



### Showcasing green: how culture influences sustainable behavior in food eco-labelling

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# Showcasing green: how culture influences sustainable behavior in food eco-labelling

**Design/methodology/approach:** We tested the impact of culture dimensions through an econometric model, on a sample composed by several countries of the world, in which at least a food certification is in force.

**Purpose:** The aim of this study is to verify, through Hofstede's 6-D model, the impact of national culture on the implementation of eco-labelling activities on the supplier side, in order to provide consumers information about the sustainable behavior adopted by firms.

**Findings:** Interesting results have been obtained and discussed, proving the existence of a relationship between culture and corporate sustainability showcasing. Cultural heritage has a deep influence on sustainable consumption demand. Firms need to put more effort to showcase their green behavior. Economic indicators have a role in fostering sustainable behavior.

**Originality/value:** Food labelling is little explored, despite its growing importance for consumers. This research is a window in green marketing issues, specifically in global branding strategies.

**Keywords:** Eco-labels; National Culture; Sustainable Behavior; Food Eco-labelling; Hofstede 6-D model.

## 1. Introduction

As well known, the survival of human beings, as well as their evolution, is highly connected to the enhancement of agricultural production and ecosystem services (Tilman et al, 2002). Their importance is confirmed in literature by several studies, in which agriculture is often put beside sustainability in order to explain how and in which direction future research is going. In 1990, MacRae et al. defined sustainability in agriculture as a "philosophy and system of farming", whose roots lie in a set of values reflecting empowerment, awareness of ecological and social realities, and one's ability to take effective action. Therefore, on these grounds, a set of goals were defined with the purpose of reducing the long-term impact on the natural heritage caused by human activities (Francis and Youngberg, 1989). Agriculture and agri-food systems need to be completely oriented towards the three dimensions of sustainability, where the latter shall be intended in its most modern concept (Elkington, 1997, 1998). The perspective to adopt must be complete where, at the environment, it is crucial to include the economical, technical and social instances too, from the strategic stage (Yunlong & Smit, 1994; Smith & McDonald, 1998). For this reason, the primary sector has been deeply analyzed, in order to define the best practices as well as a new set of indicators to evaluate its sustainable assessment (Latruffe et al., 2016). It is not a simple work, considering all the aspects related to this very important challenge, where the balance between production and consumption implies several evaluations (Reisch et al., 2013). Many authors tried to give a valid contribution, adopting an integrated vision, or proposing a specific measure for a detailed aspect (Hayati et al., 2010; Sabiha et al., 2016; Janker et al., 2019). In the last decades the monitoring of sustainability was also supported by different indexes that focused many aspects, from the rule of law to the environmental performances and so on (Reyter et al., 2014).

For example, Pretty (2007) fixed some golden rules which established the conditions of sustainable processes, which are as follows:

- Integrate biological and ecological processes such as nutrient cycling, nitrogen fixation, soil regeneration, allelopathy, competition, predation and parasitism into food production processes;

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- 3 - Minimize the use of those non-renewable inputs that cause harm to the environment or to
- 4 the health of farmers and consumers;
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- 6 - Make productive use of the knowledge and skills of farmers, thus improving their self-
- 7 reliance and substituting human capital for costly external inputs; and
- 8
- 9 - Make productive use of people's collective capacities to work together to solve common
- 10 agricultural and natural resource problems, such as for pest, watershed, irrigation, forest
- 11 and credit management.
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14 The reason of this high awareness is strictly connected with the relevance of this topic, since  
15 agriculture is the first activity to put in a deep connection the natural environment with the human  
16 activity. However, a real change toward a more balanced system could be obtained not only through  
17 the imposition of new laws, but also through voluntary actions (Banterle et al., 2018), identifying  
18 new guidelines (Baritz et al., 2018) as well as favoring the stakeholders' inclusion (Cheyns, 2011).  
19 Moreover, there is an increasing demand for sustainable agricultural products and food, at a pace  
20 that is proportional to the rise of environmental concerns among population, above all in the  
21 premium or quality segment (Belz & Schmidt-Riediger, 2010).  
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24 Many firms have transformed their production and distribution systems to reduce their carbon  
25 footprint; moreover, coffee retailers, have introduced new practices into their supply chains to  
26 ensure better working conditions for the farmers, dealing with other aspects of sustainability,  
27 looking more at the social issues; architects and technicians have included innovative design  
28 features into new buildings to reduce consumption of energy, water, and materials (Castka and  
29 Corbett, 2016). These improvements are often "hidden" and difficult to observe (Terlaak, 2007) so  
30 firms try to find several ways to enlighten consumers about them. Products might be labeled as  
31 "carbon zero", "fair trade" or "organic" to communicate the firms' social and environmental novel  
32 behaviors to consumers (Harbaugh et al., 2011; Hartlieb and Jones, 2009) and retailers report a fast-  
33 increasing demand for "green" products (TerraChoice, 2010). To give an answer to market demands,  
34 eco-labels were introduced as a measure of firms' sustainable behavior above all towards  
35 consumers and stakeholders (D'Souza, 2004). They identify a synthetic – but effective – indicator  
36 which application allows comparisons in terms of best practices, product quality, and social and  
37 environmental impact among firms, representing a marketing instrument too (Atanasoae, 2013).  
38 Over the years, the interest in eco-labels in practice grew to the point of giving birth to a real  
39 "market", alongside the growing concerns for sustainable consumption and the tightening of  
40 regulations by governments regarding sustainability goals as well as environmental and social  
41 preservation. Nowadays, however, it seems that this market of labels is full of overlapping  
42 certifications. Of course, this is not an optimal scenario as it makes them less recognizable and less  
43 authoritative toward the market and consumers (Annunziata et al., 2019).  
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49 The aim of this paper is to understand whether culture has to deal with the spread of food  
50 sustainability certifications, i.e., eco-labels, and in what measure they are influenced by culture. For  
51 this reason, we considered Hofstede's national culture dimensions as a benchmark for our analysis.  
52 A remainder of this paper is as follows: the next paragraph fixes a theoretical background of eco-  
53 labelling in food and the sustainability-culture nexus, then we follow up the methodology and the  
54 results of the analysis; the paper ends with discussions and conclusions on the study.  
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## 57 **2. Theoretical background**

### 58 *2.1 Towards a sustainable food system*

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3 The evidence of climate change issues has led, in the last years, to a radical change in consumption  
4 habits, pushing consumers, from the majority of the countries to react to such critical situation (the  
5 rise of planet's temperature, critical levels of GHG emissions, polar ice meltdown, and so on). Agri-  
6 food sector, more than others, has accepted this radical change in the way of acting in business,  
7 being accountable in its relevant role played in climate change and environmental impact issues  
8 (Azzurra et al., 2018). Overall, all the actors along the whole food supply chain have an impact on  
9 the environment (Grunert, 2011), starting from animal, fish, and plant production, passing through  
10 all food processing stages and the way it is transported, and finally, the way consumers buy and  
11 dispose of food. As a result, its production and consumption impact the environment in terms of  
12 greenhouse gas emissions (GHGs), water pollution, and loss of biodiversity, events which, according  
13 to Reisch et al. (2013), will be further exacerbated by future world population growth. As a matter  
14 of facts, it is clear that such barely sustainable practices, especially in food production and farming,  
15 ought to be changed in favor of less impacting processes of production and consumption (TP  
16 Organics, 2019). These last two aspects represent the starting point of this study.  
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21 A first way to inquire possible paths of change in production, efficiency of factors and more  
22 sustainable supply chain systems is to analyze possible positive effects on the agriculture sector  
23 (Clark and Tilman, 2017). A central aspect is, first of all, to identify the most effective green practices  
24 to be adopted in the outlook of environmental protection, such as avoiding the overuse of pesticides  
25 and respecting the normal life cycle of the production of plants and animals, employing resources  
26 more efficiently, avoiding disruptive effects on the ecosystem. One of these practices is adopting  
27 Organic Agriculture, which arises as an alternative to food produced with agrochemicals and  
28 agricultural inputs (Reynaldo et al., 2019). According to IFOAM (2005), Organic Agriculture is defined  
29 as a production system that regenerates the health of soils, ecosystems, and people. More  
30 specifically, it relies on ecological processes, biodiversity and cycles adapted to local conditions,  
31 rather than the use of inputs with adverse effects. Therefore, Organic is the production system that  
32 combines tradition, innovation, and science to benefit the shared environment and promote fair  
33 relationships and a good quality of life for all involved (IFOAM, 2005).  
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37 As regards the consumption, transition towards a more sustainable food system is focused on the  
38 consumer behavior (Sargant, 2014; Vittersø and Tangeland, 2015); purchasers, shall adopt  
39 consumption habits that aim to diminish their impact on the environment and contribute to the  
40 local economy with their socially responsible choices (Sargant, 2014). In fact, like a 'break point' in  
41 the chain (Grunert, 2011), consumers can reward more sustainable food production by choosing  
42 those products made according to certain green production standards, that are fundamental  
43 determinants of food security, safety and human health (Myers et al., 2013). However, since  
44 sustainability is a characteristic that cannot be seen or touched, to be appreciated, products made  
45 in this way must be communicated. One way to communicate food sustainability is the use of eco-  
46 labels (Erskine & Collins, 1997), which indicates an attribute associated with environmentally  
47 friendly products that can provide the value of a product.  
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## 50 *2.2 Eco-labelling in the agri-food industry*

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52 The presence of eco-labels on agri-food products resumes a concrete effort to provide better and  
53 deeper characteristics from different perspectives, since they are also an answer to a rising concern  
54 in product details (Zepeda et al., 2013). There are a considerable number of eco-labels on food  
55 products, whose common denominator is the fact that they are adopted on a voluntary basis. Most  
56 of them cover only certain aspects of the broader sustainability concept, while others focus on  
57 signaling issues related to environmental protection, fair trade, animal welfare, carbon footprint,  
58 local production, and other aspects. According to OECD (1997), there are three main types of labels:  
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- Type I labels insist on parameters of the environmental impact of products and production processes, released by third party organizations, generally government supported. They aim at fostering the improvement of firms' sustainable behavior by comparing different products of the same segment, so firms voluntarily apply to obtain them;
- Type II labels are arbitrary declared by firms, which make determined statements about characteristics of their products, generally referred to environmental concern aspects;
- Type III labels usually correspond to the accomplishment of certain indices, giving information about the product and have independent verification.

Eco-labels, in particular, comply with the Type I features, characterized by criteria that are regularly verified by dedicated bodies, which provide for the display of a logo that makes consumers aware of the sustainable behavior of such firms. Specifically, a product certification is generally accompanied by a process certification. In fact, it is unthinkable that a sustainable output can be obtained without sustainable inputs transformed through sustainable processes.

Firms are currently able to trace sustainable processes and their ESG commitment through the attribution of certification to all sorts of goods and service provided. This commitment is driven by the achievement of a specific aim: the rise in consumers' trust. Some scholars (Galarraga Gallastegui, 2002; Loureiro et al, 2002) argued that consumers are likely to pay a premium price if the product is endowed with an eco-label. This is an interesting result which leads to important considerations regarding the attributes that come with the release of the label: perceived quality of products, food safety, and environmental and health concerns above all, but also trust and brand loyalty when labels are combined with well-known CSR conscious firms (Perrini et al., 2010). For what regards the approach to sustainable consumption decision making process, and environmental impact, i.e., an adequate signaling strategy of reducing pollution (e.g., carbon emission reduction) leads to a fairer behavior by consumers, which are more willing to purchase such products which are told to be less harmful for the environment (Vanclay et al, 2011).

Ecolabel's certifier bodies' attributes, as the features of the ecolabel itself, are a determining factor in granting products and services to be identified as reliable and successful in showing accuracy of responsible propensity. Evidence shows that NGOs are acknowledged to be more trustworthy than other subjects as a guarantor and issuer of eco-labels (Nilsson, Tunçer, and Thidell, 2004; De Pelsmacker et al., 2005).

It is overstated that the proliferation of eco-labels could lead to a growing confusion among consumers about the truthfulness, the provenience, and the impartiality of several of such certifications (Thorne, 2009). However, as pointed out by some scholars, there has been a lot of confusion around eco-labels, due to the high number of such certifications, the consequent lack of clarity, as well as the attempt made by some companies that have used this tool to do greenwashing actions. Indeed, when information released with regard to green products characteristics is not fully accessible and understandable, the virtuous spiral stringing environmentally responsible firms and consumers is compromised, with the crucial implication that companies are no longer encouraged in investing in their efforts in sustainability issues (Iraldo, Testa, and Bartolozzi, 2014).

However, even if these data detect a relevant signal in response to food safety and quality issues, the existence of such a high number of certifications is clearly a limit because it undermines the right of consumers to simplicity and good information. Tregear and Giraud (2011), indeed, stated that future developments in Geographical Indication systems and certification should consider how to align codes of practice and qualification criteria with dimensions of importance to food consumers/citizens. As a matter of fact, even the traditional and heritage aspects have problems of

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3 recognition by the certifications, due to the lack of a linkage between factual and material  
4 components in the transfer of information on food characteristics (Treager and Giraud, 2011).  
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6 Furthermore, given the recent hard times due to Covid-19, informing the consumer about the safety  
7 of the product they are buying through a label is still a crucial issue, linked to the need to avoid a  
8 collapse of its trust, especially in relation to those production activities that were affected the most  
9 by the pandemic crisis. From this point of view, the enhancement of quality and local production  
10 could be considered a lever to realize a generalized economic recovery. Providing consumers with  
11 clear information on the safety and quality of products – especially the local ones – through eco-  
12 labels is a way to promote local development. In this way, indeed, it could be possible to support  
13 short supply chains (Canfora, 2016), create informal relationships of trust and good reputation  
14 (Migliore et al, 2015), and give credit to retailers who, in most cases, associate Type I eco-labels with  
15 their private label, thus providing an increase of trust in the brand equity (Castaldo et al., 2009;  
16 Perrini et al., 2010).  
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20 Overall, reducing the information gap between producers and buyers of eco-sustainable products  
21 is certainly one of the fundamental functions of eco-labels. In fact, because of the presence of a  
22 third party that guarantees the customer compliance with public and transparent environmental  
23 standards by the manufacturer, buyers can be at ease and safe in making their purchasing decisions  
24 (Jahn et al., 2005; van Amstel et al., 2008).  
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27 To contribute to the debate on eco-labels, it could be interesting to study whether and how much  
28 this relationship of trust can be influenced by aspects rooted in a country's national culture. It is  
29 known, in fact, that the national culture can guide the choices of its citizens in certain directions,  
30 and, in this particular case, it may or may not push consumers towards a greater level of acceptance  
31 of eco-labelled products.  
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### 34 *2.3 National culture model*

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36 “The collective programming of the mind distinguishing the members of one group or category of  
37 people from others” is the definition of culture issued by Geert Hofstede (1991).  
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39 The six dimensions of national culture are based on extensive research done by Geert Hofstede,  
40 Gert Jan Hofstede, Michael Minkov and their research teams. The application of this research is used  
41 worldwide in both academic and professional management situations. The Hofstede model of  
42 national culture consists of six dimensions. The cultural dimensions represent independent  
43 preferences for one state of affairs over another that distinguish countries (rather than individuals)  
44 from each other (Hofstede, 1991).  
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47 The country scores on the dimensions are relative, in that we are all human and simultaneously we  
48 are all unique. In other words, culture can only be used meaningfully by comparison. The model  
49 consists of the following dimensions: power distance (PDI), that expresses the degree to which the  
50 less powerful members of a society accept and expect that power is distributed unequally;  
51 individualism vs. collectivism (IDV), can be defined as a preference for a loosely-knit social  
52 framework in which individuals are expected to take care of only themselves and their immediate  
53 families; masculinity vs. femininity (MAS), which represents a preference in society for achievement,  
54 heroism, assertiveness, and material rewards for success; uncertainty avoidance (UAI) expresses a  
55 measure to which the members of a society feel uncomfortable with uncertainty and ambiguity  
56 (Hofstede, 1991); long-term orientation (LTO) indicates the measure of how societies look at the  
57 future with suspicion or take the challenge of evolution with pragmatism and effort; indulgence vs.  
58 restraint (IVR) stands for a society that allows relatively free gratification of basic and natural human  
59 drives related to enjoying life and having fun (Hofstede et al, 2005, 2010; Hofstede-insights, 2019).  
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The 6-D model on national culture has been widely employed to assess consumer behavior and firm marketing strategies across different countries. De Mooij and Hofstede (2002) argued that retailing strategies ought to adapt to every specific context in order to payoff best. This is of particular interest for our analysis, assuming this model to be very useful and appreciated in cross-cultural marketing studies. Indeed, this model has been employed in the most different economic sector, proving its feasibility and adaptability to different context. Global marketing strategies are naturally affected by cultural factors which are not easily interchangeable and dynamically changing from time to time. As proved also by Beugelsdijk and Welzel (2018), our society – especially in younger generations – is encountering a season of epochal cultural changes, as it happened for past generations. Even though, it is barely impossible to trace such changes in a particularized way in order to find a general golden rule to obtain a new, unbiased model on cultural values. Other several attempts of updating the Hofstede's model are being currently carried on: Minkov et al. (2018a; 2018b) provided new values and rationalization of some of the cultural dimensions, which actually still lacks data for all the countries involved in this study. For this reason, a stable and rather complete indicator for some crucial parameters assessing national values is a useful tool to understand, in this specific context, the existence of a relationship between culture and consumption, i.e., if there is a direct link between the demand for sustainability from the consumers and the sustainable behavior adopted and signaled by firms.

#### 2.4 Building the research model

Based on the theoretical background built, we decided to match data about eco-labels in the food industry with national culture dimensions. Many scholars inquire the relationship between national culture and sustainable behavior, especially from the consumer perspective, proving the existence of a relationship between collectivistic values and sustainable purchase (Kimura and Nakajima, 2011; Han and Kim, 2019). The present study, instead, aims to flip the perspective on the supply side, in order to capture the possible existence of sustainable behavior in production processes. The following paragraph conveys the quantitative methodological process.

### 3. Materials and Methods

We collected data exclusively concerning the food and agriculture industry, by detecting interesting data from Eco-label Index database. We encountered 148 labels divided into 44 countries. We decided to attribute the presence of a single label (i.e., the EuroLeaf), being an EU label, to each of the countries of the European Union. Other national and international eco-labels are country specific. We also collected data of national culture dimensions from Hofstede insights database, which provides values for more than 120 countries in the world.

The descriptive statistics related to our dataset are summarized in table 1 as follows:

**Table 1.** Descriptive statistics (own elaboration)

	Average	Median	Dev. Std	Min	Max
<b>ecolabels</b>	3783,00	2000,00	7685,00	1000,00	51,00
<b>PDI</b>	56,59	57,00	23,07	11,00	100,0
<b>INV</b>	53,65	59,00	21,92	14,00	91,00
<b>MAS</b>	48,89	50,00	22,13	5000,00	100,0
<b>UA</b>	63,96	64,00	23,71	8000,00	100,0
<b>LTO</b>	55,98	55,50	19,31	21,00	88,00
<b>IND</b>	45,59	48,00	19,38	13,00	78,00
<b>PPC</b>	33849,00	26043,00	26103,00	1238,00	111100000,00

Population	101100000,00	11100,00	284800000,00	620,00	1398000000,00
LN_Population	18,43	9,31	19,47	6,43	21,06

Finally, we decided to assess the relationship country based by acquiring variables such as the GDP per capita and the population of the countries considered. As can be seen from the descriptive statistics, the standard deviation of the variables that measure the nation scale is very high. For this reason, we will treat the dimension through a logarithmic transformation.

In order to accomplish to our task, we first operated a correlation among our variables.

**Table 2.** Correlation matrix (own elaboration)

	Eco-labels	PDI	INV	MS	LTO	UA	IND	PPC	Population
Eco-labels	1								
PDI	-0,354737587	1							
INV	0,566299866	-0,78158	1						
MS	0,223889974	0,166845	0,202963	1					
LTO	-0,275041569	0,506555	-0,47725	-0,15435	1				
UA	-0,353623437	0,523378	-0,36733	0,046572	0,00882	1			
IND	0,401240192	-0,91945	0,768175	-0,05986	-0,69462	-0,38953	1		
PPC	0,288045433	-0,68826	0,491154	-0,19461	-0,60062	-0,11728	0,645612	1	
Population	0,864430921	-0,05156	0,354413	0,191066	-0,01937	-0,21219	0,079143	0,000441	1

According to the matrix obtained (Table 1), we observe interesting and intuitive results: Distance of Power, the Long-term Orientation and the Uncertainty Avoidance are negatively correlated with the number of eco-labels, while the Individualism, the Masculinity and the Indulgence are positively correlated with the number of eco-labels. On the other hand, also GDP per capita and population are positively correlated with the number of eco-labels.

We also built seven econometric models, interpreting the number of eco-labels as the dependent variable. The first is given by:

$$ECO_i = \beta'_0 + \beta'_1 PPC_i + \beta'_2 POP_i + \varepsilon'_i \quad i = 1, \dots, 44 \quad (1)$$

Then, for each  $j = 1, \dots, 6$ , we consider the following model:

$$ECO_i = \beta_{0,j} + \beta_{1,j} HOF_{i,j} + \beta_{2,j} PPC_i + \beta_{3,j} POP_i + \varepsilon_{i,j} \quad i = 1, \dots, 44 \quad (2)$$

Where  $HOF_{i,j}$  is  $j^{\text{th}}$  Hofstede's dimension of the  $i^{\text{th}}$  country,  $PPC_i$  the GDP per capita and  $POP_i$  the population of the  $i^{\text{th}}$  country. We tested our model through the software Gretl.

#### 4. Results

According to the models built, we decided to operate a logarithmic transformation for GDP and POP variables. We, therefore, encountered the following results:



**Table 3.** Model I-VII: OLS, using observations 1-44. Dependent variable: eco-labels

	model I	model II	model III	model IV	model V	model VI	model VII
const	-46,098 *	-34,058	-34,1083 *	-46,075 *	-41,618 *	-45,085 *	-45,9025
L_PPC	2,93 *	2,051	1,32	2,926 *	2,827 *	3,186 **	2,62
L_Population	2,091 *	2,1287 *	1,85 *	2,071 *	2,007 *	2,1562 *	2,03
PDI PowerDistance		-0,0634 **					
INV Individualism			0,1189 *				
MS Masculinity				0,0046			
UA UncertaintyAvo					-0,04		
LTO LongTermOr						-0,078	
IND Indulgence							0,073
Adj. R <sup>2</sup>	0,22	0,223	0,28	0,2018	0,2183	0,245	0,232
n. observations	44	44	44	44	44	44	44

The first model reported (model I - Table 3) gave a very positive outcome, detecting a high significant model. Both the independent variables revealed a very low p-value, while the R-squared parameter is quite low. We then tested each of the Hofstede's dimensions in the model, revealing no significance except for Power Distance and Individualism, as reported in Table 3.

Power Distance turned out to be significant, according to model II, with a p-value <0.05, with an adjusted R-squared parameter slightly higher than in model I, but still quite low. Individualism, as well, is significant in the frame of the model III, with a p-value <0.1. Here the quality of the model is a bit higher, with an adjusted R-squared of 0.28. Others, unfortunately, resulted non-significant.

It was decided to model the variables population and wealth according to logarithmic models, both to reduce the variance and to better link the variables to the models in the literature. Size is a fundamental aspect of empirical analyses on cultural variables (Beugelsdijk et al 2016). Therefore, in our model this aspect was captured by the population and GDP variables (in logarithm). The significance of the models is very low in general. This is not surprising in exploratory models that relate new variables in the literature. This study aims to lay the foundations for further developments, as specified below. Indeed, strong restrictions on cross sectional data do not allow the exploration of even more robust models such as panel models. The applied heterogeneity and sensitivity analysis relate to the fact that the results for all Hofstede dimensions are presented here, one by one. For reasons of space, the results of the models with the interactions between the variables are not presented and remain available upon request of the reader.

## 5. Discussion

The study aimed at revealing the existence of a possible relationship between the eco-labels and national culture. Results are controversial, not very intuitive, but anyway interesting and meaningful. First, we saw that the wealth of a country is positively impacting the number of eco-labels. This is a quite important and intuitive result, demonstrating a popular paradigm which sees richer countries more concerned on environmental issues. The positive observation directly coming from the dataset is the presence of very low-income countries, such as Indonesia, Malaysia, and Kenya, which showed an attitude toward sustainability issues.

Moreover, an interesting fact is reported by the direct correlation and the positive impact of population on the number of eco-labels. Most populated countries have more labels than other, which leads to the first consideration, assuming the necessity to record a wider control action on production activities.

This comes from the dataset, once more, observing that in some countries, internationally recognized labels are supported by local or national certifications. The size of the country, in this sense, both in term of population and richness, has a relevant influence on sustainability issues. Another aspect regards the relationship between cultural dimensions and eco-labels. The study did not prove a solid relationship but showed the existence of a strong correlation among variables. The only resulting significant are power distance and individualism. The first dimension is related to the perception of the distance between government and people, which, in some way, confirm a lack of interaction among stakeholders on the establishment of those criteria for the creation and issue process of eco-labels, while the second is a feature related to ambition and success, and it also the one showing the highest correlation among the six dimensions. This aspect stresses, on the producer side, the aspect of voluntariness of adopting eco-labels.

The weak relationship may be related to many difference factors, first the nature of the dataset: we employed one of the world's most recognized indexes (i.e., Ecolabel index), but we only focused on a single industrial sector, the agri-food one, which is endowed with "only" 148 certifications worldwide. The extension to other industrial sectors may enlarge the sample, and also make the relationship more significant.

A final consideration may be given about the relationship between cultural differences and food security: in this glance, the relationships inquired, with such variables significantly impacting on the eco-labels – and therefore a higher concern on sustainable development issues, including food safety and security -, once more underlines the disparity among richer and poorer countries, which is unavoidably related to cultural and country-based factors which we attempted to capture through our analysis. The UN Agenda 2030 with its sustainable development goals underlines the objectives of food security for all countries, especially poorer countries which suffer from an unstable – or, worse, corrupted – political system, a weak economic structure, and several social and health issues which obstacle the path towards an improvement in the provision of more secure and safer food.

The limits and difficulties of conducting an analysis with Hofstede's cultural dimensions are well summarized in Steel's work (Steel et al. 2020).

## 6. Conclusions

The paper aimed at inquiring the relationship between cultural values and sustainable behavior through the Hofstede's national culture 6-D model. Meaningful results have been observed from the analysis, so that some implications occur: first, culture is a relevant component in the formation of a sustainable behavior, also on the firm side. Business and organizational culture influence the component of corporate sustainability, and the food industry reveals to be one of the most central sectors to showcase a sustainable process. Second, the solidity of the economy is also important in adopting sustainable behaviors: the richest countries are more eager, and for sure better equipped, to adopt sustainable behaviors.

Another important aspect raising from the analysis is the ability of firms and organization to signal their sustainable behavior, based also on the cultural context they operate in. Acquiring a certification, most of the times, corresponds to a relatively consistent cost, which of course ought to be balanced on a potential pay-off on a long term, which are sometimes not certain to obtain if their green marketing strategy is not effective or, simply, target consumers are not interested in it. Analyzing cross-cultural context has a relevant practical implication in the field of marketing analytics, studying the opportunity to exploit the sensitivity of sustainable consumers to gain a competitive advantage deriving from the signaling of a green behavior.

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3 Developing countries or poorer countries need to better structure their economies first, in order to  
4 plan a long-term sustainable development strategy. Third, most populated countries have more  
5 certifications than less populated, and this is probably due to the fact that size is less controllable,  
6 so a stronger demonstration of sustainable behavior help bigger countries to keep the horizon.  
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8 Although results are interesting and appreciable, some limitations affected it: Hofstede's model on  
9 national culture is limited because not including all the countries, missing information may not let  
10 us reveal a more complete framework. Moreover, as assumed by Kirkman et al. (2006) and  
11 Beugelsdijk et al. (2017), a possible limitation of the application of Hofstede's national cultural  
12 differences model derives from the fact that it measures cultural differences, but not cultural  
13 distance among the analyzed countries. The opportunity to update such a study with the continuous  
14 integrations to Hofstede's model could lead to more detailed results on such approaches to business  
15 culture studies. **Among the limitations of the model a problem of endogeneity ought to be  
16 highlighted, although classic conditions have been neutralized. The nature of the available data and  
17 the strong theoretical background repair the emerging results from possible threats. It is anyway  
18 possible to follow up such issues with other methodologies and other data, also in future research.**  
19

20 Indeed, the time invariance of Hofstede's model may not consider some relevant aspects of business  
21 culture, even though the number of certifications recovered has not changed at all in the last years.  
22 On the other hand, recent studies carried on by Minkov et al. (2018) made new attempts to update  
23 some of the Hofstede's original dimensions, i.e., the Long-Term Orientation, which has been reset  
24 as Flexibility vs. Monumentalism, with the aim to capture new shades regarding aspects of self-  
25 enhancement and self-stability or consistency. Future research may be addressed to add new  
26 components to measure sustainable behavior by firms, and also to employ differently implemented  
27 variables to assess national culture.  
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33  
34  
35

## 36 References

- 37 Annunziata, A., Mariani, A., & Vecchio, R. (2019). Effectiveness of sustainability labels in guiding food  
38 choices: Analysis of visibility and understanding among young adults. *Sustainable Production and  
39 Consumption*, 17, 108-115.  
40  
41 Atanasoaie, G. S. (2013). Eco-Label and its Role in the Development of Organic Products Market.  
42 *Economy Transdisciplinarity Cognition*, 16(1).  
43  
44 Azzurra, A., Massimiliano, A., & Angela, M. (2019). Measuring sustainable food consumption: A case  
45 study on organic food. *Sustainable Production and Consumption*, 17, 95-107.  
46  
47 Banterle, A., Ricci, E. C., & Cavaliere, A. (2018). Environmental sustainability and the food system. In  
48 *Regulating and Managing Food Safety in the EU* (pp. 57-88). Springer, Cham.  
49  
50 Baritz, R., Wiese, L., Verbeke, I., & Vargas, R. (2018). Voluntary guidelines for sustainable soil  
51 management: global action for healthy soils. In *International yearbook of soil law and policy 2017*  
52 (pp. 17-36). Springer, Cham.  
53  
54 Belz, F. M., & Schmidt-Riediger, B. (2010). Marketing strategies in the age of sustainable  
55 development: evidence from the food industry. *Business strategy and the environment*, 19(7), 401-  
56 416.  
57  
58  
59  
60

- 1  
2  
3 Beugelsdijk, S., Kostova, T. & Roth, K. (2017). An overview of Hofstede-inspired country-level culture  
4 research in international business since 2006. *J Int Bus Stud* 48, 30–47.  
5 <https://doi.org/10.1057/s41267-016-0038-8>  
6  
7 Beugelsdijk, S., & Welzel, C. (2018). Dimensions and Dynamics of National Culture: Synthesizing  
8 Hofstede with Inglehart. *Journal of Cross-Cultural Psychology*, 49(10), 1469-1505.  
9 <https://doi.org/10.1177/0022022118798505>  
10  
11  
12 Castaldo, S., Perrini, F., Misani, N., & Tencati, A. (2009). The missing link between corporate social  
13 responsibility and consumer trust: The case of fair trade products. *Journal of business ethics*, 84(1),  
14 1-15.  
15  
16  
17 Castka, P., & Corbett, C. J. (2016). Governance of eco-labels: Expert opinion and media coverage.  
18 *Journal of Business Ethics*, 135(2), 309-326.  
19  
20  
21 Cheyns, E. (2011). Multi-stakeholder initiatives for sustainable agriculture: limits of the  
22 'inclusiveness' paradigm. *Governing through standards: Origins, drivers and limits*, 318-354.  
23  
24 Clark, M., & Tilman, D. (2017). Comparative analysis of environmental impacts of agricultural  
25 production systems, agricultural input efficiency, and food choice. *Environmental Research Letters*,  
26 12(6), 064016.  
27  
28 D'Souza, C. (2004). Ecolabel programmes: a stakeholder (consumer) perspective. *Corporate*  
29 *Communications: An International Journal*.  
30  
31 De Mooij, M., & Hofstede, G. (2002). Convergence and divergence in consumer behavior:  
32 implications for international retailing. *Journal of retailing*, 78(1), 61-69.  
33  
34 De Pelsmacker, P., Driesen, L., & Rayp, G. (2005). Do consumers care about ethics? Willingness to  
35 pay for fair-trade coffee. *Journal of consumer affairs*, 39(2), 363-385.  
36  
37  
38 Ecolabelindex.com  
39  
40 Elkington, J. (1997). Cannibals with forks. *The triple bottom line of 21st century*, 73.  
41  
42 Elkington, J. (1998). Partnerships from cannibals with forks: The triple bottom line of 21st-century  
43 business. *Environmental quality management*, 8(1), 37-51.  
44  
45 Erskine, C. C., & Collins, L. (1997). Eco-labelling: success or failure?. *Environmentalist*, 17(2), 125-  
46 133.  
47  
48  
49 FiBL; IFOAM (2018). *The World of Organic Agriculture: statistic and emerging trends 2018*.  
50  
51 Francis, C. A., & Youngberg, G. (1989). *Sustainable agriculture: An overview*. Department of  
52 Agronomy, University of Nebraska.  
53  
54 Galarraga Gallastegui, I. (2002). The use of eco-labels: a review of the literature. *European*  
55 *Environment*, 12(6), 316-331.  
56  
57 Grunert, K. G. (2011). Sustainability in the food sector: A consumer behaviour perspective.  
58 *International Journal on Food System Dynamics*, 2(3), 207-218.  
59  
60

- 1  
2  
3 Han, B., & Kim, M. (2019). Hofstede's collectivistic values and sustainable growth of online group  
4 buying. *Sustainability*, 11(4), 1016.  
5  
6 Harbaugh, R., Maxwell, J. W., & Roussillon, B. (2011). Label confusion: The Groucho effect of  
7 uncertain standards. *Management science*, 57(9), 1512-1527.  
8  
9 Hartlieb, S., & Jones, B. (2009). Humanising business through ethical labelling: Progress and  
10 paradoxes in the UK. *Journal of Business Ethics*, 88(3), 583-600.  
11  
12 Hayati, D., Ranjbar, Z., & Karami, E. (2010). Measuring agricultural sustainability. *Biodiversity,*  
13 *biofuels, agroforestry and conservation agriculture*, 73-100.  
14  
15 Hofstede, G. (1980). *Culture's consequences: National differences in thinking and organizing.*  
16 Beverly Hills, Calif.: Sage.  
17  
18 Hofstede, G. (1984). *Culture's consequences: International differences in work-related values (Vol.*  
19 *5).* sage.  
20  
21 Hofstede, G. (1991). *Organizations and cultures: Software of the mind.* McGrawHill, New York.  
22  
23 Hofstede, G. (1991). *Cultures and organizations: Software of the mind.* Maidenhead.  
24  
25 Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and*  
26 *organizations across nations.* Sage publications.  
27  
28 Hofstede, G. H., Hofstede, G. J., & Minkov, M. (2005). *Cultures and organizations: Software of the*  
29 *mind (Vol. 2).* New York: Mcgraw-hill.  
30  
31 Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and Organizations: Software of the*  
32 *Mind. Revised and expanded 3rd Edition.* N.-Y.: McGraw-Hill.  
33  
34 Hofstede-insights.com  
35  
36 IFOAM, <https://www.ifoam.bio/>  
37  
38 Iraldo, F., Testa, F., & Bartolozzi, I. (2014). An application of Life Cycle Assessment (LCA) as a green  
39 marketing tool for agricultural products: the case of extra-virgin olive oil in Val di Cornia, Italy.  
40 *Journal of Environmental Planning and Management*, 57(1), 78-103.  
41  
42 Jahn, G., Schramm, M. & Spiller, A. (2005) The reliability of certification: quality labels as a consumer  
43 policy tool. *Journal of Consumer Policy* 28, 53–73.  
44  
45 Janker, J., Mann, S., & Rist, S. (2019). Social sustainability in agriculture—A system-based framework.  
46 *Journal of rural studies*, 65, 32-42.  
47  
48 Kimura, H., & Nakajima, T. (2011). Designing Persuasive Applications to Motivate Sustainable  
49 Behavior in Collectivist Cultures. *PsychNology Journal*, 9(1).  
50  
51 Kirkman, B. L., Lowe, K. B., & Gibson, C. B. (2006). A quarter century of "Culture's Consequences": A  
52 review of empirical research incorporating Hofstede's cultural values framework. *Journal of*  
53 *International Business Studies*, 37(3): 285–320.  
54  
55  
56  
57  
58  
59  
60

- 1  
2  
3 Latruffe, L., Diazabakana, A., Bockstaller, C., Desjeux, Y., Finn, J., Kelly, E., ... & Uthes, S. (2016).  
4 Measurement of sustainability in agriculture: a review of indicators. *Studies in Agricultural*  
5 *Economics*, 118(3), 123-130.  
6  
7 Loureiro, M. L., McCluskey, J. J., & Mittelhammer, R. C. (2002). Will consumers pay a premium for  
8 eco-labeled apples?. *Journal of Consumer Affairs*, 36(2), 203-219.  
9  
10 MacRae, R. J., Hill, S. B., Mehuys, G. R., & Henning, J. (1990). Farm-scale agronomic and economic  
11 conversion from conventional to sustainable agriculture. *Advances in agronomy*, 43, 155-198.  
12  
13 Migliore, G., Schifani, G., & Cembalo, L. (2015). Opening the black box of food quality in the short  
14 supply chain: Effects of conventions of quality on consumer choice. *Food Quality and Preference*,  
15 39, 141-146.  
16  
17 Minkov, M. (2018), "A revision of Hofstede's model of national culture: old evidence and new data  
18 from 56 countries", *Cross Cultural & Strategic Management*, Vol. 25 No. 2, pp. 231-256.  
19 <https://doi.org/10.1108/CCSM-03-2017-0033>  
20  
21 Minkov, M., Bond, M. H., Dutt, P., Schachner, M., Morales, O., Sanchez, C., Jandosova, J.,  
22 Khassenbekov, Y., & Mudd, B. (2018). A Reconsideration of Hofstede's Fifth Dimension: New  
23 Flexibility Versus Monumentalism Data From 54 Countries. *Cross-Cultural Research*, 52(3), 309–  
24 333. <https://doi.org/10.1177/1069397117727488>  
25  
26 Myers, S. S., Gaffikin, L., Golden, C. D., Ostfeld, R. S., Redford, K. H., Ricketts, T. H., ... & Osofsky, S.  
27 A. (2013). Human health impacts of ecosystem alteration. *Proceedings of the National Academy of*  
28 *Sciences*, 110(47), 18753-18760.  
29  
30 Nilsson, H., Tunçer, B., & Thidell, Å. (2004). The use of eco-labeling like initiatives on food products  
31 to promote quality assurance—is there enough credibility?. *Journal of Cleaner production*, 12(5),  
32 517-526.  
33  
34 OECD. 1997. *Eco-Labeling: Actual Effects of Selected Programme*. Paris  
35  
36 Perrini, F., Castaldo, S., Misani, N., & Tencati, A. (2010). The impact of corporate social responsibility  
37 associations on trust in organic products marketed by mainstream retailers: a study of Italian  
38 consumers. *Business Strategy and the Environment*, 19(8), 512-526.  
39  
40 Pretty, J. (2008). Agricultural sustainability: concepts, principles and evidence. *Philosophical*  
41 *Transactions of the Royal Society B: Biological Sciences*, 363(1491), 447-465.  
42  
43 Reisch, L., Eberle, U., & Lorek, S. (2013). Sustainable food consumption: an overview of  
44 contemporary issues and policies. *Sustainability: Science, Practice and Policy*, 9(2), 7-25.  
45  
46 Reynaldo, G. O., de Moraes, P. M., Skowronski, L., & Paes, G. (2019). Organic production and its  
47 market support policies.  
48  
49 Reytar, K., Hanson, C. R. A. I. G., & Henninger, N. O. R. B. E. R. T. (2014). Indicators of sustainable  
50 agriculture: a scoping analysis. World Resources Institute: Washington, DC, USA.  
51  
52 Sabiha, N. E., Salim, R., Rahman, S., & Rola-Rubzen, M. F. (2016). Measuring environmental  
53 sustainability in agriculture: A composite environmental impact index approach. *Journal of*  
54 *environmental management*, 166, 84-93.  
55  
56  
57  
58  
59  
60



- 1  
2  
3 Sargant, E. M. (2014). Sustainable food consumption: a practice-based approach. Wageningen  
4 University.  
5  
6 Smith, C. S., & McDonald, G. T. (1998). Assessing the sustainability of agriculture at the planning  
7 stage. *Journal of environmental management*, 52(1), 15-37.  
8  
9 Terlaak, A. (2007). Order without law? The role of certified management standards in shaping  
10 socially desired firm behaviors. *Academy of Management Review*, 32(3), 968-985.  
11  
12 TerraChoice. (2010). *The Sins of Greenwashing: Home and Family Edition 2010*.  
13  
14 Tilman, D., Cassman, K. G., Matson, P. A., Naylor, R., & Polasky, S. (2002). Agricultural sustainability  
15 and intensive production practices. *Nature*, 418(6898), 671-677.  
16  
17 TP Organics (2019). *Strategic Research & Innovation Agenda for Organics and Agroecology Leading*  
18 *the transition to sustainable food and farming in Europe*.  
19  
20 Tregear, A., & Giraud, G. (2011). Geographical indications, consumers and citizens. Labels of origin  
21 for food: local development, global recognition, 63-74. Vanclay, J. K., Shortiss, J., Aulsebrook, S.,  
22 Gillespie, A. M., Howell, B. C., Johanni, R., ... & Yates, J. (2011). Customer response to carbon  
23 labelling of groceries. *Journal of Consumer Policy*, 34(1), 153-160.  
24  
25 Van Amstel, M., Driessen, P., & Glasbergen, P. (2008). Eco-labeling and information asymmetry: a  
26 comparison of five eco-labels in the Netherlands. *Journal of Cleaner Production*, 16(3), 263-276.  
27  
28 Vittersø, G., & Tangeland, T. (2015). The role of consumers in transitions towards sustainable food  
29 consumption. The case of organic food in Norway. *Journal of Cleaner Production*, 92, 91-99.  
30  
31 Yunlong, C., & Smit, B. (1994). Sustainability in agriculture: a general review. *Agriculture, ecosystems*  
32 *& environment*, 49(3), 299-307.  
33  
34 Zepeda, L., Sirieix, L., Pizarro, A., Corderre, F., & Rodier, F. (2013). A conceptual framework for  
35 analyzing consumers' food label preferences: An exploratory study of sustainability labels in France,  
36 Quebec, Spain and the US. *International Journal of Consumer Studies*, 37(6), 605-616.  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
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