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Assessing the Influence of Energy Efficiency Guide Label on Consumers' Purchasing Decisions for Household Refrigerating Appliances

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Abstract
This study assessed how the Ghana Energy efficiency guide label influenced consumers purchasing decisions for refrigerating appliances (refrigerator and/or freezer). In addition to exploring consumers' sources of information at the time of purchase, the study considered consumers' sources of information before purchasing refrigerating appliances. The study used the phenomenological descriptive research design. We sampled 20 consumers from two large retail stores in the capital of the Central Region of Ghana, Cape Coast. The data gathered from the face-to-face interview was analyzed thematically. The findings showed that consumers use multiple information sources to make their purchase decisions for refrigerating appliances. We found that consumers' acquaintance and sales assistance are the most patronized sources of information before purchasing an appliance and at the time of purchase, respectively. Further, the findings revealed that the energy efficiency guide label influenced consumers' decision to purchase a refrigerating appliance. The study concludes that the energy efficiency guide label positively influences consumers' purchasing decisions for refrigerating appliances, contributing to the country's effort towards energy security, achieving SDG7 and SDG13, and reducing the environmental impact of greenhouse gas emissions.

Key Words: Consumers, Energy Efficiency, Energy Guide, Energy Label, Refrigerating Appliance

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Introduction

Consumer protection regulations provide consumers with the right to be informed; furnished with accurate and complete information about goods and services (United Nations, 2016). Senauer (2013) termed consumers' right to know as transparency, knowing what is in products such as foods and cosmetics and how to use or operate electrical appliances. However, this right is associated with the duty (on the part of the consumer) to search for accurate, reliable, and adequate information before making a purchase. This implies that consumers must collect and evaluate product information before or during purchasing. For example, to choose between similar items that differ in price and function, the consumer should have access to the correct information to select the right product, which will provide value for money. Producers have tried to meet these rights of consumers by using different strategies (sources of information) such as advertisement, print media, electronic media, and labels (Lal, 2016). The latter serves as an identifier material attached to a product to provide information concerning the product or embellish a marketing package (Sarpong, 2015). According to Lal (2016), a label is a simple tag attached to a product that carries the brand name and other information or an elaborate graphic design that forms part of the package. The information on a label may be only textual or carry the manufacturer's or company's logo as well as illustrations and images. This information on the label assists consumers in making an informed choice. Senauer (2013) adds that the labeling of products by producers is an acknowledgment of consumers' right to know.

Arguably, labeling products is not only a strategy used by producers to meet consumer rights but a prerequisite to allowing the sale of their product on the local and/or international market (Jansen and Lince de Faria, 2002). They explained further that governments worldwide oblige producers to label their products to provide information for consumers to evaluate product quality. In addition, governments authenticate the labels on products and regulate the number of labels through their policies. Furthermore, Jansen and Lince de Faria (2002) point out that regulating labels by governments is in the best interest of citizens and guarantees a higher product quality for consumers. It is of this view that Horne (2009) stressed that the attention given to product labels by governments worldwide is not only in the interest of helping the populace obtain value for their money but the concern of climate change and environmental issues such as pollution and energy crisis. Furthermore, the author added that governments' labeling regulations are also means of achieving Sustainable Development Goals (SDGs) (Horne, 2009).

Energy efficiency labels are an example of label and labeling regulation for household appliances in many countries (IEA, 2000; Heinzle, 2012; Kuhn, Kutzner & Thøgersen, 2022). These labels inform consumers about the energy consumption of products, change consumers' choices, and guide them toward sustainable consumption (Nair et al., 2010; Brazil & Caulfield, 2017; Yu et al., 2019; Wang et al., 2021) because household appliances are the major source of energy demand and it is one of the fastest growing energy loads (IEA, 2003; Singh, 2016; Olanrewaju & Adegun, 2021). This is attributed to the continuous increase in ownership of electrical appliances (Bertoldi & Atanasiu, 2009; Gyamfi et al., 2015). Masjuki et al. (2000) explained that the introduction of labels for household appliances by several countries such as France, Russia, Japan, Poland, Canada, China, the United States, Thailand, and Hone Kone in the 1960s was to influence consumers to purchase more efficient household appliances thereby reducing energy consumption and the impact of these products on the environment. In support, Deshpande (2001) adds that governments have generally relied on appliance labeling policies to enhance energy efficiency in their effort to achieve sustainable growth and development.

A unique and growing labeling practice that has pervaded the literature is the implementation of energy efficiency standards and labeling for household appliances such as air conditioners, compact fluorescent lights, refrigerators, and freezers (Agyarko, 2015; Abd Alfattah, Sakhrieh & Al-Ghandoor, 2017; Agyarko, Opoku, & Van Buskirk, 2020). This practice attempts to employ more sustainable measures of reducing electricity consumption through demand-side management, Ghana's Energy Commission (Energy Commission, 2019; Energy Commission, 2022). This move by the Ghana Energy Commission led to the compulsory display of the Energy Efficiency Guide Label on electric bulbs, air-conditioners, and refrigerators/freezers to indicate the energy efficiency rating of products before the first retail sales (Energy Commission, 2022). These labels are meant to provide consumers, at the time of purchase, with information about the type of product, its energy efficacy rate, and most importantly, influence consumers to purchase more energy-friendly appliances, which in turn will contribute to reducing the total energy consumption, consumer's electricity bills and the achievement of SDG 7 and SDG 13 (Energy Commission, 2022). Studies have shown that energy efficiency labels effectively increase

the demand for energy-efficient household appliances (Iweka, Liu, Shukla, & Yan, 2019; Si-Dai, Cheng-Peng, Hang & Ning, 2021). However, there is a lack of information on how the energy efficiency guide label influences consumers' purchase of household appliances in Ghana. Studies on the influence of labels on consumers purchasing decisions in Ghana have focused mainly on food labels (Ababio et al., 2012; Osei Mensah et al., 2013; Azila-Gbettor et al., 2013; Darkwa, 2014; Affram & Darkwa, 2015; Madilo et al. 2020; Bannor et al. 2022), clothing labels (Apedo, 2014; Fiifi Esseku & Duku, 2020; Komasi, 2018), prospective cook-stove labels (Essuman & Frimpong, 2018) and the effectiveness of energy efficiency labels (Kuhn et al., 2022). Hence, this study qualitatively explored the influence of the Ghana Energy efficiency guide label on consumers' purchasing decisions for refrigerating appliances.

Literature Review

Energy Efficiency Labels

Energy efficiency labels are communicative or informative labels attached to manufactured products to expound on products' energy performance (often in the form of energy use, efficiency, or energy cost). These labels provide consumers with the information needed to make informed purchases and enable them to manage their energy bills (Wiel & McMahon, 2005). They added that energy labels could be used alone or complement energy standards to help consumers interested in selecting efficient models. Studies have indicated that three types of energy labels are in use worldwide (Mahlia & Saidur, 2010; Mahlia, Saidur, Yanti, and Masjuki, 2011; Azoumah, Tossa & Dake, 2020). They are endorsement, comparative, and information-only energy labels.

Endorsement Labels

Endorsement labels are primarily "seals of approval" because a product met a specified criterion (Heinzle & Wüstenhagen, 2012). In other words, endorsement labels are the seal of approval that depict that a product meets the specified benchmark. This points out clearly to the consumer that the labeled product saves energy as compared to others on sales. Mahlia, Saidur, Yanti, and Masjuki (2011) explained that these labels are usually based on a "yes and no" cut-off; a product uses less or more energy than a specified threshold. Endorsement labels provide little additional information; therefore, it does not permit differentiation among products concerning energy efficiency (Rohling & Schubert, 2013). Endorsement labels are used in many countries such as Canada, Australia, Japan, New Zealand, Taiwan (Rohling & Schubert, 2013), and the U.S. (Wiel & McMahon, 2005). Figure one depicts some examples of endorsement labels.

Figure 1. (a): *ENERGY STAR, (b): Chinese Energy Conservation Program, (c): Recognition-type Energy Label, (d): South Korean High-efficiency Appliance Certification Program. Source: Rohling and Schubert (2013)*

Comparative Labels

Comparative labels rate the energy efficiency of a product in relation to an absolute scale (Harrington & Damnics, 2004). These labels allow consumers to compare the performance and energy use of similar products. The comparison can be made across different energy efficiency categories but not within (Rohling & Schubert, 2013). It is mandatory to provide comparative labels on household appliances

(Rohling & Schubert, 2013; Si-Dai et al., 2021). There are two primary forms of comparative labels in use in various countries. They are categorical labels and continuous-scale comparative labels.

Categorical Labels

These labels use a ranking method in communicating to consumers the energy efficiency of a product model so that they can compare it with other models on the market. Unlike the endorsement label, based on a "yes or no" examination of product efficiency, categorical labels use several classes that move from least efficient to most efficient or vice versa. The majority of comparative categorical labels around the world use between five and seven categories for defining the rank or range of performance or energy use. But some countries, such as Australia, have introduced half-step ranking. It doubles the number of qualifying categories. Policymakers should be more concerned about providing consumers with a label with specific categories. It will help consumers compare easily. Categorical labels may or may not provide comprehensive information on the operating features, cost, and energy use of product models (Wiel & McMahon, 2005; Rohling & Schubert, 2013). Categorical labels are presented in two forms or formats, or styles.

One has a rectangular or square base with a dial or a semi-circle across the top. The dial looks like a speedometer or a gauge. The further advanced the gauge indicator, the better the product. Examples of such labels are used in Australia, Thailand, Korea, and India. It has six stars on the dial or has numbers (one to five) like in the case of Australia's label and Thailand's energy labels, respectively. The highest pre-set threshold for energy performance the model meets determines the scale's numerical grade or the number of stars. Some fulfillment uses a 1-5 numerical scale, others use an A to G letter scale, and some use a 1- 5- or 6-star scale (Waide & Bernasconi-Osterwalder, 2008).

The other form of the categorical label has a vertical rectangular shape with a series of alphabet ranging from "A" to "G". Letter "A" is the best and at the apex of the label while the letter "G" depicts the worst and is located at the bottom of the label. Relative efficiency on this label is communicated by the use of an arrow of different lengths and color progression which is next to each alphabet. Letter "A" is represented by the shortest arrow and the color green while "G" is represented with the longest arrow and the color red. Three new categories (A+++, A++, and A+) have been added to the original seven categories for refrigerators, dishwashers, and washing machines (Recast, 2010). Rohling and Schubert (2013) explained that this is to account for the significant technological advancement in energy efficiency. The usage of different colors and arrow length makes all grades visible on the label and a product's grade is indicated by a black-colored arrow that points to (against) the appropriate arrow.

The E.U label is an example but is in two parts due to language requirements. The right-hand side of the label provides base data that is common to all products and is not language-specific. In contrast, the left-hand side of the label provides explanatory text about the product model, which is language-specific. Generally, it is affixed in the country of sale. The E.U label style is used in Eastern and Western Europe and Brazil but with different criteria for Western Europe's A to G category (Rohling & Schubert, 2013).

A variation of the European label is used in Iran. This is because Persian script reads from right to left and uses numerals for ranking instead of Roman script letters. Also, Tunisia uses the European label style with two languages; French on one side and Arabic on the other side because they have a bilingual population while in Canada the U.S. label is modified to have a continuous horizontal scale (Rohling & Schubert, 2013). This label has a linear bar scale showing the lowest and highest energy use of the product within a similar category and shows the position of the specific model on the bar scale. Figure 2 shows examples of categorical labels.

Figure 2. (a). *EU Energy Label, (b): Chinese Energy Label, (c): Australian Energy Label, (d): Japanese Energy Label (Source: Rohling and Schubert, 2013).*

Continuous-Scale Labels

Continuous labels usually carry comprehensive information on models' operating features, cost and energy use. This type of label uses a line or a bar graph to depict the range of a product model. The scale permits consumers to see where the product's unit is based on the full range of similar models. Some examples of Continuous-Scale Labels are shown in Figure 3.

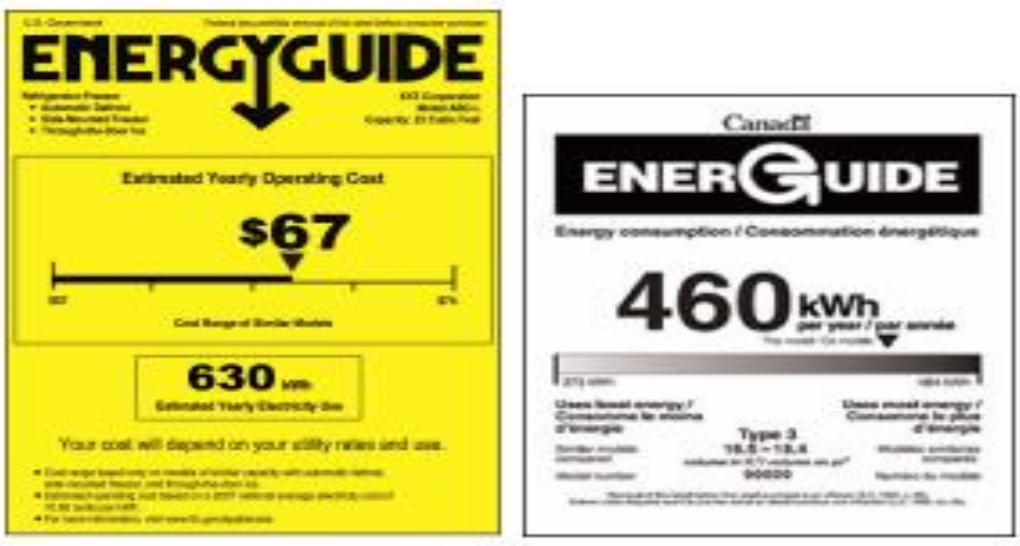
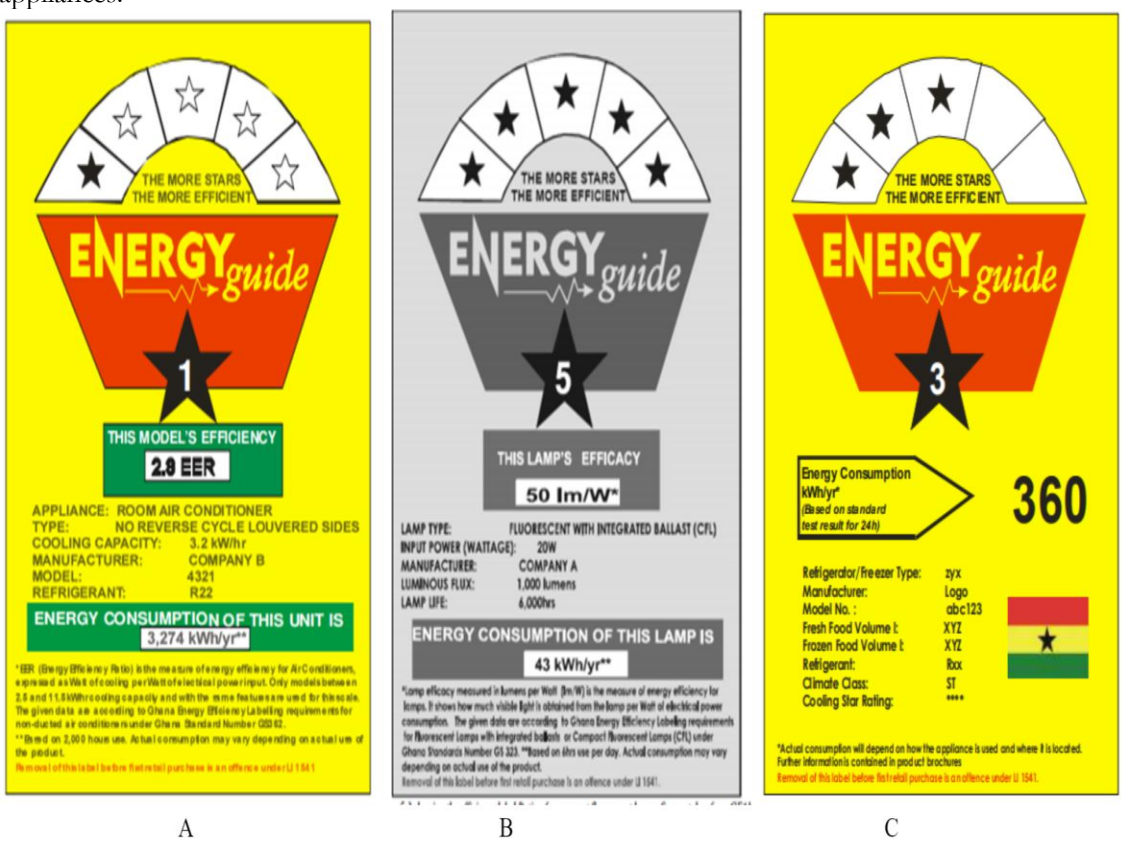


Figure 3. *Continuous-Scale Labels- US Energy Guide, and Canadian Energy Guide (Source: Rohling & Schubert, 2013).*

Ghana Energy Standards and Labelling Regulation

The energy efficiency regulations for air conditioners and fluorescent lights were passed in 2005 to achieve the policy directions on energy efficiency and conservation in Ghana(Energy Commission, 2005). In October 2008, the energy efficiency regulation that prohibited the importation, distribution, and sale of used air conditioners, refrigerator-freezers, freezers, and incandescent filament lamps was passed (Energy Commission, 2008). In addition to these regulations, the Energy Commission 2009 introduced energy efficiency standards and labeling regulations for household refrigerating appliances (refrigerator-freezers, freezers) (Energy Commission, 2009). This regulation aimed to discourage and remove inefficient

refrigerating appliances through an energy performance and labeling approach (Energy Commission, 2011). Hence, producers, importers, and vendors of air conditioners, fluorescent lights, and household refrigerating appliances must ensure that their products meet energy efficiency standards. Also, they must ensure that appliances carry the Ghana Energy Guide label before being offered for sale in the domestic market (Energy Commission, 2005). Figure 4 depicts the energy efficiency guide label for the various appliances.



A B C

Figure 4. *Energy efficiency guide label for Non-Ducted air-conditioners (A); Energy efficiency guide label for Compact fluorescent lamps (B) Energy efficiency guide label for Refrigerator or Freezer (C) (Source: Energy Commission, 2005).*

Consumers' Understanding of Energy Labels and Purchasing Decisions

Various studies have explored consumers' understanding of energy labels and purchasing decisions, shedding light on their knowledge of energy efficiency information and its impact on household appliance purchases. For instance, a study by Dünnhoff and Palm (2014) investigated consumers' understanding of energy labels on various appliances, including refrigerators, freezers, washing machines, televisions, air conditioners, and vacuum cleaners. The findings of this study showed that consumers demonstrated a good understanding of energy efficiency classes. However, approximately half of the respondents struggled with practically applying information related to electricity consumption and water usage. Specifically, these challenges were more prominent among women, individuals with lower education and technical knowledge, and those above 60 years. Similar patterns were observed among Chinese consumers, as reported by Yu, Zeng, and Li (2015). According to the authors, most Chinese consumers (74%) understood the energy efficiency rating on China's Energy Label. However, 35% of the consumers found some technical information difficult for an average consumer to understand, particularly older people.

In exploring the role of energy efficiency labels on consumers' purchasing behavior, Zainudin, Siwar, Choy, and Chamhuri (2014) found that energy labels did not effectively encourage consumers to opt for energy-efficient products, as there was a negative correlation between the energy label and green purchasing behavior. However, the researchers identified a significant positive relationship between environmental awareness and consumer buying intentions. Their findings suggest that consumers who exhibited consciousness and sensitivity towards environmental issues were more inclined to make objective decisions in favor of products that consume less energy and are environmentally friendly. Moreover, Zainudin, et al. (2014) emphasized the crucial role of social influence in shaping consumers'

purchasing decisions, indicating that external factors significantly influence consumer behavior and concluded that energy labels are insufficient in encouraging consumers to purchase energy-efficient appliances. Using social cognition, planned behavior, and signal transmission theories, Si-Dai et al. (2021) developed a theoretical model to understand how energy efficiency labels influenced consumers' purchasing behavior in Mianyang City, China. The findings showed that mandatory energy efficiency labels effectively alter consumers' consumption patterns and direct them toward purchasing energy-saving appliances. The study further revealed that energy efficiency labels positively influence consumers' decisions when buying energy-saving household appliances. However, the study by Wang et al. (2021) found contradictory results regarding the impact of the energy efficiency labeling policy in China. Despite its implementation, consumers continue to choose appliances with high power consumption, suggesting that the policy has limited effectiveness. The authors also identified a potential lack of consumer awareness and concern for energy conservation and environmental protection when making purchasing decisions. Furthermore, consumers faced challenges in understanding and trusting the information provided by energy efficiency labels due to flaws in the labeling system. The study recommended the enhancement of the comprehensiveness and user-friendliness of the energy efficiency labeling policy to promote sustainable consumption behaviors among Chinese consumers.

Kuhn et al. (2022) examined eco-labels' influence on consumer decision-making, explicitly focusing on variation in response to energy efficiency labels for air conditioners in Ghana and the Philippines. Employing discrete choice experiments in both countries, the researchers observed that individuals with higher levels of environmental concern and knowledge placed greater value on energy efficiency labels. Also, the study revealed that incorporating attitude functions such as cost-saving, environmental benefits, and health benefits into energy efficiency labels could enhance their effectiveness. Context-specific findings indicated that Ghanaian consumers were more responsive to labels emphasizing cost-saving and environmental benefits, while Filipino consumers were more receptive to labels emphasizing health benefits. These variations in consumer responses were attributed to cultural distinctions between the two countries.

A report by Ghana's energy commission shows that the implementation of energy efficiency labeling regulations has resulted in significant energy savings and reduced CO2 emissions both at the household and national levels (Energy Commission, 2022). Despite the numerous studies that have investigated the impact of energy efficiency labels on consumers purchasing decisions, there is no empirical evidence regarding how the Ghana Energy Efficacy Guide label influences consumers' household refrigerating appliance purchases. This study aimed to fill this knowledge gap because the labeling regulation for refrigerating appliances in Ghana is one of the country's efforts toward sustainability.

Method

Study Design

This study is a qualitative study that employed the descriptive phenomenological research design. The descriptive phenological design (Todres & Holloway, 2004; Padilla-Díaz, 2015) was used because the study sought to expound how participants understand the energy efficiency label, feel about it, judge it, recollect it, and make meaning of it (Patton, 2002). Also, the study sought to explore consumers' personal experiences using the energy efficiency guide label and label information in their purchase decision for refrigerators or freezers.

Population

The population for the study was shoppers of two large retail stores in the Cape Coast Metropolis, Ghana. These retail stores were appropriate for the study because they sell electrical appliances such as refrigerators and freezers and are the most patronized in the Cape Coast Metropolis. The accessible population of this study is defined as consumers who purchased a refrigerator or a freezer with the Ghana Energy efficiency guide label on it at the time of data collection and were willing to participate in the study. This decision by the researcher is appropriate because the accessible population is the portion of the target population the researcher can access, as postulated by Asiamah, Mensah, and Oteng-Abayie, (2017) and Fetzer (2020).

Sample

The purposive sampling technique was used in this study. This sampling choice is to Bernard's (2002) position, which suggests that purposive sampling entails the researcher identifying and selecting individuals who possess the necessary knowledge and are willing to provide information pertinent to the study's purpose. This sampling method was relevant because it helped obtain information from consumers who contributed significantly to the purpose of the study. Hence, 20 consumers who purchased a refrigerator or freezer with the Ghana Energy Efficiency Guide label were purposively sampled. The sample size of 20 consumers aligns with recommendations for phenomenological research, as multiple authors (Dukes, 1984; Ray, 1994; Kuzel, 1999; Morse, 2000; Kumar, Kumar, & Prabhu, 2020) have indicated that phenomenological studies can utilize a sample size ranging from three to ten (3-10) participants.

Data Collection

We used a semi-structured interview guide was used in a face-to-face interview with consumers to gather data for the study. The interview guide had five open-ended items. These items were formulated based on the purpose of the research and informed by the literature review. Before the interview, we explained the purpose of the study to consumers who purchased a refrigerator or a freezer with the energy efficiency guide label. Those who agreed to participate in the study were briefed about the nature of the interview. Participants agreed to be interviewed and recorded by signing a consent form. The interview focused on consumers' sources of information and the influence of the energy efficiency guide label on their purchase. In all, twenty (20) consumers were interviewed due to data saturation; when no new information or themes emerged from the responses of participants (Speziale, Streubert & Carpenter, 2011). In addition, participants who were willing to confirm the study results gave their contact information.

Data Analysis

This study adopted Colaizzi's process for phenomenological data analysis (as cited in Speziale, Streubert & Carpenter, 2011; Shosha, 2012; Salifu, 2016). Hence, I listened to the tape-recorded interview twice to gain a general sense of the interview before transcribing it verbatim to ensure no data was lost, as Hill, Tawiah-Agyemang, Kirkwood, and Kendall (2022) recommended. Then, I read and re-read the transcripts to ensure consistency and obtain a general understanding of the entire content. We coded significant statements and formulated meanings from the coded segments. These were then sorted and organized into themes. To ensure the dependability of the study's results, first, the transcribed data was sent to consumers who provided their contact information. A few of them responded with minor corrections that were incorporated into the analysis. Secondly, the results were sent to participants to ensure that the information presented reflected their responses. Finally, the feedback received from participants was incorporated into the findings. The results of the analysis are shown in the next section.

Findings

Participants Characteristics

The participants were 20 consumers who were all Ghanaians. Participants consisted of fourteen (n=14) males and (n=6) females. Their ages ranged between 22-83 years. Most (n=13) of the consumers were within 30-40 years. Most (n=13) of the participants were tertiary graduates, while four (n=4) were basic school graduates. The remaining three (n=3) participants were university students. Concerning participants' occupations, twelve (n=12) of the participants work in the formal sector; as teachers (n=9), nurses (n=2) and supply officers (n=1), while five (n=5) participants are traders in the informal sector. Three (n=3) participants were unemployed because they were still at school (university) at the time of data collection.

Consumer Information Sources

When consumers were asked how they obtained information before purchasing the appliance, most interviewees emphasized friends, relatives, past experiences, and advertisements as their sources of information. Most interviewees explained that they consulted their friends and relatives whom they believed could assist them in purchasing the right appliance. For example, an interviewee who consulted a friend before buying the appliance said, *'I informed a friend about my intention to purchase a fridge and asked him which one he thought was best. He said it was either brand 'Q' or 'A'. Again, he said I should check the number of stars on*

the yellow sticker [Energy Efficiency Guide Label]; if the number of stars is two or three, then it is good. So, when I came here, I found the brand my friends spoke about and decided to purchase it…'. Another participant who sought information from a relative said, '*I asked my big sister about the freezer because I needed that particular type of fridge. She said that that particular freezer brand was good and it would help me, considering what I would be using it for'.*

Some participants relied on their past experiences. These interviewees explained that they had used or are using an appliance such as a mobile phone, a blender or an electric iron produced by the same manufacturer or brand. One of such participants said, *'Actually, the particular brand of the fridge I purchased, I have been using products of the same brand, so I know the brand's quality already. So, there was no need to read or ask anybody about what I needed.* Similarly, another participant explained that because she is already using the same refrigerator brand, she knew what she wanted before coming to the shop. She said, *'Regarding the fridge, I did not read or ask anybody about which fridge to buy or not because we [*the nuclear family*] have a freezer of the same brand. So, right from the time I decided to purchase a fridge, I knew what I was coming to buy.*

Again, the analysis showed that social media platforms such as Facebook and online advertisement were sources of information for a few participants. These participants explained that they gathered information about the appliance they purchased from these online advertisement sources before coming to the retail shop to buy it. For example, a participant said, '*I read about it on Facebook. The information I had about was basically about the cost. They displayed the product with the prices, so that's what I checked before coming here.'* Another participant said he read about the appliance online before purchasing it because he did not know which refrigerator was the best on the market. He said, *'I read about it on the internet because I had no idea about the quality of the brand and all that, so I spent some time reading about it before…'.*

On the other hand, the analysis revealed that consumers, at the point of purchase, searched for information to guide their investment. The product label and sales assistants were consumers' information sources at purchase. A consumer explained that he consulted the shop attendant to confirm that he had selected a quality and efficient appliance because he believed sales assistants were knowledgeable about quality and efficient appliances. He said, '*I intentionally asked him about his preference if he was to choose. I wanted to sample his view to see, you know [referring to interviewer], that they are workers here and know which is good and which is not. So, I asked him if he were in my shoes, that is, if he was the person buying, which one would he choose? He told me he would have chosen either 'Q', 'A' or 'M'. So, I asked him to choose between 'A' and 'Q', and he said He would go for 'Q'. This confirmed my choice'. Likewise, another participant added that she asked a shop attendant about the appliance's price and quality because she was not sure of the quality brand. She said, 'I asked an attendant there about his opinion on good quality brands and their prices. Yes, I bought one of the attendants, he told me about one brand, but I did not buy that because he said that the brand was of good quality, and that was what I had in mind. I only wanted to be sure.'*

Some participants who consulted the energy efficiency guide label for information to guide their purchase explained that they did that because they wanted to purchase an energy-efficient freezer or refrigerator. For instance, a participant explained, *'I was looking at the number of stars on the yellow sticker [the energy efficiency guide label] since I wanted something which was energy efficient, I didn't want to waste too much electricity.'* In like manner, a participant who purchased a freezer said, *'I was looking at the energy commission's label on the freezer. So, I checked the number of stars on the energy commission's label [the energy efficiency guide label]. That tells me about the electricity consumption of the freezer. Also, I checked the brand, the energy consumption and the cost of the fridge.*

Energy Consumption, Originality and Energy Saving

Most participants emphasized that they would not have purchased the refrigerator or freezer if it did not have the energy efficiency guide label on it because they would not know the appliance's energy consumption. One of such participants answered, *'as for me, I wouldn't purchase a refrigerator without the sticker* [energy efficiency guide label]. *Unless there is something else that can tell me about energy consumption of the refrigerator because I am first and foremost interested in the energy consumption of the refrigerator. As you can see, that information is on the sticker', when I asked him whether he would have purchased the refrigerator if the energy efficiency guide label was not on it.* Another participant also said that without the energy efficiency guide label on the refrigerator, she would not *'know the energy consumption [referring to energy consumption rate expressed in kWh/yr on the energy efficiency guide label] of the refrigera*tor' and would not have purchased it because 'the label helps determine the consumption of the refrigerator'.

Also, some participants expressed that the energy efficiency guide label on a refrigerator or freezer is an assurance of the originality of the appliance. Hence, they would not have purchased a refrigerator or freezer if it did not have the label on it. A participant said, *'what I know is that every brand-new refrigerator or*

freezer has this sticker on it which shows that it is original'. Another participant responded to the same question, *'I would not have bought it because every refrigerator or freezer I have seen this shop has this label. The ones [refrigerators or freezers] that have this sticker [the energy efficiency guide label] are original and not fake'*. A participant added that *'the moment you see that yellow sticker [the energy efficiency guide label] on a refrigerator, it means it has gone through some approved standard, so it is genuine. So, if the label is not on it, it means the refrigerator is not genuine. It came[imported] into the country through the back door [unapproved means]; therefore, I will not buy such an appliance.'*

Some participants believed the energy efficiency guide label on a refrigerator or freezer means the appliance is energy-saving. Hence, they would not purchase a refrigerator or freezer without the energy efficiency guide label on it. For instance, a participant said: *'No, I would not buy it because I came to buy an energy-saving refrigerator. With the energy-saving ones [refrigerator or freezer], they [manufacturer] want to communicate to us[consumers], that is why they[manufacturer] put the label on it. But, once the label is not there, it means that it is just a normal refrigerator or freezer [a used or second-hand refrigerator or freezer which is not energy-saving] that would consume more power'[electricity]*. Likewise, *a participant explained: 'I am not sure I would have purchased the one without the energy label'. He continued, 'the sticker shows that the refrigerator saves energy, which is good for me since I would spend less on electricity'*.

Unlike most participants who would not purchase a refrigerator or freezer without the energy efficiency guide label, two males indicated that they would do otherwise. When I asked why they would have bought a refrigerator or freezer without the energy efficiency guide label, they said, *'I would have because I am in need. I am going to use it to satisfy something small. My decision to purchase was based on the size; I just need something small for a guest' and the other participant answered, 'I need a fridge, so the label was not that important to me. However, the price was important because my budget was 700 cedis [69.87 USD]. So, when I arrived, I saw the one my money could afford; I checked it, and it was okay, so I bought it.*

Discussion

This study explored how the Ghana energy efficiency guide label influenced consumers' purchasing decisions for refrigerating appliances. In this study, it was evident that consumers' sources of information in purchasing decisions were in two forms namely; prior sources of information and information source during purchasing. The findings of this study are consistent with that of Jang, Prasad, and Ratchford (2017) that consumers often use multiple information sources when making purchasing decisions. Consumers' sources of information before purchasing appliances were made up of consumers' acquaintances (relatives and friends), consumers' past experiences, and advertisements. This finding confirms researchers' (Loudon & Della Bitta, 1993; Loudon & Della Bitta, 2002; Lamb et al. 2013) assertion that during the information search stage of the consumer decision-making process, consumers conduct internal (recall of past experiences) and external information search (consulting social networks, advertisement search on the variety of products). Additionally, the study revealed that most participants sought information from individuals within their social network before purchasing a refrigerator or freezer. This finding is consistent with the result of Furaiji, Łatuszyńska and Wawrzyniak (2012) that consumers' social network (relatives and friends) is the most effective source of consumer information during the information search stage of the decision-making process because consumers perceive family and friends to provide more credible and trustworthy information than commercial sources. Also, the findings of this study show that to purchase a quality refrigerator or freezer (reducing purchase risk), consumers received information concerning quality brands and categories of refrigerators or freezers from their friends and family. This aligns with Assael's (1995) assertion that information consumers receive about products, such as their efficacy and performance from friends and family helps consumers reduce the risk associated with purchasing decisions.

On the other hand, the study revealed that consumers consulted appliance labels and sales assistants for information when purchasing. The finding shows that most consumers depended on sales assistants for information due to the fear of purchasing inferior refrigerators or freezers. Also, the study revealed that consumers believe sales assistants are in the best position to provide them with information concerning quality and inferior refrigerators or freezers. This implies that consumers trust and consider information provided by sales assistants essential regarding purchasing a refrigerator or freezer. Similar to the findings of this study, 41.9% of consumers in a survey conducted by Kwiatek, et al. (2011) revealed that consumers consider information provided by sales assistants very important when making purchasing decisions. However, most consumers in their study relied on other sources of information compared to sales assistants as a source of information during purchase (Kwiatek, et al., 2011). Also, the findings of this

study contradict that of Alborzi, Schmitz and Stamminger (2017), who found that in eleven European countries, online product information was the most important source of information when purchasing household appliances such as washing machines.

Furthermore, the results indicated that the energy efficiency guide label positively influenced most consumers' purchasing decisions. This is because consumers would not have purchased a refrigerator or freezer if they had not seen the energy efficiency guide label fixed on it. To consumers, the energy efficiency guide label informs them of the energy consumption of a refrigerator or freezer. This implies that consumers notice the label information because the energy efficiency guide label provides information on the energy consumption of refrigerating appliances in kWh/yr (in figures) based on standard test results for twenty-four hours. Also, the findings show that consumers believe that a refrigerating appliance with the energy efficiency guide label fixed on it is energy-saving and that its electricity consumption is low compared to those without the energy efficiency label (used or second-hand refrigerators). Consistent with an evaluation report by the Energy Commission (2022), refrigerating appliances without the energy efficiency guide label (used or second-hand refrigerators) are the most electricity-consuming appliances in the residential sector. This shows that the energy efficiency guide label encourages consumers to purchase appliances that meet the minimum energy efficiency for household refrigerating appliances as prescribed in the Household Refrigerating Appliances Regulations, 2009 (Energy Commission, 2019). These findings indicate that consumers are willing to purchase energy-efficient appliances, which is consistent with the results of Li, et al. (2019); they found that residents in Shanxi, China, had a positive attitude towards purchasing energy-efficient appliances. The findings of this study show that the energy efficiency guide label encourages consumers' sustainable consumption behaviour, but a survey of China's biggest online sales platform revealed that the energy efficiency labelling policy does not promote consumers' environmentally friendly consumption behaviour (Wang et al., 2021). In contrast, the finding of this study differs from that of Zainudin, et al. (2014), who observed that in three urban areas in Selangor, the energy label did not help encourage consumers to buy energy-efficient products because they found a negative relationship between the energy label and energy-efficient product purchases.

Although the energy efficiency guide label does not indicate or approve of the originality of refrigerating appliances, consumers explained that it assured them of the originality of refrigerators or freezers. However, in as much as consumers are misinterpreting the purpose of the energy efficiency guide label, they would contribute to reducing energy consumption, and the purchase of used or second-hand inefficient refrigerators and freezers since they would not purchase a refrigerator or freezer if the energy efficiency guide label is not fixed on it (Energy Commission, 2022). Hence, consumers purchase behaviour is instrumental in mitigating the negative environmental impacts (Schrader & Thøgersen 2011) of used or second-hand refrigerating appliances since consumer purchase habit (purchasing refrigerating appliance with energy efficiency guide label) contribute directly and indirectly to environmental degradation (Schrader & Thøgersen 2011).

On the other hand, few consumers were not influenced by the energy efficiency label. The finding showed that these consumers would have purchased the refrigerator or freezer without the energy efficiency guide label fixed on it. These consumers were concerned about their needs and the price of the appliance. This finding is similar to the results of Osei, et al., (2012), who found that price was the main factor influencing consumers' purchasing decisions. This implies that some consumers would purchase a refrigerator or freezer that does not meet the standard regulation, which would reduce the effectiveness of reducing energy consumption using the consumer demand-side management approach.

Conclusion

The study concludes that consumers' acquaintances and sales assistants are the primary sources of information when purchasing refrigerating appliances. However, consumers value the energy efficiency guide label when buying refrigerating appliances because the label indicates energy consumption of the appliance. Also, the energy efficiency guide label shows that the appliance is energy-saving and connotes the originality of the refrigerating appliance. Hence, most consumers refrigerating appliance purchase decisions were based on the energy efficiency guide label. This implies that consumers are contributing towards the country's effort towards energy security, achieving SDG7 and SDG13 and reducing the environmental impact of greenhouse gas emissions. Therefore, the study concludes that the Ghana Energy Commission's labelling regulation promotes sustainable consumer purchase behaviour. Future

studies could investigate whether the label's impact varies depending on consumers' prior knowledge of energy efficiency and environmental concerns.

Strengths and Limitations

The study's relevance lies in the method and time of data collection, interviewing consumers right after purchasing a refrigerating appliance. This ensured that the study involved individuals in the best position to provide the information needed for the study. Also, the rigour ensured in the data analysis process adds to the study's strengths. Despite the study's advantage, a series of focus group discussions would have improved the strength of the findings. Although qualitative research does not seek population generalisation, a larger sample would have strengthened the findings. However, none of these limitations invalidates the findings of the study.

Ethical Declaration

During the writing process of the study "*Assessing the Influence of Energy Efficiency Guide Label on Consumers' Purchasing Decisions for Household Refrigerating Appliances*" scientific rules, ethical and citation rules were followed. No falsification was made on the collected data and this study was not sent to any other academic publication medium for evaluation.

Declaration of Conflict

There is no potential conflict of interest in the study.

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EXTENDED ABSTRACT

Consumer protection regulations grant consumers the right to accurate information about goods and services. Producers fulfill consumers' right to information through various means such as advertisements and labels. Labels serve as identifiers and assist consumers in making informed choices. Energy efficiency labels are examples of labels informing consumers about household appliance energy consumption. These labels are intended to guide consumers to purchase more energy-friendly appliances, which in turn will contribute to reducing the total energy consumption, consumers' electricity bills and contribute to sustainable consumption. In Ghana, energy regulations for household appliances such as air conditioners, refrigerator-freezers, freezers, and incandescent filament lamps have been implemented as means of employing more sustainable measures of reducing electricity consumption through demand-side management and discouraging the sale, purchase, and removing inefficient refrigerating appliances through energy performance and labelling approach (Energy Commission, 2011). These regulations led to the compulsory display of the Energy Efficiency Guide Label on electric bulbs, air-conditioners, and refrigerators/freezers to indicate the energy efficiency rating of products before the first retail sales. Various studies have explored consumers' understanding of energy labels and purchasing decisions, shedding light on their knowledge of energy efficiency information and its impact on household appliance purchases. For instance, Kuhn et al. (2022) found that consumers with higher levels of environmental concern and knowledge prioritised energy efficiency labels when purchasing air conditioners. Also, the study revealed that incorporating attitude functions such as cost-saving, environmental benefits, and health benefits into energy efficiency could enhance their effectiveness among consumers in Ghana and the Philippines. In China, Wang et al. (2021) found that despite the implementation of energy efficiency labeling policy, consumers continue to choose appliances with high power consumption due to lack of consumer awareness and concern for energy conservation and environmental protection when making purchasing decisions. Furthermore, consumers faced challenges in understanding and trusting the information provided by energy efficiency labels due to flaws in the labeling system. A report by Ghana's energy commission shows that the implementation of energy efficiency labeling regulations has resulted in significant energy savings and reduced CO2 emissions both at the household and national levels (Energy Commission, 2022). In spite of the numerous studies that have investigated the impact of energy efficiency labels on consumers purchasing decisions, there is no empirical evidence regarding how the Ghana Energy Efficiency Guide label influences consumers' household refrigerating appliance purchases. This study aimed to fill this knowledge gap because the labeling regulation for refrigerating appliances in Ghana is one of the country's efforts toward sustainability. This study assessed how the Ghana Energy efficiency guide label influenced consumers purchasing decisions for refrigerating appliances (refrigerator and/or freezer). In addition to exploring consumers' sources of information at the time of purchase, the study considered consumers' sources of information before purchasing refrigerating appliances. The study used the phenomenological descriptive research design. The accessible population of this study was consumers who purchased a refrigerator or a freezer with the Ghana Energy efficiency guide label on it at the time of data collection and were willing to participate in the study. Twenty (20) consumers consisting of fourteen (n=14) males and (n=6) females were purposively sampled from two large retail stores in the capital of the Central Region of Ghana, Cape Coast. A semi-structured interview guide was used in a face-to-face interview with consumers to gather data for the study. The interview guide had five open-ended items. The data collected from the face-to-face interview was analyzed thematically. The findings showed that consumers use multiple information sources in their purchase decisions for refrigerating appliances. It was found that consumers' acquaintance and sales assistance are the most used sources of information prior to purchasing refrigerating appliances and at the time of purchasing refrigerating appliances, respectively. Further, the findings revealed that the energy efficiency guide label influenced consumers' decision to purchase a refrigerating appliance. This is because consumers are of the view that the energy guide label indicates the appliance's energy consumption, shows that the appliance is energy-saving, and connotes the originality of the refrigerating appliance. The study concludes that the energy efficiency guide label positively influences consumers' purchasing decisions for refrigerating appliances. Therefore,

consumers are contributing to the country's effort toward achieving energy security, SDG7 and SDG13 and reducing the environmental impact of greenhouse gas emissions. Future studies could investigate whether the label's impact varies depending on consumers' prior knowledge of energy efficiency and environmental concerns.