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Article

Synthesis of Constructs for Modeling Consumers' Understanding and Perception of Eco-Labels

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Abstract: 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.

Keywords: eco-label; sustainable business; environment-friendly product; consumer perception; parameters

1. Introduction

The rapid economic growth in the past years have witnessed increasing consumers' consumption worldwide causing environmental deterioration through over-consumption and utilization of natural resources [1]. It is anticipated that if the current trend of economic growth and an irresponsible consumption pattern continues, environmental degradation would worsen with the consequences of global warming, depletion of stratospheric ozone layer, pollution of seas and rivers, noise and light pollutions, acid rain and desertification [2]. Therefore, on a global level, there is an increased awareness and concern of global warming and adverse climatic conditions. As a result, there is a spur in interest toward environmental protection and sustainable development. A general deterioration in the physical environment is driving individuals and organizations to implement changes for improving the current state of the environment. A shift towards more sustainable consumption patterns is required and it is important to increase people's environmental awareness and consciousness. People, as consumers, can reduce their impact on environment and make a positive difference through their purchasing decisions. The belief is that the consumer's pro-environmental concern is one of the determinants of their "green buying" behavior *i.e.*, buying and consuming products that are environmentally beneficial [3]. Indeed, consumers can reduce their impact on environment and make a difference through their purchasing decisions. The rising number of consumers who prefer and are willing to buy eco-friendly products are creating opportunity for businesses that are using terms like "eco-friendly" or "environmentally friendly" as components of their offers. Hence, a better understanding of consumer preferences in this instance should allow businesses to acquire more market-applicable approaches to survive and sustain in the competitive market.

One of the important ways to educate the consumers about environmentally friendly products is to use eco-label. During the last 30 years, a growing number of environmental labels have been developed by individual companies, industrial sectors and non-government organizations (NGOs), national and international governmental organizations [4,5]. The increasing popularity of these labels must be seen 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 [5–7]. In other words, there are many good reasons why companies should adopt environmental labeling schemes and why consumers should compensate such effort by purchasing environmental performance labeled products and services.

1.1. Historical Background

The concern for ecology involving consumption is not new. The idea can be traced back to the late 1960s [8] when the increasing and dangerous pressure of production systems on the environment was recognized. Several attempts have been made to move towards more sustainable and environmentally friendly approaches. A flash of interest in eco-labels also surfaced in the 1980s and early 1990s when there was a shift from government controlled measures to a more market regulated new environmental policy that includes eco-labeling [9]. Heightened interest in environmental issues over the past couple of years has led to environmental labeling in an effort to allow consumers to differentiate between more or less environment friendly products and sustainable consumption. Such actions assume that if consumers are presented with appropriate label information, their purchases will change and more sustainable purchasing will result [10]. Eco-labels are one type of "new" environmental policy instruments with the emphasis on the role of information about environmental impacts associated with producing, distributing, consuming and/or disposing of a product. As informational devices, eco-labels are "non-binding voluntary policy tools" [11]. Eco-labels are meant to influence consumer behavior toward buying a sound eco-labeled product.

1.2. Narratives of Green Consumer Behavior

Consumers may exhibit green consumption behavior in several appearances: shoppers, retailers, business-to-business customers, shareholders, and employees, among them [12]. Whatever hat green consumers wear, they are all fundamentally supposed to be concerned about the environment in their buying and consumption behavior. However, any consensus in defining green consumer behavior is somewhat atypical.

Quite a few literatures [13–17] acknowledged that the quest for an agreed upon conception of green consumer is still around. Some definitions in scientific literature may provide with some notion of green consumer. Laurinėnaitė [17] refers to new consumers as the green consumer. The notion can be interpreted from two perspectives. First in a straight way, a new consumer is not necessarily a green consumer. On the other hand, new consumers are generally more concerned about the environment than traditional consumers, and thus it is more likely to find green consumers among new consumers [15]. Green consumers endorse green marketing and advocate eco-friendly lifestyle. Wind [15] and Ščypa [16] argued that green consumers are those who buy eco-friendly products not because of being fashionable, but because of caring about environmental issues. This definition of green consumers is also supported by Banytė, Brazionienė and Gadeikienė [18].

Green consumer behavior and factors affecting such behavior are not identical across the world; rather they are by and large region or country specific. A majority of surveys in Europe and North America reveal that consumers are becoming environmentally conscious [19–21]; however, it is much less certain the importance of environmental attributes of products [22]. Tang, Fryxell and Chow [22] further argued that it is likely that cultural and economic considerations will lead to variance on this issue by region. For instance, British consumers agreed to pay higher price for eco-friendly products [23,24]. Consumers in Canada are also willing to do the same provided that the quality is maintained [25]. A survey on US consumers showed that 25 percent of the respondents stopped buying

products from at least one company which is not found to be environmentally responsible [20]. However, in most Asian countries except the developed ones (e.g., Japan, Singapore), the environmental issue is recent but emerging at the same time.

On the ground, there is a gap between consumers' reported intention and actual purchase of green products. Reasons for such a gap are cited in many studies [26,27]. Some of the justifications that have been suggested include excessive price premiums for eco-friendly products, reluctance to change purchasing habits, little societal pressure to conform and inability to identify the actual environmental attributes [22]. Considering this reality, Laroche, Bergeron and Barbaro-Forleo [28] emphasized on the importance of having an enhanced knowledge of the profile of green consumers.

1.3. Purpose and Need of the Study

With already available scores of eco-labels in different countries today, the new eco-labeling schemes are being added every year by different organizations, from non-profit to retailers [29]. 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 minds of the consumers?

Accordingly, the effectiveness of the increasing number of eco-labels needs to be investigated on various dimensions including consumers' understanding and perception of such labels. 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.

2. Materials and Methods

In selecting research studies for inclusion in this synthesis, a systematic review of the relevant literature was conducted according to some steps in order. The review process was started in February 2013 with updates occurring till late 2013 in line with suggestions by [30–32]. For identifying the relevant articles, first a general keyword search was conducted in Google and in databases such as EBSCO, Emarald, ScienceDirect, and SCOPUS. Keywords included "consumer perception of ecolabels", "consumer understanding of ecolabels", "factors affecting consumers' understanding of ecolabels", "factors affecting consumers' perception of ecolabels", "determinants of consumer understanding and perception of ecolabels", "ecolabels and consumer purchase decision", "ecolabeling and green products", "ecolabeling and green consumer behavior", "success of ecolabeling scheme", "impact of ecolabels on consumer", "ecolabeling as a promotional tool", and "ecolabeling as an environmental tool". Finally, as suggested by Randolph [33], the references of the retrieved articles were repeatedly searched until a point of saturation was reached. After that, the inclusion of the articles was narrowed down to match the focus of this paper following the review guidelines of Hart [34].

From the sources named above, a total of 88 peer-reviewed journal articles were revealed of which 51 were found directly relevant. The publication period for the selected article ranges from 1981–2013. Out of total 51 papers, 49 were published after 1990 whereas only two papers were published before 1990. This is perhaps due to the fact that the 1990s have been identified as the "decade of the environment" [35] or as "the Earth decade" [36]. During this decade, social and environmental concerns assumed great importance for consumer purchasing decisions [37]. The research designs for

the selected papers included survey research, experimental research, qualitative literature review, meta-analysis, analysis of scanner data, questionnaire survey with copy test, focus group discussion and desk study. In addition to peer-reviewed journals, 17 government and other project reports, 3 conference proceedings, 2 academic thesis, 1 working paper, 1 newspaper article, 1 book review and materials from the official website of Global Ecolabelling Network (GEN) relevant to the topic were reviewed and incorporated in the synthesis.

3. Eco-Label: Meaning

An eco-label is a "visual communication tool indicating environmentally preferable products, services or companies that are based on standards or criteria" [38]. Primarily it has to do with providing customers with certified environmental information about the products to differentiate them from conventional products and to promote environmental friendly consumption. It can be considered as an effective vehicle to promote green consumer behavior since it assists consumers in directly addressing environmental externalities and in making informed purchases. Although the definition of eco-label may vary from type to type, the concepts of eco-labeling and eco-label need to be clarified. 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 [39]. 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 [39]. According to Global Eco-Labeling Network [40], "Eco-labeling" is a voluntary method of environmental performance certification and labeling that is practiced around the world. An "eco-label" is a label which identifies overall, proven environmental preference of a product or service within a specific product/service category. GEN also declares that "in contrast to 'green' symbols, or claim statements developed by manufacturers and service providers, the most credible labels are based on life cycle assessment (LCA); they are awarded by an impartial third-party in relation to certain products or services that are independently determined to meet transparent environmental leadership criteria".

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.

There are also some other definitions of eco-label: An eco-label is a legally protected image that certifies that the product or service displaying that image complies with certain pre-defined environmental (and sometimes human health and social) criteria [41]. Eco-labels enable those products with the least environmental impact to be distinguished from other similar products [41]. However, eco-label regulations, as a form of information-based government intervention, work best "when the label's meaning is well understood by consumers and reflects their preferences" [42].

4. Eco-Label: Types and Scope

The International Standards Organization (ISO), as part of its ISO 14000 series of environmental standards, has classified environmental labels into three typologies—Type I, II and III and has also specified the preferential principles and procedures for each. However, there are other types of label

that are hybrids of these and those that do not fall easily into the ISO classification system [41]. For these types of labels, no ISO guidelines exist.

Below (Table 1) is an outline of the ISO-defined labels and what is being claimed in each type of label.

Table 1. ISO-defined types of green product certification labels.

Type	ISO Number	What the label does
Type I	ISO 14024	Seal of approval for multi-attribute requirements.
Tpe II	ISO 14021	Verifiable single-attribute environmental claims for issues such energy consumption, emissions, or recycled content. Can be first-party, self-declared manufacturer claims. However, many manufacturers are beginning to seek third-party verification of those claims in response to industry demand.
Type III	ISO > 14025	Comprehensive environmental product disclosure and detailed product information. Similar to an Environmental Product Declaration (EPD).

Chart source: WBDG [43].

4.1. Type I

Type I labels are normally voluntary, multi-criteria based, third party verified schemes that award a license to use the scheme label/logo for specific products or services that meet prescribed standards based on a life cycle assessment (LCA) approach including, for example, energy and water consumption, emissions, disposal, *etc.* The standards and scheme criteria are usually developed through the involvement of stakeholders and awarded after an independent process of verification. Examples include the *Nordic Swan* and *Blue Angel* labels in Europe.

4.2. Type II

This type of label is the most widely used to provide environmental information to consumers and other stakeholders. According to the official ISO definition, they are not awarded or verified by an independent authority but usually developed internally by companies and tend to take the form of a declaration, a logo, a commercial, *etc.* For example: "made from x% recycled materials", "biodegradable", "recyclable" or "free from chlorine".

There have been many concerns about this type of label as some investigations have shown that claims can be vague, misleading and sometimes untrue [41]. Some industries have developed voluntary codes of practice regarding this type of labeling [41]. Whilst label information of this type may not be malicious and may be well intentioned, in the absence of independent checks for compliance there is no way the consumer can identify if the manufacturer has abided by such codes. This is known as "greenwashing" and can lead to consumers mistrusting labels in general [41].

4.3. Type III

Type III labels, often referred to as environmental product declarations (EPDs), provide comprehensive product information based on quantitative life cycle assessment. These types of labels are product specific and do not normally assess or weight the environmental performance of the products they describe, but only the raw data, such as the quantity of emissions, is provided. Their

evaluation is left to the consumer. Many of the carbon labels fall into this category whereby the amount of CO_2 emitted is provided on the label. The definition of Type III should be considered as a "draft working definition" since an ISO standard for this type is still in process.

The approach used in Type III labels involves the development of Product Category Rules (PCR), which are developed for each functional unit in a supply chain based on a life cycle approach. PCRs are owned by the labeling scheme. One example of Type III label is the SCS (Scientific Certification Systems), which is awarded to a wide range of products from textiles to flooring to furniture by SCS Global Services, a third-party environmental certification, auditing, testing, and standards development firm.

5. Findings and Discussion

5.1. Synthesis of the Constructs for Assessing Consumers' Understanding & Perception of Eco-Labels

The following table (Table 2) summarizes the major constructs for evaluating consumers' comprehension of eco-labels followed by the detailed discussion. The constructs have been extracted from the relevant literature according to the guidelines of Hart [34].

The grouping of the constructs was initially based on the corresponding literature referred to thereof. The grouping has been finalized based on the measurement items to be used for testing each of the constructs borrowed from Bruner [44] and Bruner [45]. The Marketing Scale Handbooks of these authors have grouped various constructs for consumer behavior and advertising research. Originally, all those multi-item psychometric scales and their corresponding constructs were used in articles published in top marketing journals between 1980 and 2005 [44,45].

Table 2. Constructs for assessing consumer understanding and perception of eco-labels.

Construct	Reference	Key Argument
Consumer awareness	[46–48,51]	Consumer awareness is one of the key factors for an eco-label to be effective. Knowing a label is a prerequisite for using it in decision making.
Consumer knowledge	[55–60,107]	The degree of knowledge about the stimulus object influences the processing and use of message about the stimuli, e.g., product label. Consumer knowledge about the verification process of the eco-labels directly influences consumers' assessment of the label. Lack of sufficient knowledge about the functional aspects of the eco-labels may lead consumers to be misguided by some opportunistic companies. Adequate knowledge about production information (e.g., logo) can have positive impacts on consumers' food choice.
Consumer involvement	[55,62,65–79]	Consumer involvement has impact on their ability and extent to process information (e.g., advertising message). The degree of involvement may vary from consumer to consumer. Consumer buying decisions are influenced by their degree of involvement.
Consumer trust	[86–90,97,98]	Consumer trust, as only proof of the product, is vital for organic food market. Consumer trust in the third-party certified labeling scheme can reduce the information asymmetry between producer and consumer. Consumer distrust may make it hard for them to understand the meaning/content of the eco-labels.

Table 2. *Cont.*

Construct	Reference	Key Argument
Design and visibility	[86–90,97]	The green labels (e.g., organic label) must be noticed and understood by consumers before they endeavor to seek them out. Consumer misperception of product labels is caused by consumers relaying on the symbol with a lack of attention to the detailed information.
Credibility of the source	[50,59,94,101, 105,107]	Credibility or believability in labeling of a product plays a vital role in consumer assessments and intentions toward the product. Credibility of the source of the eco-labels, as one of exogenous factors, can influence the consumers in assisting their purchase decision. The nature of credibility is subjective.
Type and level of information	[95,112–115, 117–124,126]	The reasons why consumers rarely search out, read or properly process all of the information available when shopping are partly due to the type, complexity and amount of information provided. The nature of the information claims, whether general or specific, can have a vital role for the consumers in generalizing the marketing information. Information overload may cause the consumers to be confused about the product label. Additional information may assist in identifying the eco-friendly products and in increasing the credibility.
Clarity of meaning	[28,107, 127–135]	If eco-labels fail to communicate adequately, its purpose of reducing information asymmetry will not be achieved. Consumers seem to be somewhat confused about the green terminology used on product labels. Over exaggeration of the terms used in the eco-label may confuse the consumers. Several studies revealed that many consumers, who are aware of the eco-labels, are not able to comprehend the clear meaning of labels. Lack of in-depth understanding may lead the consumers to overestimate the amount of environmental benefits from using an advertised product.
Persuasiveness	[137,138]	Consumers' overall assessment of the eco-label is found to be substantially influenced by the persuasiveness of the information presented by the eco-label. Study found that 70 per cent of the respondents' purchase decisions were often influenced by environmental messages in advertising and product labeling.
Private benefits	[104,127]	If labels are not associated with private benefits, consumers might not be willing to pay a price premium for the eco-labeled product. Providing private benefits attributes will help individuals improve their perception of eco-labels. Consumers' information processing when shopping is often triggered by the benefit they perceive from doing so.

Consumer Awareness. The term "consumer awareness" has been in use for a long time. Consumer awareness is predominantly a marketing construct referring to the consumers' right to be aware of the products they purchase. It also refers to an ethical conduct for those responsible of the production and distribution of the products. Here in this case, the construct "consumer awareness" is meant to reflect consumers' recognition about the existence of eco-labels.

Research shows that the level of consumer awareness plays a significant role for the success of any eco-labeling scheme [46–49]. 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 [50]. In fact, knowing a label is a must to use it in buying decision [51].

Consumer Knowledge. Consumer knowledge is thought to be consisting of two complementary dimensions: familiarity (sometimes called experience) and expertise [52,53]: familiarity is defined as the "number of product related experiences (e.g., advertising exposure, or other means of information searches) that have been accumulated by consumers"; expertise is defined as the "ability to perform product-related tasks successfully" that includes both the cognitive structures and cognitive process. Increased familiarity with a brand may result in a better developed knowledge structure—both in terms of the knowledge an individual has stored in memory as well as what people perceive they know about a brand [54]. Here, the construct "knowledge" is meant to measure consumers' familiarity with the functional aspects of eco-labels and their verification process.

The ability to process information is influenced by both knowledge and individual's ability to retrieve knowledge [55]. It is also argued that people having more knowledge are better able to deploy that knowledge in understanding messages [56]. This is evidenced in some studies on product labeling such as Drichoutis, Lazaridis and Nayga [57] and Jasti and Kovacs [58] that suggest that more knowledgeable the consumers are about nutrition, the more likely they use the label information related to fat, calories, and ingredients.

Consumer knowledge, in particular, about the verification process of eco-labels is important to consider in evaluating their perception of eco-labels. Galarraga Gallastegui [59] argued that the choices of consumers will depend on the subjective interpretation of the labels' credibility if they lack a thorough knowledge of the verification process of the various environmental labels. In another study, Verbeke [60] argued that product information, such as logo, can have positive impact on consumers' choice of food only when they have adequate knowledge about the issue at hand.

Consumer Involvement. The construct "involvement" has been defined and operationalized in many different ways. Having no consensus, many researchers define involvement as the extent to which a stimulus or task is relevant to the consumer's existing needs and values [61–63].

After reviewing past conceptualizations in advertising research, Laczniak, Muehling and Grossbart [64] suggested two components of involvement in advertising. As consumers become more involved they should (1) pay more attention to the ad message, and (2) focus more on brand processing as opposed to non-brand processing. As an information tool, consumer understanding and perception of eco-labels is assumed to be influenced by their degree of involvement with the environmental issues.

The significance of the influence of consumer involvement on information processing and purchase behavior can be traced back in the earlier studies. [65,66]. The most classic model regarding consumer involvement in marketing is said to be the one developed by Engel, Blackwell and Miniard [67] that categorized consumers into two types on the 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 [55,68–71]. Enduring involvement is referred to as the relevance of a product category that a consumer has with [72]. Situational involvement, as the name implies, is referred to consumers' involvement which is context specific and accordingly short-term in nature [72].

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 on 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 numerous studies [55,68–70,73–79], whereby the term "felt involvement" was used, 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-labels.

Consumer Trust. Trust has been defined as the truster's expectation that the trustee is willing to keep promises and fulfill obligations [80–82]. Trust has been recognized as important in both marketing and management research [83,84]. The issue of trust is specifically considered to be valuable in analyzing situations where the truster is vulnerable [85].

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 [86]. It is very vital to have consumer trust in the product integrity since the credence attribute "organic" mostly involves a considerable price premium [87,88]. McCluskey [88] claimed that third-party certified 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 [87,89,90]. According to Jordan *et al*. [91], "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 [92–94]. More than two-thirds of the respondents in one survey distrust information from large companies and similar numbers agree that companies do not have moral or ethics [95]. 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 [96].

It was found in several studies that consumers have a hard time in understanding what labels are aimed at communicating, and uncertainty about what a label means could be associated with mistrust [97]. Thøgersen [97] showed that consumers pay attention to and use environmental labels in their buying decisions only if they trust such labels. Janssen and Hamm [98] identified consumer trust as one of the crucial factors for the success of third-party certified eco-labeling scheme.

Design and Visibility. Here, the construct "design and visibility" refers to the look or appearance and display of a particular eco-label and its ability to attract the attention of the customer. The importance of design and visibility of the label has been emphasized in the study of Perrini *et al.* [85] on organic products where the authors argued that organic labels are the primary source of consumer trust in organics, but these labels must be noticed and understood before consumers will actively seek them out.

In an extended study conducted in four different countries, Thøgersen [97] reported that a large majority of consumers pay attention to eco-labels at least sometimes. However, another two studies conducted by Laric and Sarel [99] concluded that the misperceptions were caused by consumers

relaying on the symbol with a lack of attention to the detailed information. Similarly, Morris [100] argues that the use of eco-labels may obscure relevant product information and, thus, mislead consumers, and even encourage the consumption of more resources, which does more harm to the environment. Hence, it is reasonable to assume that the design and display of the eco-label are likely to influence consumers' attention to the label.

Credibility of the Source. Credibility or believability in labeling of a product plays a vital role in consumer assessments and intentions toward the product [101]. Believability of the information in environmental labeling claims is conceptualized as how credible the information provided by the eco-label is perceived by the consumer [102]. Credibility of the source of the eco-labels, as one of the exogenous factors, can influence the consumers in using eco-labels to assist their purchase decision [50,94].

Any environmental label needs to be credible and robust [103,104]. 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 [48]. The credibility of information provided in eco-labels has also been emphasized in the study of [105]. The study suggests that the information need be related to the environmental attributes of the product signaling the superiority of the product compared to the non-labeled product. Especially, manufacturer-declared eco-label may confuse or mislead the consumers in trusting products' environmental attributes and underlying production practices, causing consumers to choose products that do not in fact have the attributes implied by the label [106].

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 [59]. However, the nature of credibility is said to be subjective [107]. It is further argued that even though the third party verified labels are supposed to be more credible [93,108–110], it will only have an impact on market demand if the consumers are able to recognize the products subject to third party verification [107]. Unfortunately, this is very difficult since third party verified labels are less in use than that of private labels [51].

The Type and Level of Information. Here, the construct "type and level of information" basically refers to the nature and amount of information each eco-label provides. Part of the reason why consumers rarely search out, read or properly process all of the information available when shopping is likely to be the way in which the information itself is presented: the type, complexity and amount of information provided [111]. The amount and format of information can affect consumers' ability to process the information [55]. Consumer scientists have long argued that excessive information can cause information overload for the consumers [112]. It is also argued that additional information can create distraction from more authoritative information sources [113]. On the flip side, adding to the amount of information is likely to improve a person's ability to correctly spot eco-friendly products [114,115]. Moreover, additional amounts of information can augment the perceived credibility of a label [114].

The study of Teisl and Roe [116] 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 misperceptions of their information content, may influence consumers in making inappropriate decisions [99].

According to Maronick and Andrews [117], 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 [118] who argued 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.* [119] and Janssen, Heid and Hamm [120] argued 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.

The issue of verifiability is also emphasized in the study of Shimp and Harris [121]. Consumers tend to rely upon and find more believable those claims that are more specific or concrete [122–124]. Hoch and Ha [123] 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, Smith and Swasy [122] indicated that consumers often perceive general or subjective information as puffery reasoning. An example of such general or subjective information is "environmentally friendly".

Consumer comprehension of specific environmental claims such as "recycled" and "recyclable" is not an issue to be very much agreed upon [125]. Rather consumers are likely to be uncertain about the meaning of these terms since different manufacturers use these terms based on differing standards [125]. 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 1%–100%. This may ultimately lead consumers to be confused or suspicious of various eco-labels. On the other hand, overloaded information becomes a problem. The study of Lloyd [95] found that 97% of those interviewed pointed out that there "was more stuff to read than I could ever dream of reading" and 92% reported that they experienced being "surrounded" by information. Even consumers who know and trust a relevant environmental label will not use it due to information overload [126].

Clarity of Meaning. Here, the construct "clarity of meaning" indicates the quality of being easily understood. The significance of communicating the right meaning of the eco-label to the customers has been highlighted in several studies. According to Delmas [127], although the objective of eco-labels is to reduce information asymmetry between the producer of green products and consumers, if eco-labels fail to communicate adequately they will not diminish the information gap between seller and buyer.

It is argued in some studies that consumers perceive product eco-labels as a requirement and demand proper and correct information on labels, yet they seem to be somewhat confused about the green terminology used on product labels [128–130]. Another reason that can lead consumers to misinterpret the eco-label is the exaggeration of the terms used in the label [131].

Studies in Nordic countries revealed that in 1997, two out of every three consumers who could recognize the *Swan* label (the official sustainability eco-label for the Nordic countries) were not able to comprehend the meaning of the *Swan* label properly [132]. The study found that consumers were becoming increasingly aware of the *Swan* label in 2000. Yet, only one out of three consumers recognizing the *Swan* label was not able to clarify the right meaning of the label [132]. Another study from Juhl and Poulsen [133] on the *Swan* label reported that above 50% of the consumers, irrespective of their environmental awareness, supported the fact that it was not possible for the common people to understand the meaning and content of the different labeling schemes. Besides, the study found that from 86.4%–97.3% of the consumers feared that there were too many labeling schemes. Similar results were found in some other studies as well. An assessment of a campaign in Denmark promoting the

Nordic *Swan* and the European *Flower* labels reported that although 36 percent of the consumers were able to identify the EU *Flower*, only 16% could recognize that it was an eco-label. Similarly to the *Swan* label, 68% of the consumers could identify the label whereas only 41% were able to relate the symbol with an eco-label [134]. Evidently, there is very limited research on consumers' in-depth comprehension of the terms "recycled" and "recyclable". Two of such studies [135,136] concluded 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. Consumers might be misled by the overestimation of the amount of environmental benefit of product advertised if they lack in-depth comprehension [125]. As a result, uncertainty remains with respect to how labels influence consumers and how well consumers comprehend the information provided on product labels [131]. It is also argued that consumers' comprehension of 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 [131].

Persuasiveness. Persuasiveness is defined as how convincing is the information provided by the label. Persuasiveness of information presented by the eco-label is found to be significantly influential in consumers' overall assessments of the eco-label [137]. A survey conducted by Chase and Smith [138] revealed that 70% of the respondents' purchase decisions were often influenced by environmental messages in advertising and product labeling. An empirical study was conducted by Bjørner, Hansen and Russell [139] 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 1997–2001. The study reported that the label had a significant effect on consumers' choices of brand. However, the opposite result is also evidenced in some other studies. Rex and Baumann [140] concluded from their work 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. Some other surveys also concluded that consumers' purchasing patterns do not always reflect their awareness level and that positive attitudes towards an eco-label does not necessarily mean it will be purchased by the consumers [141,142].

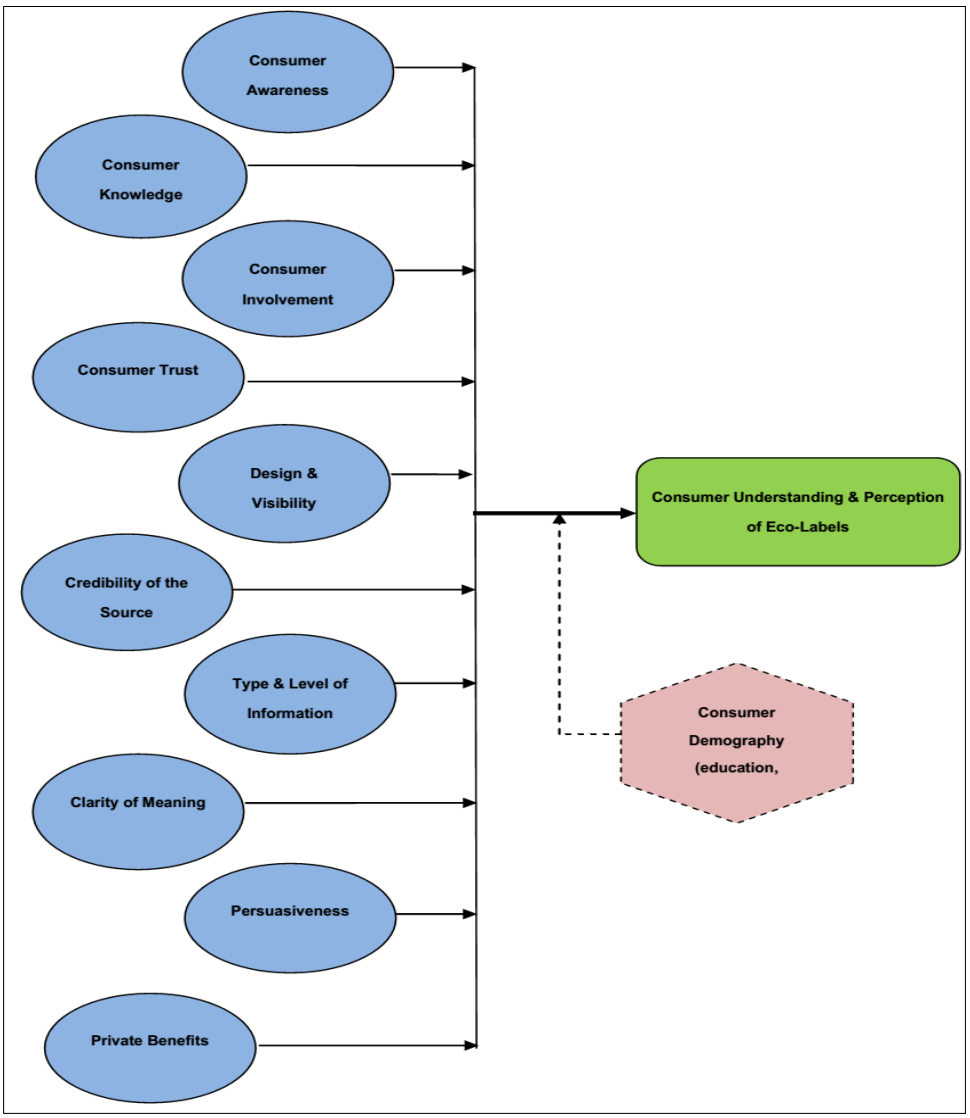
Private Benefits. In addition to environmental attributes, consumers might also consider some other associated benefits labeled on eco-labels in evaluating them. These additional benefits may include labels such as "taste better" and/or "healthier" *etc.* Several studies found that the most important purchase criteria for organic products are related to quality rather than the environmental concern. It is hypothesized [127] that if labels are not associated with private benefits, consumers might not be willing to pay a premium price for the eco-labeled product [143], thus providing private benefits attributes will help individuals improve their perception of eco-labels. According to the report of Defra Project [48], consumers' information processing when shopping is often triggered by the benefit they perceive from doing so.

In addition, consumers' levels of education, gender, income and age could also be other influencing factors. Several studies have emphasized the impact of level of education and income on consumers' environmental knowledge and understanding of environmental information [144,145]. Some studies also recognized the influence of age [144] and gender [144,145] in explaining pro-environmental attitudes and behavior.

5.2. Proposed Model

The following graphical model (proposed) (Figure 1) represents the design of the proposed empirical research. The nine factors in the circles represent the latent constructs extracted from the literature. The effect/influence of these factors on consumer perception of eco-labels is proposed to be investigated using structural equation modeling (SEM) subject to the validity of each of the constructs confirmed by factor analysis. In addition, some studies argued that some of the demographic variables, particularly education, income, age, and sex, are likely to meddle consumer perception of eco-labels. Hence, it is also proposed to test whether these demographics have any mediating or moderating effect on consumer perceptions of eco-labels. The mediating and moderating effect can well be detected in structural equation modeling.

Figure 1. Conceptual model (developed by the authors).



5.3. Limitations of the Study

First of all, this study should not be taken as a conclusive research, rather an exploratory one. The intension of this study was to provide a strong theoretical foundation by proposing a theoretical model

consisting of an all-inclusive set of constructs. One of the foremost limitations of this paper is that it is solely based on literature review. Though all of the constructs proposed in the model have been generated by conducting a comprehensive and systematic review, none of the constructs have so far been tested empirically, specifically for eco-label perceptions. In other words, the measurement scale items to be used to test the model have not yet been empirically tested for confirming their reliability. Another limitation of the study is that some of the constructs are grouped with reference to their application in advertising research. However, this limitation is not expected to be costly since eco-label is also a communication tool for the consumer, as is advertising. It should also be recognized that though some of the constructs may appear to be overlapping, they have been used differently in different studies. This issue will be reconfirmed for this study as suggested in the avenues for further research.

5.4. Further Research

The main purpose of this paper has been to review the existing literature on eco-labels from a consumer perspective in a holistic approach and, thus, suggest an inclusive set of all possible determinants of consumers' understanding and perceptions of eco-labels. In line with the guidelines of literature review [34], efforts have been made to cover all the available studies and materials that have been conducted and used so far on the issue. As a first phase of further research, it is recommended to empirically determine the reliability and validity of the constructs based on a sample survey of consumers. Once the validity of the constructs is confirmed, the research should aim at testing hypotheses using the valid constructs on the target group using any multivariate statistics, preferably Structural Equation Modeling (SEM). In addition, further exploratory research (e.g., focus group discussion) can be conducted to explore more constructs.

SEM is basically a multivariate statistical method for measuring the underlying latent constructs identified by factor analysis and assessing the paths of the hypothesized relationships between the constructs [146]. The rationale for using SEM in testing the hypotheses is that the SEM has been referred to as a well-accepted statistical tool in marketing research [147–149], because of its ability to test complete theories and concepts [150]. Researchers especially appreciate SEM's ability to assess latent variables at the observation level (measurement model) and test relationships between latent variables on the theoretical level (structural model) [151]. SEM has also been referred to as an attractive tool for application in psychoenvironmental research [152].

The proposed study is concerned with assessing some aspects of consumer behavior where the relationships among some predetermined latent constructs are to be measured using some interval scales. Accordingly, SEM is preferred to simple multiple regression analysis as the former is capable of confirming the latent construct at the measurement level (measurement model) and testing the relationship between latent variables at the theoretical level (structural model). In fact, SEM can be thought of as a combination of factor analysis model (known as measurement models) and regression model (known as structural models) [153].

Hence, the use of SEM is justified for at least two major advantages it offers: (1) it allows for the estimation of a series, but independent, multiple regression equations simultaneously, and (2) it has the ability to incorporate latent variables into the analysis and account for measurement errors in the estimation process [154]. In their argument of using SEM in environmental psychology, Bechtel and

Churchman [152] pointed out four tasks that a researcher can perform using a single model: (1) building factors or latent variables from manifest variables, (2) determining the consistency and validity of observations or manipulations, (3) estimating relationships between variables, and (4) testing the goodness of fit of the model.

6. Conclusions

For consumption of products and services where consumer choice can have a significant impact on the environment, effective implementation of eco-information programs is called for. Such programs, if properly executed and supported, will assist consumers in making eco-friendly purchasing and consumption decisions while simultaneously achieving various policy objectives. However, environmental policy objectives at the consumption level are not likely to be achieved unless consumers notice, believe, understand and, accordingly, use eco-information presented to them. Thereby, as one of the vehicles to the journey of sustainable development, the ultimate actor of eco-friendly consumption is the consumer, while eco-labels are ideally used as a media vehicle to "educate" the consumer on eco-friendly consumption.

The U.S. Environmental Protection Agency [5] reports that if environmental labeling 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.

In marketing, it is generally said that when communicating to consumers, "start where they start, speak how they speak, think about which aspects of the product are most important to them". Therefore, the green marketers need to learn where the consumers start, what they like to see, how they like to see, which aspects of the green products are important to them and so on. Accordingly, consumers' understanding of the eco-labels needs to be warranted, which can be possible by empirically investigating the consumers' reaction on eco-labels. Since there is no absolute measures for consumer understanding of eco-labels, it is inevitable to rely on well-defined and valid latent constructs.

Again, to initiate and/or amend any policy strategy for eco-labels, the government as well as other concerned organizations first need to know the present standing of the consumers regarding the eco-labels. It has been emphasized in scores of studies that for eco-labels to be workable, they must be well communicated and well-understood by the consumers. In communication language, the eco-label should not be "misfired".

Finally, an explicit understanding of consumers' understanding would guide the marketers and other concerned organizations to tailor the eco-labels for different target markets, especially if empirical studies reveal significant variations in different market conditions. Thus, the implication of this study is primarily limited to preparing a strong theoretical foundation for further empirical research on consumer understanding and perception of eco-labels in order for marketers and other concerned parties to design and implement effective and successful eco-label schemes.

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Author Contributions

Taufique designed and organized the study. Siwar and Talib helped in organizing the study and providing with relevant literature. Sarah and Chamhuri assisted in summarizing the literature and writing the draft. Taufique wrote the final paper.

Conflicts of Interest

The authors declare no conflict of interest.

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