FACTORS AFFECTING CONSUMERS’ PERCEPTION OF ECO-LABELS: EVIDENCE FROM MALAYSIA

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ABSTRACT

The increasing use ‘eco-labels’ by businesses in various forms arises question about how much these labels are attended, understood and used by the consumers in their buying and consumption behaviour. This study aims to empirically test a set of theoretical constructs and measurement instruments generated from literature to understand the factors affecting consumers’ understanding and perception of eco-labels. Questionnaire surveys were conducted in selected cities of Malaysia. A total of 381 respondents were surveyed using personal interview. Both confirmatory factor analyses and structural analysis were conducted to test the reliability, validity and other model fit indices to determine the factors. The results suggest six factors namely consumer awareness, consumer knowledge, credibility of environmental quality, clarity of information, persuasiveness and personal benefits influence consumer understanding and perception of eco-labels. The possible policy implications of the study is for the marketing and other policy makers to assist in better designing the eco-labels that truly create environmental awareness and promote environmentally sustainable consumption behaviour.

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INTRODUCTION

During the last 30 years, a growing number of environmental labels have been developed by individual companies, industrial sectors and NGOs, national and international governmental organizations (EPA, 1998; EU, 2001). Apparently, though the increasing use of these labels is signaling some “green” initiatives, they must be looked at in conjunction with the benefits they presumably bring to companies and consumers. From the company’s perspective, the labels are expected to legitimatize its business practices, protect it from public regulation and/or help it gain competitive advantages. From the consumer’s point of view, the labeling will reduce uncertainty about the environmental performance of products and enable consumers to choose products that cause less damage to the environment (EPA, 1998; Kollman & Prakash, 2001; Porter & van der Linde, 1995). From marketing perspective, these labels are aimed at bolstering consumer perception of brands in the name of “green” marketing (Bickart & Ruth, 2012).

With a total of 458 eco-labels in 197 countries today (Ecolabel Index, 2014), the new eco-labeling schemes are being added every year by different organizations, from non-profit to retailers (Saunders, 2010). Over the last 2–3 years, recognition of the need to act on climate change has driven a renewed interest in eco-labels as a means to drive a widespread transition towards more sustainable lifestyles. Malaysia is not an exception of this trend. There are total 18 different eco-labels that are now in use in Malaysia with assorted appearances and specifications (Ecolabel Index, 2015). However, with so many competing eco-labels available today, questions arise about how well they are understood by consumers. Do these increasing numbers of eco-labels create confidence or confusion in the mind of the consumers?

Malaysia is currently experiencing rapid economic growth, industrial development, urbanization process, increasing population and a changing lifestyle. Specifically, the recent economic boom and rapidity of development have increased Malaysians’ incomes at every level leading to a raise in consumption level. Studies have suggested that economic growth and increased household income in Malaysia have led to two important phenomena: an increase in the proportion of the middle class in the overall labor force – from 24% to 37% – and an overall increase in consumption (CI-ROAP 1997). As a result of this, many problems of urban life such as water crises and solid-waste management have become more prominent. Solid waste is
already a significant problem for the Malaysian government. For example, it has been reported that each resident in the Klang Valley area produces 1.5 kg solid waste every day. At this rate, at least 80% of the 230 available disposal sites will be filled up within 2 years (MHLC 2003). Apparently the concern and responsibility of households as consumers cannot be overlooked in keeping the environment clean and green. Environmental activist Al Gore and Mark Lynas argued that responsible consumption is a catalyst rather than a substitute for environmental campaigning (Dale 2011: 75).

Malaysia is also reported to be a pioneer in the Asian region to promote environmentally responsible behavior (Yee 2014) with the goal of being a carbon emission free nation by 2020. Malaysia also established the Ministry of Energy, Green Technology and Water in 2009 (http://www.kettha.gov.my/portal/index.php#) to promote environment friendly consumption. The country introduced the National Green Technology Policy in 2009 aimed at minimizing the degradation of the environment, attaining zero or low greenhouse gas (CHG) emission, conserving the use of energy and natural resources and promoting the use of renewable resources (Muhammad 2012). The Malaysian government launched a number of eco-labeling schemes such as SIRIM national eco-label (SIRIM 2004), energy-efficiency label (Tenaga National 2006) and MyHijau mark (Malaysian Green in English) (MyHijau 2012). A thorough literature review reveals that research on exploring consumers’ perception of and respond to eco-labels on Malaysian consumers is very scarce. Only very few studies are found that explored only narrow aspect of consumers’ environmental concern and issues related to eco-labels (e.g., Aman et al. 2012; Mohamed et al. 2014; Rahbar & Wahid 2011; Ramly et al. 2012; Rashid et al. 2009; Sharaf et al. 2015). This is again important because the effectiveness of eco-labels as an information tool for promoting pro-environmental consumer behaviour is influenced by how the consumers comprehend and perceive the label information (Daughbjerg et al. 2014; Darian et al. 2015; Grunert 2011; Thøgersen 2000). Thus, it is necessary to determine the factors affecting consumers’ understanding and perception of eco-labels in order for eco-labels to be used as an information tool for purchasing and consumption behavior.
ECO-LABEL

Eco-labels are voluntary schemes of environmental quality certification by industry, government or NGOs and, at present, hundreds of eco-labels are available worldwide (e.g., EPA 1998; EU 2001; ISO14024 1999). Germany was the first country to introduce a government-sanctioned ‘Blue Angel’ eco-label in 1978. The Ecolabel Index (2014) lists 458 existing eco-labels in 197 countries.

Bougherara and Combris (2009: 321) define eco-labels as information tools that “aim to internalize the external effects on the environment of the production, consumption and disposal of products”. The eco-labels are the tools used by firms and governments for raising awareness of the higher ecological quality of a given product with respect to unlabeled goods (Brécard et al. 2009). Because of the unobservable nature the environmental consequences of the production and the consumption of a product, the eco-label is considered to be the only way for consumers to gather such information (Brécard et al. 2009).

According to Global Ecolabelling Network (2004: 1), “an ecolabel [italics added] is a label which identifies overall environmental preference of a product (i.e., good or service) within a product category based on life cycle considerations”. The International Standards Organization (ISO) has defined eco-labels as “verifiable and accurate information, that is not misleading, on environmental aspects of products and services, to encourage the demand for and supply of those products and services that cause less stress on the environment, thereby stimulating the potential for market-driven continuous environmental improvement” (ISO14024 1999: 2). According to ISO14020 (2000: 3) labeling “information should be sufficient and reasonably comprehensible to allow purchasers, potential purchasers, and other interested parties to evaluate and compare environmental labels and declarations in terms of scientific principles, relevance, and overall validity, and to assess whether an environmental label or declaration is consistent with the applicable standards within the ISO 14020 series”.

Life-Cycle Assessment (LCA) is a key to eco-labeling schemes. Properly implemented, LCA assists governments, industry and consumers in: understanding the complex environmental effects of products from “cradle-to-grave”; reducing environmental burdens caused by products
during their life-cycle; and making environmentally-informed production and purchasing decisions.

Many researchers argue that from a business perspective, eco-labels are meant to legitimize practices, safeguard firms from public regulation and/or help firms attain competitive advantages (Kollman & Prakash 2001). From the consumers’ perspective eco-labels are anticipated to ease uncertainty about the environmental performance of products and enable consumers to choose less environmentally harmful products (EPA 1998; ISO14024 1999), as well as serve as an informational cue to consumers about a good’s environmental characteristics (Horne 2009).

LITERATURE AND HYPOTHESES
In exploring the factors affecting consumer understanding and perception of eco-labels, a systematic review of the literature was conducted. The review generates ten factors influencing consumer understanding and perception of eco-labels: consumer knowledge, consumer awareness, consumer involvement, consumer trust, design and visibility of labels, credibility of environmental quality, type and level of information, clarity of meaning, persuasiveness, and private benefits (Taufique et al. 2014b). The details of these ten factors and corresponding hypotheses are discussed in the following section.

Consumer Awareness
Research shows that the level of consumer awareness plays a significant role for the success of any eco-labeling scheme (DEFRA 2010; Leire et al. 2004; Winters 1994). A few studies undertaken periodically in Sweden during the late 1990s showed that the recognition of the label exceeded 50 percent each year and was rising. Consumers link the label with reduced environmental impact and generally considered the brand to be trust-worthy (Nilsson et al. 2004). In fact, knowing a label is a must to use it in buying decision (Thøgersen, 2000). Apparently consumers who are aware of eco-labels are said to have better understanding and perception of eco-labels.
**H1:** The level of consumer awareness of eco-labels has positive impact on consumers’ understanding and perception of eco-labels.

**Consumer Knowledge**

The ability to process information is influenced by both knowledge and individual’s ability to retrieve knowledge (Celsi & Olson 1988). It is also argued that people having more knowledge are better able to deploy that knowledge in understanding messages (Gregan-Paxton 2001). This is evidenced in some studies on product labeling such as Drichoutis et al. (2005) and Jasti and Kovacs (2010) that suggest that more knowledgeable the consumers are about nutrition, the more likely they use the label information related to fat, calories, and ingredients.

Knowledge is considered vital for consumers’ understanding of eco-labeling (D’Souza et al. 2006; Leire & Thidell 2005), although, eco-labels may not be considered to be objective information sources by all consumers (Pedersen & Neergaard 2006). Thus it is assumed that the level of consumers’ knowledge on different aspects of eco-labels has impact on their understanding and perception of eco-labels.

**H2:** The level of consumers’ knowledge of eco-labels has positive impact on their understanding and perception of eco-labels.

**Consumer Involvement**

The significance of the influence of consumer involvement on information processing and purchase behaviour can be traced back in the earlier study by Sherif and Hovland (1961) or Sherif et al. (1965). The most classic model regarding consumer involvement in marketing is said to be the one developed by Engel and Blackwell (1982) that categorized consumers into two types on involvement scale: highly involved consumers and lowly involved consumers. Highly involved consumers are meant to be more receptive to stimuli from advertising or other messages whereas lowly involved consumers are said to be not so easily influenced by marketing stimuli (e.g., advertising or other messages). Consumer involvement has also been classified into enduring involvement and situation involvement by some other authors (Celsi & Olson 1988; Richins & Bloch 1991; Zaichkowsky 1985). Enduring involvement is referred to as the relevance
of a product category that a consumer has with (Espejel et al. 2009). Situational involvement, as the name implies, is referred to consumers’ involvement which is context specific and accordingly short-term in nature (Espejel et al. 2009).

Broadly in marketing literature the issue of ‘consumer involvement’ as a variable to influence different aspects of consumer decision making has been examined in various ways. Since the focus of this study is on ‘eco-label’ which is, at least from marketing perspective, a communication tool, the issue of consumer involvement will be centered to its likely influence on consumers’ information processing and responses to marketing stimuli. The influence of the consumers’ ‘involvement’ with the information stimuli on their attention and comprehension of information has been referred to in many studies (Celsi & Olson 1988; Greenwald & Leavitt 1984; Petty & Brinol 2010; Zaichkowsky 1985). Celsi and Olson (1988) used the term ‘felt involvement’ meaning a consumer's overall subjective feeling of personal relevance to the stimulus object. According to these two authors, motivational qualities of felt involvement influence consumers’ cognitive process such as attention and comprehension. Thus, it is rational to assume that consumers’ involvement has impact on their understanding and perception of eco-label information.

**H3:** The level of consumer involvement in searching and processing eco-label information has positive impact on their understanding and perception of eco-labels.

**Consumer Trust**

Consumer trust, especially for organic food market, is a vital issue since consumers are not generally able to prove whether a product is an organic product, not even after consumption (Janssen & Hamm 2011). It is very vital to have consumer trust in the product integrity since the credence attribute “organic” mostly involves a considerable price premium (Jahn et al. 2005; McCluskey 2000). McCluskey (2000) claimed that third-party certified eco-labeling signifies a tool for gaining consumer trust in credence goods markets. However, some other studies reported that third-party certification reduces the paradox of information asymmetry between producer and consumer only if consumers trust the certification scheme (Albersmeier et al. 2010; Golan et al. 2001; Jahn et al. 2005). According to Ozanne (2003: 1941), “along with confusion about the
language used in environmental labeling, consumers do not trust industry to make accurate environmental claims.” It has also been reported that consumer distrust and confusion over manufacturers’ environmental claims resulted in the demand for third-party labeling schemes (Baker & Miner 1993; Eden 1994; Erskine & Collins 1997). A survey conducted in four European countries (Norway, Spain, Germany and Italy) on consumer trust in delivery of eco-labels came up with identical results (Gertz 2005). Janssen and Hamm (2012a) identify consumer trust as one of the crucial factors for the success of third-party certified eco-labeling scheme. It is then assumed that consumer trust in eco-labels has strong influence on consumer perception of eco-labels.

**H4:** Consumer trust in eco-labels has strong positive influence on their perception of eco-labels.

**Design and Visibility**

In an extended study conducted in four different countries, Thøgersen (2002) reports that a large majority of consumers pay attention to eco-labels at least sometimes. However, another two studies conducted by Laric and Sarel (1981) conclude that the misperceptions were caused by consumers relaying on the symbol with a lack of attention to the detailed information. Pedersen and Neergaard (2006) suggest that the symbolic meaning of eco-labels (e.g., logos) can facilitate eco-label understanding. For instance, research identifies that consumers may perceive a product labeled with picture of a dolphin, the sun or pine tree as being an environmentally friendlier product (Polonsky et al. 2002). Hence, the imagery used on eco-labels is likely to influence consumers’ attention to and understanding of the label.

**H5:** The way the eco-label is designed and displayed on the product has positive impact on consumers’ understanding and perception of eco-labels.

**Credibility of Environmental Quality**

Credibility or believability in labeling of a product plays a vital role in consumer assessments and intentions toward the product (Beltramini 1988). Credibility of the source of the eco-labels, as one of exogenous factors, can influence the consumers in using eco-labels to assist their
purchase decision (Cary et al. 2004; Erskine & Collins 1997; Nilsson et al. 2004). Consumers tend to rely upon and find more believable those claims that are more specific or concrete (Ford et al. 1990; Hoch and Ha 1986; Pechmann 1992). Any environmental label needs to be credible and robust (Carbon Trust 2008; DEFRA 2003). This is important not only for consumer confidence in the label, but also to ensure that the production chain is driven in a sustainable direction (DEFRA 2010). Crespi and Marett (2005) suggest that the eco-label information need be related to the environmental attributes of the product signaling the superiority of the product compared to the non-labeled product. One study reports that only 15% of the respondents found the environmental claims to be extremely or very believable (Dagnoli 1991).

The credibility issue of eco-label is assumed to be directly linked with the ultimate response of the consumers in terms of buying decision. It is argued that environmental labels can only contribute to increase in sales and/or improve the image if consumers find them credible (Gallastegui 2002; MAPP 2000). However, the nature of credibility is said to be subjective (Pedersen & Neergaard 2006). It is further argued that even though the third party verified labels are supposed to be more credible (Eden 1994; Enger & Lavik 1995; MacKenzie 1991; Schlegelmilch et al. 1996), it will only have an impact on market demand if the consumers are able to recognize the products subject to third party verification (Pedersen & Neergaard 2006). Unfortunately this is very difficult since third party verified labels are less in use than that of private labels (Thøgersen 2000). Thus credibility is considered to be one of the important aspects of eco-labels for consumers to understand and perceive eco-labels.

**H6: Credibility of eco-label information has strong positive influence on consumers’ perception of eco-labels.**

**Type and Level of Information**
The amount and format of information can affect consumers’ ability to process the information (Celsi & Olson 1988). Consumer scientists have long argued that excessive information can cause information overload for the consumers (Scammon 1977). Roe et al. (1999) argue that additional information can create distraction from more authoritative information sources. On the flip side, adding to the amount of information is likely to improve a person’s ability to correctly
spot eco-friendly products (Teisl 2003; Teisl & Roe 2005). Moreover, additional amount of information can augment the perceived credibility of a label (Teisl 2003).

The study of Teisl et al. (1999) on eco-labels in the US electricity supply market suggests that the type of additional information available on the label also has an impact on potential environmental effects. Some highly recognized certification marks, when combined with misperception of their information content, may influence consumers in taking inappropriate decisions (Laric & Sarel 1981).

According to Maronick and Andrews (1999), whether the information claim is general or specific can have a vital role for the consumers in generalizing the marketing information. This concern is supported by the study of Darley and Smith (1993) who argue that general claims are perceived as being more difficult for consumers to verify than specific claims since the former is open to many likely interpretations. Ness et al. (2010) and Janssen et al. (2009) argue that product information or labeling on the single benefits, such as the rejection of the use of pesticides and artificial additives, could attract new consumers for organic products.

Hoch and Ha (1986) looked at it from a somewhat different outlook where it was reported that when general or ambiguous information is presented to consumers, they usually require further evidence that can have a marked effect on product perceptions. Likewise, in the writing of economics of information literature, Ford et al. (1990) indicated that consumers, often time, perceive general or subjective information as puffery reasoning. Example of such general or subjective information is “environmentally friendly”. According to the study of Shimp & DeLozier (1986), when a product is advertised with such general claim, consumers are not likely to know the true meaning of the phrase until some further supportive information (e.g., “This Product Is Environmentally Friendly Because It Contains No CFCs”) is provided with.

Morris et al. (1995) argue that consumer comprehension of specific environmental claims such as “recycled” and “recyclable” is not an issue to be very much agreed on. Rather, according to them, consumers are likely to be uncertain about the meaning of these terms since different manufacturer use these terms based on differing standards. For example, the claim “made from
recycled materials” might be interpreted differently by different consumers. The product could be assumed to have recycled content ranges from one to 100 percent. This may ultimately lead consumers to be confused or suspicious of various eco-labels. On the other hand, overloaded information becomes a problem. Even consumer who know and trust a relevant environmental label will not use it due to information overload (Jacoby 1984). Therefore it is clear that a substantial number of studies argue that the type, level, and format of information of eco-labels may considerably affect consumers’ understanding and perception of eco-labels.

**H7: The type and level of information presented on eco-labels positively influence consumers’ understanding and perception of eco-labels.**

**Clarity of Meaning**

Consumers perceive product eco-labels as a requirement and demand proper and correct information on labels, but yet they seem to be somewhat confused about the green terminology used on product labels (Caswell & Mojduzka 1996; Muller 1985; Robertson & Marshall 1987). Another reason that can lead consumers to misinterpret the eco-label is the over exaggeration of the terms used in the label (D’Souza et al. 2006).

Two separate studies were conducted to examine consumer comprehension of the term “recycled” focusing on basic understanding. Although both studies (Cude 1993; George Washington University 1991) agree on the consumers’ basic understanding of the term, none of the studies covered the issue of consumers’ perception of the percentage and of the source of the recycled content in the product. Three studies (Cude 1993; Mayer et al. 1992) conclude that many consumers having no detailed understanding of the term “recyclable” may confuse the term “recyclable” with “recycled” and may overestimate the likelihood that products labeled “recyclable” will be recycled. Morris et al. (1995) suggest that consumers might be misled by the overestimation of the amount of environmental benefit of product advertised if they lack in-depth comprehension. As a result, uncertainty remains with respect to how labels influence consumers and how well consumers comprehend the information provided on product labels (D’Souza et al. 2006). D’Souza et al. (2006) also argue that consumers’ comprehension on labeling is determined by three factors: the accurate and clear meaning of these labels; the knowledge of
labels; and the perception of businesses with respect to the environment. Therefore, it can evidently be assumed that the level of clarity of the meaning of eco-labels guides consumers’ understanding and perception of eco-labels.

**H8:** The clarity of meaning of the content of eco-labels positively influences consumers’ understanding and perception of eco-labels.

**Persuasiveness**

Persuasiveness of information presented by the eco-label is found to be significantly influential in consumers’ overall assessments of the eco-label (Bybee 2010). A survey conducted by Chase and Smith (1992) reveals that 70 per cent of the respondents’ purchase decisions were often influenced by environmental messages in advertising and product labeling. An empirical study was conducted by Bjørner et al. (2004) for quantifying the impact of the Nordic Swan eco-label on consumers’ brand choices of paper towels, toilet paper and detergents, using a large consumer panel from Denmark with detailed information on actual purchases from 1997 to 2001. The study reports that the label has had a significant effect on consumers’ choices of brand. However, the opposite result is also evidenced in some other studies. Rex and Beaumann (2007) conclude that although a significant amount of resources have been invested for eco-labels as one of the main green marketing tools, the market share of eco-labeled products is still low. So, it is clear that the effectiveness of eco-labels is, to certain degree, dependent on the degree of persuasiveness of eco-labels and hence it is assumed that persuasiveness also has impact on eco-label perception.

**H9:** The persuasiveness of eco-labels has positive impact on consumers’ perception of eco-labels.

**Private Benefits**

It is obvious that the benefits consumers search for buying green products should be improvement of the environment they live in (Hartmann & Ibanez 2006). However, beyond environmental benefits, eco-labels need to deliver additional value (e.g., private benefits) to the consumer (Grolleau et al. 2015). Delmas (2010) hypothesized that if labels are not associated
with private benefits, consumers might not be willing to pay a price premium for the eco-labeled product, thus providing private benefits attributes will help individuals improve their perception of eco-labels. According to the report of DEFRA (2010), consumers’ information processing when shopping is often triggered by the benefit they perceive from doing so.

**H10**: The additional benefits labeled on the eco-labels (e.g., “taste better”) positively influences consumers’ perception of eco-labels.

**METHOD**

**Measures**

Both past studies and qualitative interviews were used for generating the measurement items. The respondents assessed all items on six-point Likert-type scales ranging from 1 (strongly disagree) to 6 (strongly agree) without a midpoint. As the original measures were in English, all items were translated into Malay language using the parallel-blind translation technique (Behling & Law 2000). Two master students who are fluent in both English and Malay translated the questionnaire simultaneously and independently of each other. Two of the principal researchers of this study along with the two master students then compared and resolved discrepancies between two versions by discussion.

First, the qualitative interviews were conducted with eight postgraduate students and six adult consumers who were familiar with environmental issues and eco-labels. They assessed whether the scales on eco-labeling knowledge were identified. Another stage of in-depth qualitative review was undertaken with three academics who worked in the department of marketing or department of economics, as well as another five postgraduate students. In this stage, respondents were asked to assess items for ambiguity, redundancy, or items that were not clear. The two stages of qualitative examination of the scales followed Hinkin’s (1998) guidelines ensuring that all items were simply written and concise.

**Sample and Data**

Data were collected from three most urbanized states in Malaysia: Kuala Lumpur, Putrajaya, and Selangor (Department of Statistics Malaysia, 2010) and their corresponding cities. In addition,
respondents were also selected from the state of Negeri Sembilan due to its convenient location. A convenience sample of 381 respondents was interviewed. Participants were invited to answer the survey at public places, such as shopping malls, super markets, waiting areas in train stations, or university campuses. Professional data collectors, accompanied by the researchers, collected the data. Among the respondents 60% were female, 59% had a bachelor degree or above and 19% had diploma, and 85% of participants were between 18 and 44 years. Respondents were screened by asking them whether or not they were familiar with eco-labels and only those who indicated that they had heard of eco-labels were included in the survey. Note, however, that respondents’ objective knowledge of eco-labels was not assessed.

RESULTS AND DISCUSSION
Scale Reliability and Validity of the Independent Variables

The study performed a series of confirmatory factor analyses (CFA) using the robust maximum-likelihood estimation method in AMOS (20.0) software to assess the reliability, dimensionality, and validity of the multi-item scales. The final CFA model results in 32 items for ten constructs. Total four items (CT_3_r = 0.13, DV_2 = 0.57, TLI_1_r = 0.50, TLI_2_r = 0.61) were dropped at this stage due to poor factor loadings. However, one item of ‘consumer knowledge’ (CK_4) with factor loading of 0.61 is not dropped due to its strong theoretical relevance to the construct (i.e., content validity). All factor loadings are above 6.0 and are statistically significant (p<0.001). All model fit indices ($\chi^2/df = 2.36$, CFI = 0.93, TLI = 0.91, RMSEA = 0.06, and SRMR = 0.06) are within the acceptable range (Jöreskog & Sörbom, 1993; Schermelleh-Engel et al. 2003; Browne & Cudeck 1993; Hu & Bentler 1999) (see Table 1). In addition, the average variance extracted (AVE) and composite reliability (CR) values are greater than 0.5 and 0.7 respectively (Bagozzi & Yi, 1988), which confirm the internal validity of the measurement model (see Table 2). Finally, the Fornell-Larcker criterion (Fornell-Larcker, 1981) confirms the discriminant validity for all the constructs (Table 3).

In addition, error covariances of two items of ‘consumer behaviour’ (e10 and e11) were incorporated in the model with indicated result in a parameter estimated value of approximately 0.24. One of the reasons for this covariance is likely to be the content overlap in the two related items. Specifically CI_3 asks for the degree to which consumers give full effort to read the eco-
label, whereas CI_4 asks for the degree to which consumers are fully involved with eco-labels. Clearly, there appears to be a content overlap, to certain extent, between these two items. Hence, incorporation of error covariance related to these two items is justified (Jöreskog 1993).

**Scale Reliability and Validity of the Dependent Variable**

The study performed CFAs for dependent variable following the same procedure applied for independent variable. With initial 10 items, the CFA results in removal of two items with poor factor loadings, leaving total 8 items for further structural analysis. All factor loadings are above 0.70 (see Table 4) and all fit indices are within the acceptable range ($\chi^2$/DF = 3.45, CFI = 0.98, GFI = 0.96, RMSEA = 0.08, SRMR = 0.03). The CFA for dependent variable also captures the error covariances between ECP_2 and ECP_4 (e2 and e4) with an estimated parameter value of approximately 0.16. Specifically, ECP_2 asks for respondents’ degree of agreement/disagreement regarding eco-labels as a valuable source of information about environment-friendly products whereas ECP_4 asks for the degree to which respondents learn about environment related product information from eco-labels.

**Hypothesis Testing**

The next step was to examine the hypothesized relationships in the proposed model. Table 5 presents the results. The structural model results a $\chi^2$/df = 2.20, CFI = 0.92, TLI = 0.91, RMSEA = 0.056, and SRMR = 0.06. The overall squared multiple correlations value ($R^2$ value) is 0.50, indicating an acceptable model fit (Hair et al. 2011; Henseler et al. 2009).

Hypothesis 1 predicted that higher level of awareness of eco-labels has positive impact on consumer understanding and perception of eco-labels. The test of hypothesis resulted in a significant positive association between consumer awareness of eco-labels and their perception of eco-labels ($\beta = 0.14, p < 0.05$). The result implies that consumers who are more aware of eco-labels have better understanding and positive perception of eco-labels. The result is consistent with previous studies that argue that being informed about the label is requisite for consumers to use the eco-label (Leire et al. 2004; Thøgersen, 2000). Hypothesis 2 projected that knowledge of eco-labels positively influences consumer understanding and perception of eco-labels. As expected, a significant positive relationship was established ($\beta = 0.13, p < 0.05$), indicating that
consumers’ knowledge of eco-labels has positive impact on their overall understanding and perception of eco-labels. The result is also consistent with the findings of previous studies of eco-labels (e.g., D’Souza et al. 2006; Leire & Thidell 2005). Hypothesis 3 proposed that the level of consumer involvement in searching and processing eco-label information has positive impact on their understanding and perception of eco-labels. A significant negative relationship was confirmed ($\beta = -0.18, p < 0.05$), and thus, $H3$ was not supported. The likely implication is that highly involved consumers are claimed to pay full attention to read messages (e.g., ad message, message labeled on product) and deeply think about those messages (Engel & Blackwell 1982), leading them to be skeptical which might obstruct their general perception of eco-labels. Hypothesis 4 assumed that the level of consumers’ trust in eco-labels positively influences their perception of eco-labels. A non-significant positive relationship was established in testing $H4$ ($\beta = -0.09, p > 0.05$). It can be inferred that, although statistically not significant, consumers’ trust in eco-labels has certain degree of positive impact on their perception of eco-labels as the past studies recognize the importance of consumer trust in organic and eco-labeled products (e.g., Janssen & Hamm 2011; Janssen & Hamm 2012a). Hypothesis 5 propositioned that the design and the way the eco-labels are displayed on the products have positive influence on consumer perception of eco-labels. As expected, $H5$ ended up with positive relationship, but the result was not statistically significant ($\beta = -0.12, p > 0.05$). Yet the influence of design and visibility of eco-labels on consumer perception should not be deemed to be immaterial since it accounts for about 12% of the variance in predicting eco-label perception and previous studies also claim that the design of eco-logo has impact on consumers’ comprehension of the label (Pedersen & Neergaard 2006; Polonsky et al. 2002). Hypothesis 6 predicted that the credibility of information provided in eco-labels has strong positive effect on consumer perception of eco-labels. A significant positive relationship was established ($\beta = 0.10, p < 0.05$) and thus, $H6$ was supported. The essence is that consumer perception of eco-labels, to a certain degree, depends on the trustworthiness of the source of information provided in eco-labels (Cary et al. 2004; Erskine & Collins 1997; Nilsson et al. 2004). Hypothesis 7 assumed that type and level of information positively affect consumer perception of eco-labels. A non-significant negative relationship was confirmed ($\beta = 0.04, p > 0.50$). As such, $H7$ was not supported, implying that nature and amount of eco-label information do not affect consumer perception of eco-labels. This result is partially consistent with the findings of Roe et al. (1999) and Scammon (1977) who argue that sometimes
excessive information can create information overload and distraction for consumers. Hypothesis 8 propositioned that the clarity of meaning of the content of eco-labels has positive impact on consumer perception of eco-labels. A significant positive relationship was confirmed ($\beta = 0.19, p < 0.05$), leading to the support of $H8$. The result suggests that a clear meaning of information content of eco-labels leads to a positive consumer perception of eco-labels. Many past studies, for example, reveal that consumers find the meaning of the terms “recycle” and “recyclable” confusing (CFE 1991; Cude 1993; Mayer et al. 1992), and hence the clarity of meaning is essential for consumers to clearly understand the terms used in eco-labels. Hypothesis 9 predicted a positive association between persuasiveness and perception of eco-labels. As expected, $H9$ was supported with a significant positive relationship ($\beta = 0.22, p < 0.05$). The result implicates that for eco-labels to be perceived positively by consumers, the labels need to persuade consumers to change purchasing and/or consumption behaviour for environmental protection (Bybee 2010). Hypothesis 10 proposed that offering additional benefits mentioned on eco-labeled products has positive impact on consumer perception of eco-labels. A significant positive relationship was confirmed ($\beta = 0.21, p < 0.05$). Accordingly, $H10$ was supported, indicating that additional product benefits (e.g., “taste better”, “healthier”) of eco-labeled products for the consumers can positively influence consumer perception of eco-labels. This result is clearly consistent with recent studies (Delmas 2010; Grolleau et al. 2015) that suggest that beyond environmental benefits, the eco-label needs to promise some additional values (e.g., private benefits) for the consumers.

**CONCLUSIONS AND IMPLICATIONS**

The study reveals that consumer awareness of eco-labels has significant effect on consumer perception of eco-labels. This dimension of eco-label perception also reveals that consumers who are aware of eco-labels do not mostly look for the environmental logo or label at the time of buying any product. This is a serious concern for marketers and policy makers, since eco-label is an information tool that aims at assisting consumers in making informed purchase decision. One of the possible reasons might be that consumers do not find any promising benefits in eco-labeled products. This finding also supports the result of hypothesis 2(j) where it is revealed that consumers want to see some additional benefits in eco-labeled products. Clearly, this suggests...
that marketers should provide some message of additional product benefits along with environmental information on the package of eco-labeled products. The study concludes that consumer knowledge and perception of eco-labels are positively correlated. Specifically, most consumers know the meaning of the terms used in eco-labels such as “recycled”, “eco-friendly”, “organic”, and “energy-efficient”. However, the study reveals that majority of the consumers do not know the meaning of some technical terms such as “biodegradable” or “CO₂”. Hence, the implication is that eco-labels should not contain any technical words which are difficult for general consumers to understand. Rather the label should use familiar terms and words that are easy for the consumers to understand. The study also finds a positive relationship between ‘design and visibility of eco-labels’ and consumer perception of eco-labels, though the relationship is not statistically significant. The ‘design and visibility’ dimension measures the way eco-labels are designed and displayed. Consumers report that the label should be attention getting and many consumers claim that they only give attention to good-looking labels. The implication is that before launching any eco-labeling scheme, a market test research should be conducted to get the feedback of the consumers.

Another finding of the study is a positive correlation between ‘credibility of environmental quality’ and consumer perception of eco-labels. The ‘credibility’ dimension measures the degree to which consumers perceive the credibility of environmental quality of the certified eco-labels. The positive impact of this dimension on consumer perception implies that credibility of the environmental quality promised by the labels plays important role on how consumers perceive the eco-labels. The implication is that the source of the eco-labels should be authentic; preferably the labels should be verified and certified by independent third party. The source should also be communicated to the consumers so that they can make properly informed purchase decision. The study confirms a significant positive relationship between ‘clarity of meaning’ and eco-label perception. The ‘clarity of meaning’ dimension measures the importance of the ease of understanding of the message provided in eco-labels. Clearly, it is established from this hypothesis that whatever information the labels provide, they must be clear to understand. The implication is that, the text and the logo used in eco-labels should give clear message to the consumers.
The strongest predictor of eco-label perception is the ‘persuasiveness’ dimension. This dimension examines how strong the eco-labels are in convincing the consumers to change their purchasing behaviour. The study finds a strong effect of persuasiveness on consumer perception of eco-labels. The implication is that, marketers and other concerned agencies should follow up the role of eco-labels in convincing consumers to change their purchasing and consumption habit concerning the environmental consequences. Finally, the study finds a strong positive impact of ‘private benefits’ on consumer perception of eco-labels. This dimension measures the degree to which consumers prefer to have other personal benefits from eco-labeled products. In fact, consumers are said to be very rational in their purchase decision. In line with this notion, the study reveals that additional product benefits (e.g., “taste better”, “healthier”) of eco-labeled products for the consumers can positively influence consumer perception of eco-labels.

Overall from marketing perspective, labeling is one strategy to increase information at the point of purchase. Eco-labeling attempts to provide consumers with products’ environment related information in order to assist consumers in making informed purchase decision. Thus, any eco-labeling scheme would not be successful unless consumers notice, read, understand, believe, and use the eco-label information.

Acknowledgement
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References


Saunders, J. 2010. Are there too many eco-labels and green ratings? 


Teisl, M. F. 2003. What we may have is a failure to communicate: Labeling environmentally certified forest products. Forest Science 49(5): 668–680.


**Appendix**

Table 1 Scale Items with Standardized Factor Loadings for Consumer Understanding of Eco-Labels Scale

<table>
<thead>
<tr>
<th>Constructs and Scale Items</th>
<th>Standardized Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consumer awareness</strong></td>
<td></td>
</tr>
<tr>
<td>1 Have you ever heard about the term ‘eco-label’?</td>
<td>0.836</td>
</tr>
<tr>
<td>2 Do you search for any logo or label on the product certifying environmental concern when buying any product?</td>
<td>0.720</td>
</tr>
<tr>
<td>3 Would you consider yourself informed about eco-label?</td>
<td>0.872</td>
</tr>
<tr>
<td><strong>Consumer knowledge</strong></td>
<td></td>
</tr>
<tr>
<td>1 I know the meaning of the term “recycled.”</td>
<td>0.784</td>
</tr>
<tr>
<td>2 I know the meaning of the term “eco-friendly.”</td>
<td>0.611</td>
</tr>
<tr>
<td>3 I know the meaning of the term “organic.”</td>
<td>0.860</td>
</tr>
<tr>
<td>4 I know the meaning of the term “energy-efficient.”</td>
<td>0.647</td>
</tr>
<tr>
<td><strong>Consumer involvement</strong></td>
<td></td>
</tr>
<tr>
<td>1 I pay full attention to the message I read on the label.</td>
<td>0.885</td>
</tr>
<tr>
<td>2 I deeply think about the information contained in eco-labels.</td>
<td>0.905</td>
</tr>
<tr>
<td>3 I give full effort to read the label.</td>
<td>0.648</td>
</tr>
<tr>
<td>4 I feel that I am fully involved with eco-labels.</td>
<td>0.730</td>
</tr>
<tr>
<td><strong>Consumer trust</strong></td>
<td></td>
</tr>
<tr>
<td>1 The labels are genuinely committed to environmental protection.</td>
<td>0.917</td>
</tr>
<tr>
<td>2 Most of what labels say about its products is true.</td>
<td>0.860</td>
</tr>
<tr>
<td>3 If the label makes a claim or promise about its product, it’s probably true.</td>
<td>0.672</td>
</tr>
<tr>
<td><strong>Design &amp; visibility</strong></td>
<td></td>
</tr>
<tr>
<td>1 Eco-labels must be attention-getting.</td>
<td>0.769</td>
</tr>
<tr>
<td>2 The way eco-labels display must be attractive.</td>
<td>0.779</td>
</tr>
<tr>
<td>3 I give attention to only god-looking eco-labels.</td>
<td>0.644</td>
</tr>
<tr>
<td><strong>Credibility of environmental quality</strong></td>
<td></td>
</tr>
<tr>
<td>1 Certified eco-labeled products comply with trustworthy environmental quality norms.</td>
<td>0.833</td>
</tr>
<tr>
<td>2 The eco-labels displayed in the product are a good way of informing consumer about environmental safety.</td>
<td>0.909</td>
</tr>
<tr>
<td>3 The presence of certified eco-labels increases the credibility of a product.</td>
<td>0.815</td>
</tr>
<tr>
<td>4 Eco-label is a reliable source of information about the environmental quality and performance of the product.</td>
<td>0.853</td>
</tr>
<tr>
<td><strong>Type &amp; level of information</strong></td>
<td></td>
</tr>
<tr>
<td>1 Eco-labels should provide detailed information about environmental aspect of the product and consumption.</td>
<td>0.851</td>
</tr>
<tr>
<td>2 Eco-labels should indicate environmental aspect in ordinary words.</td>
<td>0.885</td>
</tr>
<tr>
<td><strong>Clarity of meaning</strong></td>
<td></td>
</tr>
<tr>
<td>1 I clearly understand all eco-labels.</td>
<td>0.779</td>
</tr>
</tbody>
</table>
Table 2 Reliability and Validity Measures for Consumer Understanding of Eco-Label Scale

<table>
<thead>
<tr>
<th>Construct</th>
<th>Composite Reliability</th>
<th>AVE</th>
<th>Discriminant Validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer awareness</td>
<td>0.852</td>
<td>0.659</td>
<td>Yes</td>
</tr>
<tr>
<td>Consumer knowledge</td>
<td>0.820</td>
<td>0.537</td>
<td>Yes</td>
</tr>
<tr>
<td>Consumer involvement</td>
<td>0.874</td>
<td>0.639</td>
<td>Yes</td>
</tr>
<tr>
<td>Consumer trust</td>
<td>0.861</td>
<td>0.677</td>
<td>Yes</td>
</tr>
<tr>
<td>Design &amp; visibility</td>
<td>0.776</td>
<td>0.538</td>
<td>Yes</td>
</tr>
<tr>
<td>Credibility of environmental quality</td>
<td>0.914</td>
<td>0.728</td>
<td>Yes</td>
</tr>
<tr>
<td>Type &amp; level of information</td>
<td>0.860</td>
<td>0.754</td>
<td>Yes</td>
</tr>
<tr>
<td>Clarity of meaning</td>
<td>0.790</td>
<td>0.653</td>
<td>Yes</td>
</tr>
<tr>
<td>Persuasiveness</td>
<td>0.905</td>
<td>0.706</td>
<td>Yes</td>
</tr>
<tr>
<td>Private benefits</td>
<td>0.812</td>
<td>0.591</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Table 3 Fornell-Larcker Criterion for Confirming Discriminant Validity (Consumer Understanding of Eco-Labels)

<table>
<thead>
<tr>
<th>Construct</th>
<th>Consumer awareness</th>
<th>Consumer knowledge</th>
<th>Consumer involvement</th>
<th>Consumer trust</th>
<th>Design &amp; visibility</th>
<th>Credibility of environmental quality</th>
<th>Type &amp; level of information</th>
<th>Clarity of meaning</th>
<th>Persuasiveness</th>
<th>Private benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer awareness</td>
<td>0.812</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumer knowledge</td>
<td>0.365</td>
<td>0.732</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumer involvement</td>
<td>0.569</td>
<td>0.258</td>
<td>0.799</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumer trust</td>
<td>0.291</td>
<td>0.309</td>
<td>0.648</td>
<td>0.823</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design &amp; visibility</td>
<td>0.294</td>
<td>0.456</td>
<td>0.434</td>
<td>0.559</td>
<td>0.733</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credibility of environmental quality</td>
<td>0.123</td>
<td>0.150</td>
<td>0.110</td>
<td>0.085</td>
<td>0.220</td>
<td>0.853</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type &amp; level of information</td>
<td>0.431</td>
<td>0.436</td>
<td>0.358</td>
<td>0.335</td>
<td>0.557</td>
<td>0.080</td>
<td>0.868</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clarity of meaning</td>
<td>0.412</td>
<td>0.339</td>
<td>0.632</td>
<td>0.677</td>
<td>0.588</td>
<td>0.123</td>
<td>0.269</td>
<td>0.808</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persuasiveness</td>
<td>0.368</td>
<td>0.337</td>
<td>0.656</td>
<td>0.642</td>
<td>0.592</td>
<td>0.091</td>
<td>0.458</td>
<td>0.662</td>
<td>0.840</td>
<td></td>
</tr>
<tr>
<td>Private benefits</td>
<td>0.316</td>
<td>0.403</td>
<td>0.557</td>
<td>0.558</td>
<td>0.683</td>
<td>0.194</td>
<td>0.583</td>
<td>0.550</td>
<td>0.646</td>
<td>0.768</td>
</tr>
</tbody>
</table>
Table 4 Scale Items with Standardized Factor Loadings for Consumer Perception of Eco-labels

<table>
<thead>
<tr>
<th>Scale Items</th>
<th>Standardized Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Eco-label is a valuable source of information about environment-friendly products.</td>
<td>0.758</td>
</tr>
<tr>
<td>2 Eco-labels persuade people to buy green products.</td>
<td>0.712</td>
</tr>
<tr>
<td>3 From eco-labels I learn about environment and about what to buy to protect environment.</td>
<td>0.753</td>
</tr>
<tr>
<td>4 Eco-labels help raise our environmental awareness.</td>
<td>0.847</td>
</tr>
<tr>
<td>5 Eco-labels result in better product for better environment.</td>
<td>0.860</td>
</tr>
<tr>
<td>6 Eco-labels tell me which brands have the eco-friendly features I am looking for.</td>
<td>0.724</td>
</tr>
<tr>
<td>7 In general, eco-labels present a true picture of the environmental quality of the product.</td>
<td>0.764</td>
</tr>
<tr>
<td>8 Overall, I consider eco-label is good thing.</td>
<td>0.752</td>
</tr>
</tbody>
</table>

Table 5 Summary of Hypotheses Tests for Consumer Understanding and Perception of Eco-labels

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Standardized structural path coefficient</th>
<th>p-value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 The level of consumer awareness of eco-labels has positive impact on consumers’ understanding and perception of eco-labels.</td>
<td>.139</td>
<td>.041*</td>
<td>Supported</td>
</tr>
<tr>
<td>H2 The level of consumers’ knowledge of eco-labels has positive impact on their understanding and perception of eco-labels.</td>
<td>.127</td>
<td>.024*</td>
<td>Supported</td>
</tr>
<tr>
<td>H3 The level of consumer involvement in searching and processing eco-label information has positive impact on their understanding and perception of eco-labels.</td>
<td>-.180</td>
<td>.036</td>
<td>Not supported</td>
</tr>
<tr>
<td>H4 Consumers’ trust in eco-labels has strong positive influence on their perception of eco-labels.</td>
<td>.092</td>
<td>.226</td>
<td>Not supported</td>
</tr>
<tr>
<td>H5 The way the eco-label is designed and displayed on the product has positive</td>
<td>.116</td>
<td>.197</td>
<td>Not supported</td>
</tr>
</tbody>
</table>
impact on consumers’ understanding and perception of eco-labels.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H6</strong></td>
<td>Credibility of eco-label information and its source has strong positive influence on consumers’ perception of eco-labels.</td>
<td>.097</td>
<td>.032*</td>
</tr>
<tr>
<td><strong>H7</strong></td>
<td>The type and level of information presented on eco-labels positively influence consumers’ understanding and perception of eco-labels.</td>
<td>-.043</td>
<td>.561</td>
</tr>
<tr>
<td><strong>H8</strong></td>
<td>The clarity of meaning of the content of eco-labels positively influences consumers’ understanding and perception of eco-labels.</td>
<td>.185</td>
<td>.045*</td>
</tr>
<tr>
<td><strong>H9</strong></td>
<td>The persuasiveness of eco-labels has positive impact on consumers’ perception of eco-labels.</td>
<td>.219</td>
<td>.004*</td>
</tr>
<tr>
<td><strong>H10</strong></td>
<td>The additional benefits labeled on the eco-labels (e.g., “taste better”) positively influence consumer perception of eco-labels.</td>
<td>.210</td>
<td>.019*</td>
</tr>
</tbody>
</table>

*Significant at $p < 0.05$