes/impacts
<p><b>Behavioural outcomes:</b> Each of the factors listed in Table 1 was found to influence purchasing behaviours across various studies</p> <p><b>Environmental outcomes:</b> Not specified</p> <p><b>Business impacts:</b> Not specified</p>
Implementation and policy learning
<p><b>Factors influencing success/failure of intervention:</b> "The U.S. Environmental Protection Agency [5] reports that if environmental labelling is to be an effective policy tool, a number of conditions must hold true. First, product evaluations must be known and accurate. Secondly, product standards must be associated with significant environmental differences among products. Thirdly, this information must be disseminated to consumers. Fourthly, consumers must understand environmental issues and product-specific information well enough to make informed purchasing decisions. Finally, the label must have substantial market penetration in order to affect a significant number of producers." p2191</p> <p><b>Unintended consequences:</b> Not specified</p> <p><b>Recommendations:</b> It is recommended to now empirically determine the reliability and validity of the constructs identified in this review using a sample survey of consumers. Once confirmed, research can test hypotheses using the constructs on target groups using multivariate statistics (e.g. Structural Equation Modelling (SEM)). Further exploratory research (e.g., focus group discussion) could also be conducted to explore more constructs.</p>
Author conclusions
When consumer choice has a significant impact on the environment, eco-information programs (like ecolabels) is called for. If properly implemented these programs will assist consumers to make eco-friendly decisions while also achieving policy objectives. However, consumer based policy objectives are unlikely to succeed if consumers do not notice, believe, understand and use the eco-information presented. Eco-labels are a vehicle to "educate" consumers who are the ultimate actors of eco-friendly consumption.
Reviewer comments
Author uses a systematic review to propose a model that needs testing.

<b>Author(s)</b>	Yokessa, M., & Marette, S.		
<b>Year</b>	2019		
<b>Title</b>	A review of eco-labels and their economic impact		
<b>Source</b>	International Review of Environmental and Resource Economics		
<b>DOI</b>	10.1561/101.00000107		
<b>AMSTAR</b>	N/A	<b>SANRA (/12)</b>	8/12
<b>Abstract</b>			
<p>In many countries, various eco-labels have emerged for informing consumers about the environmental impact of the offered products. Using recent advances in the empirical and theoretical literature, this review questions the efficiency of eco-labeling. We combine a literature review with discussions of empirical examples. We underline the limitations of eco-labels for signaling credible information to consumers. In particular, both the complexity and the proliferation of eco-labels are likely to hamper their efficiency in guiding consumers. From a regulatory perspective, several studies show that eco-labels are useful, but they cannot be considered a panacea for improving environmental quality. Indeed, it is often socially optimal to combine eco-labels with other regulatory tools such as standards banning polluting products and tax/subsidy mechanisms depending on the environmental quality. The conclusion suggests research priorities for tackling unanswered questions.</p>			
<b>Context</b>			
<p><b>Definition of ecolabel (schemes):</b>          "An eco-label can be defined as a simple signal that can be posted by several competitors to induce consumers to purchase eco-friendly products (Teisl et al., 1999)." p.120          Labels reduce the information asymmetries about a product between producers and consumers</p>			
<p><b>Geographical setting:</b>          Not specified</p>	<p><b>Population of interest:</b>          Consumers, firms, government and institutes</p>	<p><b>Label type:</b>          Focus on eco-labels that are either signals that distinguish products according to environmental criteria or declarations providing quantitative indicators of environmental performance (see the ISO 14020 definitions (ISO, 1999a,b))          We only focus on the business-to-consumer communication channel with a strong focus on agriculture and food e.g., organic, rainforest labels          The ownership of eco-labels is also important because this may sway the credibility of the label. Eco-labels mainly owned by private entities or NGOs. In 2012, public-owned eco-labels only represented one-sixth of existing eco-labels (Gruère, 2014). Most eco-labels globally are voluntarily adopted by firms; however, some characteristics can be defined by the regulator, as is the case for organic labels. Mandatory labels appear as an exception in the eco-label setting.</p>	

Review information
<b>Review type (# studies):</b> Narrative
<p><b>Review questions:</b></p> <p>Study aims to</p> <ol style="list-style-type: none"> <li>1) describe incentives for the use of eco-labels</li> <li>2) assess the limitations of eco-labels</li> <li>3) discuss the relevant use of eco-labels as a policy instrument</li> </ol>
Drivers/barriers to adoption
<p><i>Enablers</i></p> <p>Environmental concern of consumer, product price, significant but low price premium between green and regular products, WTP for environmentally friendly products; real intent to pay more for eco-labels when the WTP for eco-labeled products is higher than that for regular products --&gt; consumers sensitivity explains emergence of voluntary eco-labels in various markets;.</p> <p><i>Barriers limiting the impact of eco-labels:</i></p> <p>Consumers' perceptions of the label criteria, the peripheral broadcast of information about the label, wrong inferences of the label meaning, trade-off between an eco-label and an alternative label, consumers' sensitivity toward the environment, lack of awareness and/or credibility, lack of motivation at the time of choice. Double labelling (i.e., labelling of nutrition and environmental impacts) is ineffective as consumers do not like to trade between the nutritional and environmental dimensions.</p> <p><i>Firms' Motivations:</i></p> <p>Higher WTP for green products spurs firms to use eco-labels; opportunity to differentiate a firm's goods to improve sales; risk of greenwashing; certification costs, quality of the product; competitors in the market; supply chain promoting an eco-label and contractual relationships inside such a supply chain, strong brand reputation; retailers with supermarket brands have a higher incentive to adopt a label than manufacturers with national brands; pressure from NGOs</p>
Interventions used to promote adoption
Not specified
Outcomes/impacts
<p><b>Behavioural outcomes:</b></p> <p>When consumers are aware of an environmental problem, an eco-label may provide strong incentive (e.g., dolphin-safe label led to an impressive reduction in the number of dolphins killed). Likewise for toilet paper and detergents with the Nordic Swan. Environmental labelling of wood products influences consumers' purchase decision particularly for products such as recycled paper for which they perceive a clear connection between high usage and the environmental impact.</p> <p><b>Environmental outcomes:</b></p> <p>By choosing "clean and green" goods and services, consumers play a significant role in decreasing the environmental damage caused by production chains.</p> <p>Problems with poor environmental impacts of voluntary certification in some industries.</p> <p><b>Business impacts:</b></p> <p>Not specified</p>
Implementation and policy learning
<p><b>Factors influencing success/failure of intervention:</b></p> <p>Eco-label efficiency depends on consumers' sensitivity toward the environment and faith in third-party certifying agencies to truthfully report their examination of firms adopting eco-labels. If consumers do not trust a label, it will</p>

have no impact on their purchase or their WTP. Consumers trust may be influenced by complexity and profusion of eco-labels.

Comprehension and memorization of the label particularly when technical or complex information is transmitted (e.g., CO<sub>2</sub>, energy); label needs to convey a simple message without betraying the complexity of environmental assessment; some studies show support for using simplified labels/logos with injunctive messages conveying social approval or disapproval (e.g., smiley).

Problem of "label-overload" and confusion leads to blurred signals even to an extent where consumers may be more influenced by the marketing around the label than the environmental quality it represents; this can result in firms going for low-quality eco-labels as it's easier --> explains the fragile and weak performance of many eco-labels

Third-party organizations, including private agencies and governments, contribute to the credibility of the messages on environmental attributes through criteria setting, certification, and enforcement.

#### **Unintended consequences:**

Mandatory labels can have serious unintentional consequences (e.g., consumers' misinterpretations and/or stigmatization of low-quality products) particularly when mandatory labels are not based on science. Mandatory labels can impede the entry of firms or lead some to exit the market

#### **Recommendations:**

Combine eco-labels with other policy tools (e.g., standards banning/ limiting non-green products, taxes on non-green products, and or subsidies on green products) to overcome their weaknesses, as eco-labels alone are seen insufficient.

##### *Voluntary labels*

Regulatory tools to maximize welfare (i.e., sum of surpluses of its agents, incl environmental damage): mandatory label, subsidizing of certification cost if mandatory label is not possible, providing incentives to voluntarily adopt an eco-label, providing generic explanations and recommendations on the impact of clean consumption; generic advertisement has limited impact on attracting consumers' attention to eco-labels,

Option to limit eco-labelling in the market by capping the number of eco-labels that one owner is allowed to create

##### *Mandatory eco-labelling:*

Regulators should be careful about the product (clearness of information conveyed by the eco-label, assessment of labelling costs); mandatory labels more expensive because of regulation and inspection; for products with negative environmental consequences firms have no incentive to voluntarily eco-label their goods, which is a major motivation for mandatory labels.

#### Author conclusions

Eco-labels have many limitations

It's not useful to develop 'another' voluntary eco-label. There are already too many different labels that weakened the general effectivity of labels. Mandatory eco-labelling seems more promising.

Also eco-labels on their own are insufficient, should be paired with another policy tool

In the Conclusion, they discuss what future research could focus on and include some ideas that were not discussed before.

- 1) Consumer only look at eco-labels for some products but not for the whole based of products
- 2) using a mobile phone barcode scanner to gain information about environmental performance of various products
- 3) Look at longitudinal data
- 4) Look further into WTP
- 5) understand the impact of eco-labels on the environment
- 6) how do eco-labels contribute to green innovation
- 7) couple eco-labels with other outcomes e.g., health, animal welfare
- 8) Look at developing countries

9) Lack of studies looking at nascent use of eco-labels by public services or local authorities (e.g., Airport Carbon Accreditation)

Reviewer comments

Extensive review. The literature is divided into two main fields. The first field encompasses numerous empirical studies eliciting premiums for various eco-friendly characteristics. Numerous articles examine both consumers' WTP and the factors altering such willingness. The second field comprises theoretical studies describing the mechanisms used to improve the functioning of eco-labels. I did not include any information about the models they use for demonstration, don't seem relevant for our purposes.