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Consumer attitudes towards sustainability attributes on food labels in the UK and Japan

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Summary

With current concerns about climate change and the general status of the environment, there is an increasing expectation that products have sustainability credentials, and that these can be verified. Labelling is a common method of communicating certain product attributes to consumers that may influence their choices. There are different types of labels with several functions. The aim of this study was to investigate consumers', attitudes, knowledge and preferences towards certain sustainability claims on food products across countries; particularly attitudes towards the display of the reduction of carbon emissions were examined in this research. A web-based consumer survey undertaken in the United Kingdom and Japan showed similarities between consumers in the UK and Japan regarding desired label claims of environmental product information. Differences across these countries were observed in terms of the knowledge about certain environmental and social issues such as carbon footprint and sustainability. This information on consumers' attitudes will assist industries and firms to identify market opportunities, in particular assessing the methods by which carbon footprinting measures can be incorporated alongside information on other sustainability criteria in product marketing.

Keywords: FOOD LABELLING, CARBON FOOTPRINT, SUSTAINABILITY, CROSS-COUNTRY COMPARISON, UNITED KINGDOM, JAPAN

1. Introduction

With current concerns about climate change and the general status of the environment, there is an increasing expectation that products meet certain sustainability standards, and that these can be verified. This is reflected in changes in consumer and retailer demands in some markets and is driving changes in the value chains and markets that New Zealand's primary industries participate in. In particular, there is significant and increasing pressure in some key export markets (e.g. United Kingdom and Japan) for information on the Greenhouse gas (GHG)-intensity for products throughout the product life-cycle. Thus, alongside corporate disclosure and consumer pressure, demand for carbon labelling has increased and with it the development of carbon labelling schemes. Labelling is the method that is considered in this study to meet consumer's expectation of communicating relevant product attributes. A label is considered a display of different attributes of a product on or attached to the product's packaging. Consumers', firms, third-party entities, and governments all play a role in determining which of the products many attributes are described on the product's label.

The practice of carbon-labelling consumer goods, while relatively new, is likely to grow in importance. In 2009, there were roughly 15 carbon labels documented of which 8 were developed in European countries. The UK's pursuit of carbon footprinting and carbon labelling is of particular interest for New Zealand as it is an important export market. The UK received 3.9 per cent of all New Zealand exports in 2010 (year ended June). It was the country's principal export market for sheep meat products with 30 per cent in 2010, worth NZ\$642 million, the second largest export market of wine products (29 per cent of all wine product exports) and the fourth largest export market of wool products (7 per cent of all wool product exports) (Statistics New Zealand, 2010). The UK Carbon Trust in 2006 introduced a label called the Carbon Reduction Label with the proviso that products bearing the label have to reduce emissions associated with producing the product by 20 per cent over two years following certification otherwise they risk to lose the right of use the label. In January 2007 Tesco started as part of a trial of the Carbon Label company to include four types of products. These categories comprised of potatoes, orange juice, washing detergents, light bulbs and milk products. In the last three years, this has been expanded to more than 100 products from different product categories with plans for more categories in the future. Tesco aims to reduce the carbon impact of its products in its supply chain by 30 per cent by 2020 (Tesco, 2009). The process of developing carbon labels has varied with some being initiated by governments, others by government quangos, and some by non-profit organisations, but all have generally involved cross-sector consultation.

Elsewhere in the world, Japan has introduced a Carbon Offset labelling scheme, with retailers voluntarily attaching these labels to their products. The Japanese carbon label includes an image of a lead weight with the letters "CO₂" in the centre, with the attached carbon "weight" of the product in bold letters above (METI, 2009). Also, Japan's undertaking of carbon footprinting and carbon labelling is of particular interest for New Zealand as it is an important export market. As trade statistics show Japan was the country's fourth-largest export market in 2010, receiving NZ\$3.1 billion in export value. It is New Zealand's principal export market in vegetable products with 30 per cent of all vegetable product exports sent to Japan in 2010 and kiwifruit (27 per cent). Japan is second largest export market in cheese products, with exports valued at NZ\$642 million (Statistics New Zealand, 2010).

Consumers react differently towards different attributes on food product labels and these labels have an impact on consumer's choices, therefore it is important to understand which of the many attributes appeal to consumers and which product they finally choose. The performance of a label is also depending on the comprehensibility of label claims. Therefore, information on understandability of technical terms is an important aspect for producers.

This paper reports on preliminary findings of research examining consumer attitudes, preferences and knowledge about certain environmental and sustainability attributes on food labels, in both Japan and the UK. In particular consumers' knowledge and perceptions of the carbon footprint on product labels will be analysed in this study. It is part of a wider research study that encompasses a choice modelling analysis estimating consumers' willingness to pay for sustainability attributes on food labels. The contribution of this research is threefold. Firstly, this study will assist industries and firms to identify market opportunities. Secondly, it provides consumers an opportunity to express preferences over label claims that they could use. Thirdly, it contributes to the broader literature on food labelling by providing a cross-country comparison.

In order to facilitate the survey development for this study, a literature review, focus group meetings and stakeholder interviews were conducted. Various types of labels were considered in the literature review to provide information on consumer attitudes and preferences from different countries towards various labelling options. In particular, environmental product attributes, genetically-modified (GM) -ingredient display, carbon emission information and nutritional information of food products are within the scope of this project. The inclusion of several types of product attributes broadens the scope of current labelling practice.

1.1 Literature review on sustainability attributes on food products

Several international empirical studies on consumer's preferences for different types of food product labels were examined by McCluskey & Loureiro (2003). They argue that consumers from different countries may respond differently to the same environmental product attribute that is labelled. For example, results of a study on consumer response for environmentally friendly seafood in the U.S. and Norway showed differences of consumer preferences for price premium, species, consumer group, and certifying agency (see Johnson et al. 2001). Similarly, Roosen, and Fox (2003) estimated consumer's willingness-to-pay (WTP) for genetically modified corn fed beef in France, Germany, the United Kingdom, and the United States by using a choice experiment, for several beef attributes and compared valuations of these attributes. Results indicate that consumers in France, Germany, and the United Kingdom are willing to pay more for beef from animals not GM fed corn than are consumer in the U.S.

In order to learn more about consumer preferences towards GM ingredients in food products in different countries, comparable surveys were conducted by McCluskey and colleagues in Japan, China and Norway. The surveys included questions if respondents were willing to pay the same price for the GM food as a corresponding, non-GM food product. The survey results for Japan (McCluskey et al. 2003a) indicated that environmental attitudes and food safety, self-reported knowledge about biotechnology and risk perceptions of products containing GM ingredients, income, and education significantly increase the discount required for consumers to choose GM food products. Furthermore, Japanese consumers in the sample request on average 60 per cent

discount on GM products compared to non GM products, whereas Norwegian consumers need a 49.5 per cent discount on GM bread compared to conventional bread. Interestingly, the estimation results for China showed the opposite as Chinese consumers, on average, were willing to pay a premium of 38 per cent for GM rice over non-GM rice and a premium of 16.3 per cent for GM soybean oil over non-GM soybean oil (see Li et al. 2003). The results show that positive opinions and low risk perception regarding biotechnology and GM foodstuffs significantly increase the premium that Chinese consumers are willing to pay for GM foods. With these results McCluskey and colleagues (2003) emphasize the statement that the WTP for GM food depends on the culture and tradition and perception of the science, and they conclude that especially for socially responsible and origin-based food products consumers must perceive high food quality to pay a price premium for the labelled food product.

Concerns about climate change have also been seen through changes in markets and development of labelling schemes. The importance and role of sustainability and carbon footprint labelling for consumers has been investigated in several studies. Fischer (2009) discusses several studies on consumer perceptions of different environmental labels. Based on results of large survey across several countries (USA, UK, Netherlands and France) conducted by Capgemini (2007) an international consulting firm, Fischer (2009) discusses that consumers are willing to pay at least a small difference for sustainability attributes. The majority of consumers are willing to pay more when the product label covers fair trade issues and sustainable manufacturing. Fischer (2009) assumes that many consumers are willing to pay a premium for products that support sustainability requirements in order to give 'peace of mind'.

A 2007 survey (Synovate, 2007), with 14,220 participants across 22 countries, showed that around 68 per cent of consumers were concerned about climate change with Brazilians (87 per cent), Spaniards (87 per cent), Australians (84 per cent) and South Africans (82 per cent) most concerned (Synovate, 2007). Within this, over two-thirds of participants claimed to have actively engaged in consumption behaviour that could be seen to be effective in promoting environmental wellness. However, while these consumers considered environmental wellness in their purchase decisions, between 5 and 10 per cent were willing to accept trade-offs, i.e. lower quality product, or a higher price for environmentally sustainable goods. WTP for products with sustainable or environmentally friendly attributes also scored low within this survey, while ethical foods such as fair trade and local food scored high. Japan however, showed high levels of concern with around 30 per cent of Japanese consumers purchasing products made by companies actively involved in environmentally beneficial activities.

A survey undertaken by the European Commission in 2009 (Eurobarometer, 2009) investigated the European's attitudes towards sustainable consumption and production. Results showed that the environmental impact of a product is likely to influence consumption habits of European citizens. Slightly more than 8 in 10 participants stated that a product's impact on the environment is an important variable when deciding which product to buy (49 per cent *rather important* and 34 per cent *very important*); only 4 per cent responded this is *not important at all*. Country-specific results showed that almost 8 in 10 Hungarians answered that a product's impact on the environment is an important product feature when deciding which product to purchase (47 per cent *rather important* and 32 per cent *very important*); however, more than 90 per cent said the same about a product's price (62 per cent *rather important* and 28 per cent *very important*) and

only half said this about the brand of the product (37 per cent *rather important* and 13 per cent *very important*). The survey also investigated which of the many environmental product attributes are the most important on environmental labels. Regarding label information on package recycling and reusability, a majority of Finnish (57 per cent), British, Portuguese and Irish respondents (all 52 per cent) stated that whether a product can be recycled or reused is the most important information that an environmental label should display. Compared to Latvia and Lithuania where less than a quarter of participants selected this response (18 per cent and 24 per cent, respectively). With regards to the products' GHG emissions display on an environmental label in almost all European countries that were surveyed, the proportion of respondents selecting the carbon footprint as the most important information on environmental labels was lower than that selecting each of the alternative possibilities (e.g. recycling, eco-friendly packaging, eco-friendly sources) listed in the survey. The proportion stressing the importance of information about a product's carbon footprint was the highest in Portugal (19 per cent) and the lowest in Latvia and Poland (3 per cent and 4 per cent, respectively).

To summarize, the reviewed literature on consumers' attitudes and preferences for certain product attributes showed that preferences differ for various product attributes and between countries. The literature review showed that most research has investigated consumer attitudes towards product labels claiming single sustainability attributes, while a limited number of studies have examined the labelling of multiple sustainability claims on food products. Therefore, this research contributes to the literature by investigating which of the many environmental and social issues consumers are concerned of and what preferences they have towards different label claims on food products.

Consequently, hypotheses examined within this paper include:

- (i) *Consumers are concerned about the environment and this influences their purchase decisions.*
- (ii) *Consumers in the UK and Japan value improved sustainability credentials in food products differently.*

2. Methodology

This paper aims to establish shopping behaviour, consumer attitudes, knowledge and perceptions towards social and environmental issues in both Japan and the UK. To this end, several surveys in each country have been carried out using Qualtrics™, a computer program, with a total sample of 440 people in each country. The web-survey was conducted in July 2010 in the UK and Japan. The sampling strategy was designed to achieve a representative sample in each country. Respondents were selected by a commercial research company. The study yielded a sample of 880 completed survey answers. Data was analysed using SPSS.

Descriptive statistics have been used to determine the knowledge, attitudes and preferences of consumers in Japan and UK towards sustainability issues. In addition, as a statistical test of difference between Japanese and UK samples, p-values for a chi-square test of the null hypothesis of no difference between sample distributions are also presented in relevant

questions. If the null is rejected this provides evidence that the sample distributions are statistically different. Using conventional levels of statistical significance, a p-value less than 0.10 implies rejection of the null.

2.1 Survey description

Questionnaire development took place over an extended period. In order to determine the structure and content of the survey, focus group meetings and interviews with key stakeholders in the food industry were conducted. In these interviews participants were predominantly concerned about the future of water scarcity and quality. Hence, an attribute describing water efficiency is included in the study.

Focus group meetings are an important aspect when trying to understand the importance and role of sustainability and particularly of carbon footprint labelling. It is necessary to understand the larger process of food consumption decisions including information collection, store behaviour, and label priorities. Two focus groups were held in February 2010 in New Zealand to derive a general understanding of people's views and attitudes towards different food product labels and to identify attributes for inclusion in the choice experiment. The participants in the first group were aged 20 to 30 years whereas the second group include people aged 30 to 60 years. Both groups meetings followed a similar format including discussion of individual products and awareness and perceptions of sustainable, especially carbon footprint labelling. The level of awareness was roughly the same across both groups although Group One may have a slightly higher level of involvement and awareness than those in Group Two. The lower level reflects that people believed it would be difficult to make a decision based on sustainability due to limited knowledge and information provided.

This difficulty was found when three specific carbon labels were presented to the participants for preference and user interpretation. Participants were concerned about how the standard of the carbon measure was set. In addition, respondents were missing a reference point and background information. However, it was agreed that if all products had such labels it would be more useful because food items could be compared.

The focus groups responses reflected the complexity of decision-making facing individuals. The variety of responses and the influence of sustainability criteria reflect the nature of the decision process and constraints that individual consumers face. The awareness of sustainability issues is encouraging even though it may not be the primary driver of the decision-making. It is expected that the use of the Discrete Choice Analysis will shed more light on the priorities and use of information when specific labels are obvious and available to consumers.

The final survey included generic questions on shopping behaviour and on attitudes towards sustainability issues. In addition, a choice experiment was included which is not part of this paper. An initial pre-trial of the survey with 15 respondents was performed in the UK to test any operational issues of the web-based questionnaire.

3. Results

3.1 Sample demographics

Respondent demographics for both countries are presented in Table 1. Respondents' income distribution is provided in Table 2. The income ranges differ between the UK and Japan as incomes were elicited in respondent domestic currency. The gender distribution of the UK survey respondents was 45 per cent male and 55 per cent female, compared to a more equal distribution of 50 per cent female and male in Japan. Other categories showed highest proportions for UK respondents aged over 60, married, living in a household without children. The level of education did not have a clear distinction. In Japan, the age classes of respondents were more evenly distributed. Within the Japanese sample the highest proportions were achieved for respondents aged over 60, married, lived in a household with children in an urban area, finished a tertiary level degree and earning between £26,595 - £41,791 annually.

Table 1: Summary demographics of survey participants (per cent)

	UK	Japan
<i>Gender</i>		
Male	45	50
Female	55	50
<i>Age</i>		
15-19	0	4
20-29	5	15
30-39	8	18
40-49	13	12
50-59	17	18
60+	56	33
<i>Living environment of participants</i>		
Urban	23	48
Suburban	46	44
Rural	31	7
<i>Relationship status</i>		
single	15	31
married	57	61
other	27	7
<i>Education</i>		
Junior High School	14	2
High School	30	30
Junior College	1	19
University degree/ Tertiary level qual.	44	43
Post-graduate Degree	7	4
Other	4	1
Based on 440 responses in each country		

Table 2: Income distribution of survey participants (per cent)

Income	UK	Income	Japan
< £15,000	19	< £15,196	12
£15,001-£40,000	42	£15,197- £26,594	16
£40,001-£60,000	17	£26,595- £41,791	27
£60,001-£100,000	8	£41,792- £64,585	22
£100,001 or more	3	£64,586 or more	18
Prefer not to answer	11	Prefer not to answer	5

Note: The income ranges differ between the UK and Japan as incomes were elicited in respondent domestic currency.

3.2 Results on attitudes and perceptions towards sustainability issues

The survey included several questions to examine the attitudes, knowledge and perceptions of consumers on environmental and sustainability issues on produce.

When asked about the extent of environmental friendly activities that participants do in their life, the majority of respondents in both countries did *'quite a few'* things that were environmentally friendly as shown in Table 3. In both countries the vast majority at least did *'one or two things that were environmentally friendly'*, however in total it seems that respondents in the UK did more environmentally friendly activities, with about a quarter claiming that most things they did were environmentally friendly, in comparison to about one in ten who claimed this in Japan. Very few (about 1 per cent) in both countries claimed that everything they did was environmentally friendly. The distributions of this variable are statistically significantly different ($p < 0.01$) between the countries.

Table 3: Environmental lifestyle perceptions (per cent)

Answer	UK	Japan
Everything I do is environmentally friendly	1	2
Most things I do are environmentally friendly	25	11
I do quite a few things that are environmentally friendly	57	50
I do one or two things that are environmentally friendly	16	30
I don't really do anything that is environmentally friendly	2	7

Based on a four-point Likert-scale varying from *'very important'* to *'not important at all'*, the next question asked participants about the importance of certain product features such as brand, quality, price and impact on environment when making a purchase decision. As shown in Table 4, a large number of participants in both countries found the products' impact on the environment to be *'very important'* or *'somewhat important'* (UK 58 per cent, Japan 50 per cent). About one in ten people in both the UK and Japan considered the impact on the environment was not important. In both countries price and quality aspects were still rated higher

than the product's impact on the environment. In the UK, quality was the most important factor, with slightly over two-thirds of participants finding it very important, and 28 per cent thinking it *somewhat important*. Price was similar with 95 per cent finding it at least somewhat important, however only slightly over half of participants thought it *very important*. Conversely in Japan, price was considered most important, with a very similar response to quality in the UK. Quality was the second highest rated, with very similar results to price in the UK. Interestingly, the product brand was the least important aspect for respondents in both countries; only 49 per cent of UK respondents and 48 per cent of Japanese thought the brand is '*very important*' or '*somewhat*' and 15 per cent in the UK and 14 per cent in Japan thought the brand is '*not important at all*'. Differences between the two countries are significant on a 10 per cent level ($p < 0.1$).

Table 4: Importance of various factors upon consumption (per cent)

Question	UK				Japan			
	Very important	Somewhat important	Neither important nor unimportant	Not at all important	Very important	Somewhat important	Neither important nor unimportant	Not at all important
Price	52	43	4	0	69	26	3	2
Quality	71	28	1	0	51	43	6	0
Brand	9	40	36	15	6	42	38	14
Impact on the environment	12	46	31	11	7	43	38	12

These initial questions outlined the positive attitude towards the environment among consumers in the UK and Japan. The next question asked respondents to agree or disagree with the statement "*I trust producers' claims about the environmental performance of their own products*". There was an extremely similar result in the two countries, with about a half agreeing and a further 15 per cent strongly agreeing in both, as shown in Table 5. This left only about one in ten respondents that would not trust producer's claims, and within this amount only 1 per cent in each country strongly disagreed to the statement. For this statement, the results show no evidence that there is a significant difference between the countries. The following question asked respondents to agree or disagree with the statement "*There is a connection between environmental well-being and my personal health*". The largest difference between the two countries compared to all survey questions was observed. In the UK slightly less than a third either agreed or strongly agreed, and slightly over a third disagreed or strongly disagreed (36 per cent). Whereas in Japan, almost two-thirds of participants agreed with this statement and among these, 17 per cent agreed strongly. In total less than 10 per cent in the Japanese survey disagreed. Observed differences are statistically significant ($p < 0.01$).

Table 5: Opinion on various statements upon food consumption (per cent)

Question	UK					Japan				
	Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Strongly agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I trust producers' claims about the environmental performance of their own products	14	48	28	8	1	13	51	29	6	1
There is a connection between environmental well-being and my personal health	5	25	34	29	7	17	46	28	6	3

As mentioned above the majority of survey participants in the UK and Japan trust the producers' environmental information on products but which of the many products' attributes would consumers like to see on environmental labels? Using a five-point Likert-scale varying between 'strongly agree' or 'strongly disagree', participants were asked if they would like to see the display of 'recyclability', 'made from environmentally friendly sources', 'eco-friendly packaging', or 'GHG emissions' included on a label. As shown in Figure 1, it was observed that label information on a package's recycling and reusability is the most desired label claim in both countries (UK 89 per cent, Japan 74 per cent). Interestingly over half of the total participants in the UK 'strongly agree' that this information should be included. Results were similar in Japan, with over two thirds agreeing, although only one in five strongly agreed. The second most desired label claim is whether a package is eco-friendly, 79 per cent of UK respondents strongly agreed or agreed to the inclusion of this attribute on a product label, compared to 65 per cent of Japanese survey participants 'strongly agree' or 'agree'. In both countries the proportion of respondents selecting 'GHG emissions' as the most important information on environmental labels was lowest compared to all other listed claims. Forty seven per cent of UK respondents and 39 per cent of Japanese participants did at least agree to include the carbon footprint in a label. The observed differences are statistically significant on a 1 per cent confidence level ($p < 0.01$).

Figure 1: Opinions regarding the inclusion of environmental information on product labels

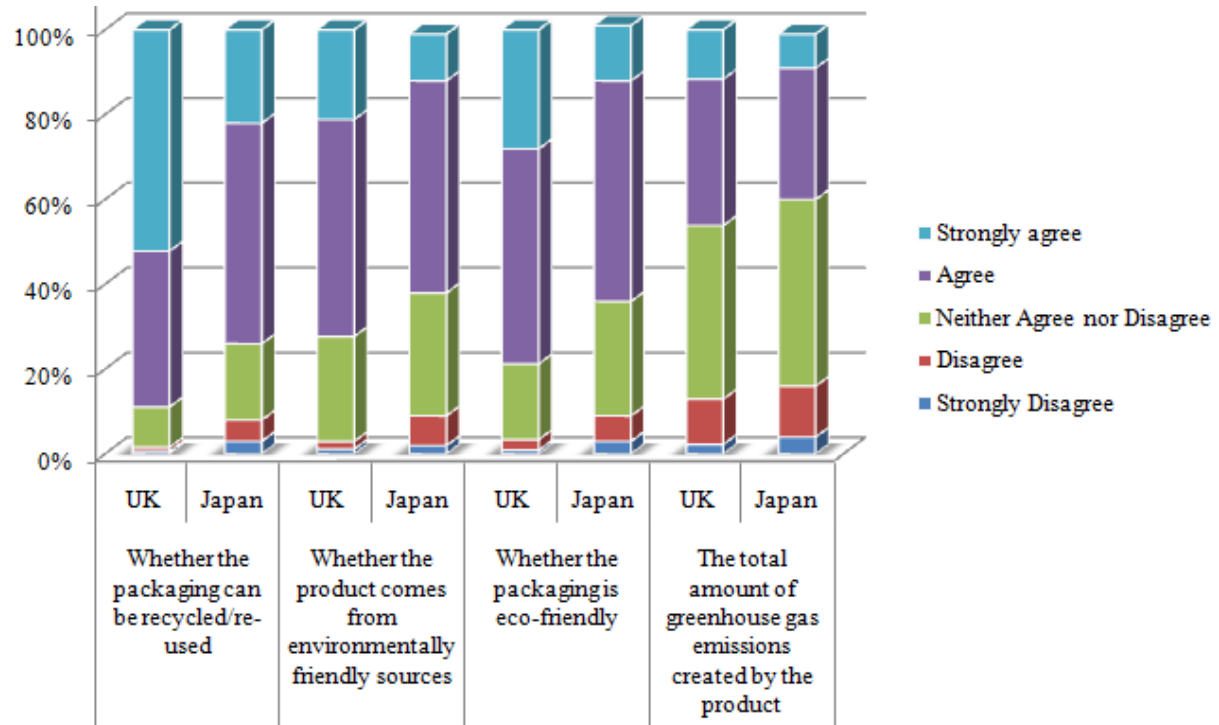
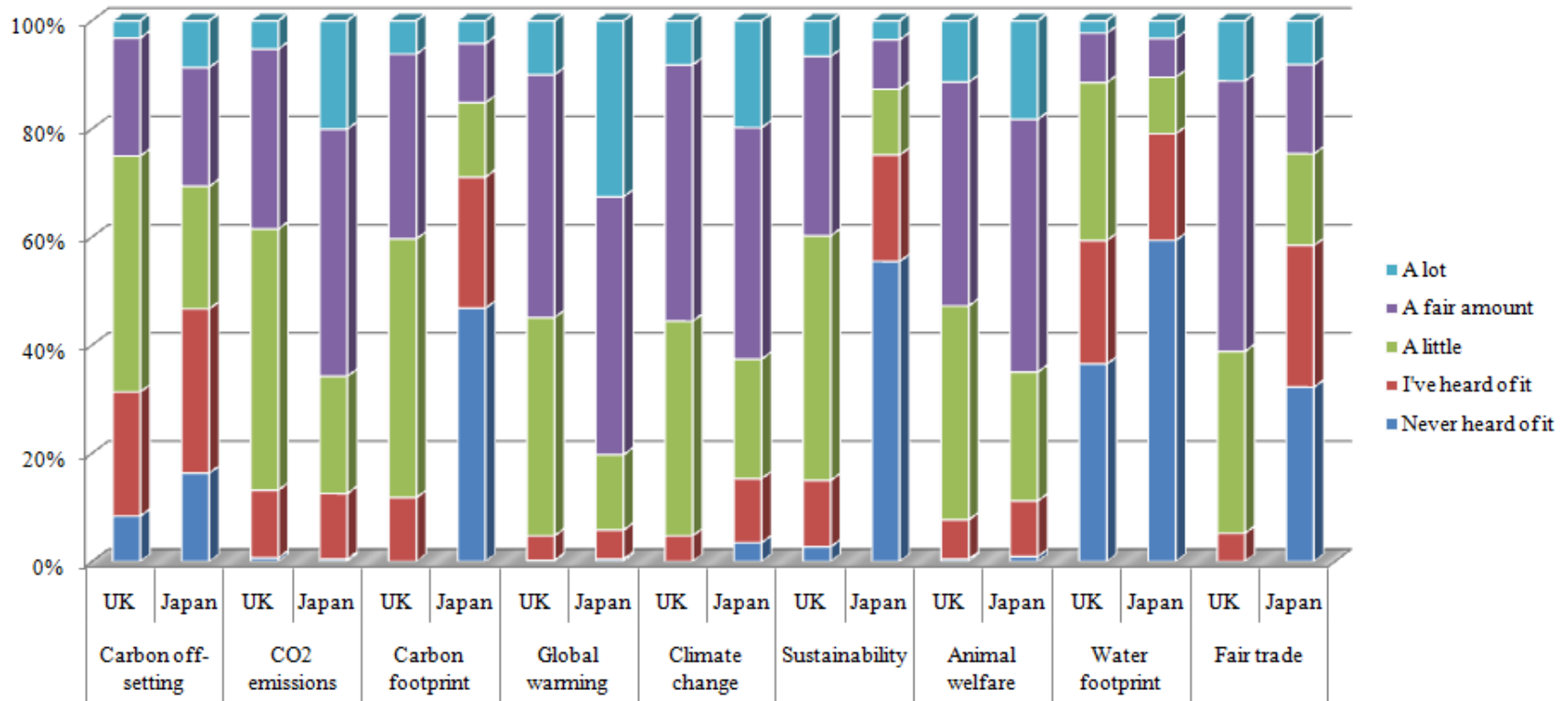


Figure 2: Knowledge of participants of various environmental and social issues



Note: Chi-Square Test for H_0 : no differences between country distributions, rejected for all cases.

In order to learn more about consumers knowledge about specific environmental and social issues that could be included on labels, participants were asked about their knowledge of general sustainability issues on a five-point Likert-scale varying between '*a lot*' and '*never heard of it*'. Figure 2 shows that overall the average knowledge of respondents' could be considered good with the bulk of respondents indicating that they had a fair amount or a little knowledge of the majority of issues presented.

In the UK survey, 'Animal Welfare' 'Fair Trade' and 'Global Warming' were the only issues that 10 per cent or more of participants claimed to know a lot about. The vast majority (95 per cent) knew at least a little about these three subjects, along with 'Climate Change'. Furthermore no one in the UK sample had never heard of any of these topics. The next most well known topics in the UK sample were 'CO₂ Emissions', 'Carbon Footprint' and 'Sustainability'. The large majority (85 per cent or more) knew at least a little about each of these topics, and over a third of respondents knew a fair amount or more about each of these topics. The least known in the UK survey, were 'Carbon Off-Setting' and 'Water Footprint', with less than 5 per cent claiming they knew a lot about either. As for 'Water Footprint' over a third (37 per cent) of participants had never heard of the topic and about a quarter (23 per cent) of participants had only heard of it, meaning the majority had no knowledge of the topic.

This is even more than in Japan, where 59 per cent of participants claimed they have never heard of the term 'Water Footprint'. In Japan, 'CO₂ emissions', 'Global warming', 'Climate change', 'Animal welfare' were the most well known, with about 20 per cent or more of participants claiming to know a lot about each topic. The term 'Global Warming' received the highest proportion with one in three people knowing a lot about the issue. Of these well known issues almost half of those taking the survey considered themselves to know at least a fair amount about each. Again in Japan, 'Carbon Off-Setting' and 'Fair Trade' were only somewhat known. The majority knew at least a little about 'Carbon Off-Setting' (54 per cent), this was not the case with 'Fair Trade', where the majority (58 per cent) didn't know anything about the topic, and almost a third had not heard of 'Fair Trade'. Finally in Japan, the least known topics were: 'Carbon Footprint', 'Sustainability' and 'Water Footprint'. Of these results on these three topics, less than 5 per cent of participants knew a lot about any. Furthermore, about a half (47 per cent) had not heard about 'Carbon Footprint', and the majority in both cases had not heard of 'Sustainability' (56 per cent) and 'Water Footprint' (59 per cent).

Comparatively, respondents in Japan were more likely to claim they knew a lot about a topic than those in the UK, responses in Japan going over 20 per cent for knowing a lot about a subject, whereas in the UK only a few topics had 10 per cent or more claiming to know a lot. Conversely, Japan also had more respondents who didn't know about subjects. In the UK, with the exception of 'Water Footprint' less than 10 per cent of people had never heard of each topic, in the majority of cases all respondents had at least heard of the topics, whereas, in Japan, over a third had never heard of the topic in several cases.

Finally, the respondents had the least knowledge about water foot-printing with 35 per cent having '*never heard of it*' (35 per cent), while they had the most knowledge about climate change. The observed differences between UK and Japan are statistically significant ($p < 0.01$).

4. Discussion & Conclusions

There is an increasing expectation from consumers that products have sustainability credentials, and that these can be verified. These sustainability criteria cover a whole range of attributes from environmental, social and ethnic dimension. Product labels are important for these credence attributes as they generate and increase the credibility of the attributes of the product. As an example, carbon accounting is growing in its use and importance for industries, corporations and individuals around the world. Alongside corporate disclosure and consumer demand, the development of carbon labelling schemes has increased. Many factors require consideration when a label is developed which is supposed to display numerous sustainable attributes of a product. In order to develop an effective label with a good performance it is important to learn about consumers' perceptions, attitudes and knowledge about certain label claims.

Using a web-based survey, this study examined consumer attitudes and knowledge about certain sustainability attributes on food labels in the UK and Japan and compared these preferences and perceptions across countries.

The results of the survey revealed similarities and differences of consumer preferences, attitudes and knowledge between the UK and Japan. It could be seen that the importance of the products' impact on the environment is valued similar in these two countries. When asked which environmental information consumers would like to see on the food label, both countries stated similar preferences for the desired label claims of environmental product features with 'recycling/ reusability' information ranked highest and 'GHG emissions' display ranked lowest. These results are in line with the above presented study from the European Commission (Eurobarometer, 2009) in which EU participants rated the display of GHG emissions on an environmental label lower than the alternative possibilities. The fact that GHG emissions display was selected least important information on an environmental label may be connected with comprehensibility of the term. Moreover, the comprehensibility of label claims is an important requirement in the business decision because it may influence the performance and effectiveness of a label to a high degree.

Differences between the two countries could be observed in the perceived connection between environmental well-being and personal health, where a majority of UK respondents stated not to see a connection compared to a large Japanese population seeing a connection between environmental well-being and personal health. This finding may have important consequence for policy development in this area and warrants further investigation.

Similarities between both countries were observed in terms of the trust in producers' claims of the environmental performance of the food product. This is perceived to be important for both Japanese and UK consumers in similar proportions. Interestingly, this was the only case where p-values did not reach the 10 per cent confidence level. Information gained from this result may be useful for producers as consumer trust can aid in forming the basis for an effective and well-performing product label that contains sustainability attributes.

Perceived knowledge about specific terms addressing environmental and social issues showed similarities and differences between the countries with 'Fair Trade', 'Sustainability' and 'Carbon

Footprint' not well known by Japanese participants and well known by their UK fellows. The term 'Water Footprint' was not known well by respondents from both countries. As for the knowledge of various environmental and social issues, it is a surprising result that more than 55 per cent of Japanese respondents have not heard about the term 'Sustainability'. This may be a translation issue specific to the survey or due to the fact that the term is not commonly used in Japan. Translation issues are a general limitation of cross-country comparisons. The original survey was in English. For the Japanese survey the questionnaire was translated into Japanese (Kanji) by a professional translation service. Translation from one language into another language can be difficult, even more when the alphabets of the languages are different. Another interesting fact is that almost 50 per cent of Japanese respondents stated to have not heard about the term 'Carbon Footprint', considering their perceived knowledge about other carbon related terms such 'CO₂-emissions' and 'Carbon Off-setting'. The higher degree of knowledge of the Japanese compared to the UK participants regarding the term 'carbon off-setting' is likely to be related to the launch of a Carbon Offset labelling scheme by the Japanese Ministry of Economy, Trade and Industry in 2009. Likewise, the good knowledge of the term 'Carbon Footprint' in the UK may be generated by the Carbon Footprint labelling of the major supermarket chains in the UK.

Overall, the results of this study find evidence that consumers in the UK and Japan value label claims that display sustainability attributes and the products' impact on the environment similarly. In addition, it could be seen that environmental issues play an important role in consumers buying decisions. However, it was observed that consumer's knowledge and perceptions of some label claims can differ substantially across countries, in particular the knowledge about certain terms such as sustainability and carbon footprint are very different between the Japanese and UK consumers. The information gained from this study may support producers and manufacturers to increase a label's performance and comprehensibility of specific label claims.

Broad policy implications that follow from this study concern the need to provide diverse policy responses based partly on differing consumer characteristics. In particular, implications for policy development concerning climate change, given what was shown in this paper, are that there is a diverse range of responses to consumer behaviour which should be acknowledged when formulating policies.

To conclude, carbon labelling is in its infancy and further research is required to investigate consumer attitudes and consumer segmentation. In fact, these results are the base for a series of surveys including a choice experiment assessing different product attributes on labels in the ongoing project. Further research will include Discrete Choice modelling for certain product attributes. In addition, consumers' attitudes and comprehensibility of different label designs will be examined, varying from pure text, to pictorial and to a combination of these two in UK and Japan.

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