Consumer preferences and willingness to pay for clams with sustainability certification in Mediterranean countries

Article

Published Version

It is advisable to refer to the publisher's version if you intend to cite from the work. See [Guidance on citing](#).

Article

Consumer Preferences and Willingness to Pay for Clams with Sustainability Certification in Mediterranean Countries

Vilma Xhakollari [1], Sina Ahmadi Kaliji [2],*, Marija Cerjak [3], Damir Kovačić [3], Luca Mulazzani [2] and Luca Camanzi [2]

[1] Department of Agri-Food Economics and Marketing, School of Agriculture Policy, and Development, University of Reading, Reading RG6 6BZ, UK; v.xhakollari@reading.ac.uk

[2] Department of Agricultural and Food Sciences, Alma Mater Studiorum—University of Bologna, 40127 Bologna, Italy; luca.mulazzani@unibo.it (L.M.); luca.camanzi@unibo.it (L.C.)

[3] University of Zagreb Faculty of Agriculture, 10000 Zagreb, Croatia; mcerjak@agr.hr (M.C.); dkovacic@agr.hr (D.K.)

* Correspondence: sina.ahmadikaliji@unibo.it; Tel.: +39-0512096146

Abstract: For some types of seafood, such as clams, there are now sustainability certificates that guarantee their sustainable production. However, their consumption may be associated with some ethical and sustainability concerns, as clams are harvested in ways that may be harmful to the environment. The aim of this study is therefore to investigate consumers' sustainability concerns based on their purchasing preferences and WTP for clams with sustainability certification in three Mediterranean countries—Italy, Spain and Croatia. Data were collected online and consumer preferences were elicited using a labelled discrete choice experiment. The results show that in general all consumers prefer clams from their country of origin, while there are differences in their appreciation for the sustainability certification. While Croatian consumers are not very interested in the current Marine Stewardship Council (MSC) sustainability certification, consumers in Spain are willing to pay a higher price for it. At the same time, consumers in Italy are more interested in new certifications such as Responsible Fisheries Management (RFM). These results could be of interest to clam production and distribution companies trying to advance their corporate social responsibility activities and positioning.

Keywords: clams; consumer preferences; sustainability certification; choice experiment

1. Introduction

The production and consumption of fisheries and aquaculture products (FAPs) have a significant impact on the environment and often threaten the well-being of communities living in coastal areas and the sustainability of the oceans [1]. The question of how to conserve and inherit marine resources for future generations is a high priority in policy debate and has recently been placed on the agenda by the United Nations as one of the Sustainable Development Goals [2]. Indeed, growing populations and increasing demand have led to overfishing of aquatic products and the depletion of stocks of many aquatic species. By-catches and discards for market reasons are another problem of current fisheries development. Discards not only lead to a waste of resources, but also have negative ecological impacts [3,4]. According to the FAO report [5], overfishing in the Mediterranean has decreased slightly, but still leads to significant pressure. The exploitation of about 75% of commercial species is far from sustainable standards, according to the same report.

Some fisheries in the Mediterranean have been considered controversial in recent years because of their environmental impact, in particular bottom trawling because of its impact on the seabed and benthic habitats [6] and because of its legal selectivity [7]. Hydraulic dredges used to catch clams (*Chamelea gallina*) also have potentially relevant

effects on environmental and ecological sustainability, as they have a great impact on the seabed [8].

However, more and more consumers are concerned about the sustainability of the use of marine resources and feel responsible towards society in their purchasing decisions [1,9]. For this reason, various labels and certifications are being introduced to the market to provide consumers with important information about seafood sustainability. Fish and seafood labelling and traceability can play an important role in protecting the interests and health of consumers, but they can also be seen as a tool to promote the sustainable use of marine resources [10–12]. This is because, in addition to informing consumers about the safety, origin, and quality of products, such labels can also provide information about the conservation of stocks and marine ecosystems [13].

Today, various eco-labels for FAPs are offered by different organisations. Eco-labels that have been welcomed recently include RFM (Responsible Fisheries Management), MSC (Marine Stewardship Council), ASC (Aquaculture Stewardship Council), FOS (Friend of the Sea), and BAP (Best Aquaculture Practices). However, as the information on the labels is often opaque, some consumers demand additional information on the labels [9,14,15].

Against this background, the aim of the present study is to investigate consumers' purchasing preferences and willingness to pay for ecologically innovative seafood, i.e., clams with extended shelf-life—obtained through high hydrostatic pressure treatment, and with a sustainability certification.

The study was conducted in three European Mediterranean countries, i.e., Croatia, Italy and Spain. Indeed, among European countries, Italy and Spain are among the largest producers and consumers of seafood [16]. According to EUROSTAT [17], Spain has the highest fish landings among EU Member States (about 752 thousand tonnes in 2021) and Italy reports about 146 thousand tonnes landed. Furthermore, Spain ranks second in the EU in per capita consumption of FAPs (about 44 kg/capita/year) and Italy sixth (about 30 kg/capita/year) [18]. Croatia is also a potentially interesting new market, as the value of Croatian FAP imports increased from EUR 74 million to EUR 194 million between 2013 and 2021 [19]. Therefore, we consider these three Mediterranean countries as the focus of the study.

In terms of labelling, two certification schemes are considered for the purpose of this study, namely RFM and MSC. The RFM fisheries standard is based on some key principles of an efficient and adaptable management system with clear sustainability objectives and guarantees the monitoring, control and surveillance of fishing activities. This certification assesses the status of the target resource and the ecosystem that hosts it, taking into account the specific impacts of the fishing activity. The fishing activity must be characterised by compliance with social and safety objectives of labour policies and economic indicators that highlight profitable activities. The MSC Fisheries Standard is based on a fisheries management system that takes into account marine resources, minimises the impacts of fishing and allows habitats to thrive under fisheries management by authorities and companies that comply with applicable laws [20].

Despite studies conducted on consumer perceptions and preferences for MSC-labelled FAPs, such as seafood in general [21], frozen processed Alaska pollock products [22], shrimp [23], canned tuna [24] and shark-free products [25], no general evidence of a price premium for eco-labelled products was found; on the contrary, differences between countries and products were found. Cross-country studies are rare and there is still a research gap in assessing consumer preference and willingness to pay a higher price in the case of bivalves (such as clams). Italy is the first country in the Mediterranean to obtain MSC certification for clams [26]. Therefore, the study of the purchase preference for mussels with this label in three Mediterranean countries can be considered as one of the research contributions. In addition to the MSC label, consumer purchasing preferences for the RFM label are also investigated, as it could be considered as an alternative label for clams in the future (currently this certification is not used in the Mediterranean).

The rest of the article is structured as follows. The following section on background provides an overview of the current literature on the research topic. The research method section explains the survey procedure, the design of the discrete choice experiment and the statistical analysis. The results section describes the participants and elaborates on consumer preferences for mussels and their Willingness to Pay (WTP). At the end, the results are compared with the findings of other studies and discussed.

2. Theoretical Background and Research Questions

Some previous literature contributions addressed the factors influencing seafood consumption and preferences, such as taste, texture, colour, smell, price, convenience, availability, health, natural content, safety, origin, ethical concerns and socioeconomic background [27,28]. Furthermore, the use of new technologies to extend the shelf life of seafood has an impact on consumer purchasing behaviour. Demartini et al. [29] evaluated an innovative extended shelf-life packaging for fresh seafood. They found that neophobia had a negative impact on the purchasing behaviour of Italian consumers and they were often sceptical about this technology, although the provision of relevant information could slightly influence consumer preferences.

Price is undoubtedly one of the most influential of the factors that play an important role in consumer purchasing behaviour. The theoretical background of how price and preferences influence seafood consumption can be explored through various economic and behavioural concepts. Understanding the interplay of these economic and behavioural factors can provide valuable insights to policymakers, businesses, and researchers seeking to analyse and influence this food consumption and preferences in the marketplace. When demand for FAPs is relatively elastic, a small price increase can lead to a proportionally larger decrease in quantity demanded [30]. Price changes in FAPS can also affect consumption through the income effect. If the price of seafood increases, this may reduce the purchasing power of consumers' income, leading to a decrease in the total quantity of FAPs demanded [31]. When seafood prices decrease, consumers' real income may increase, leading to higher demand for seafood.

In addition, an increase in seafood prices may lead consumers to choose other protein sources, such as chicken or plant-based alternatives, resulting in a decrease in seafood consumption [32]. This factor, called the substitution effect, occurs when consumers switch to alternative products when the price of a particular product increases [33]. Price actually leads to a change in consumer behaviour and preferences. Consumers may develop a preference for cheaper alternatives, leading to a shift in consumption patterns away from FAPs.

Based on the literature reviewed on the effect of FAP price on consumer preferences, a first Research Question (RQ) can be stated as follows:

RQ1: What effect will an increase in the price of clams have on consumers' utility?

According to previous studies [14], two other factors that influence consumer preferences for FAP are (i) their origin and (ii) sustainability certifications.

Regarding origin, consumers' WTP is generally higher for aquaculture products produced in their own country. For example, consumers prefer domestic fish to foreign or imported fish because the distance from producer to consumer is short and they have the opportunity to verify the production process [29,30]. The choice of country of origin is influenced by a combination of economic, cultural, and quality factors [34,35]. It is important to note that the relevance of these factors can vary by region and consumer segment [35]. To understand these factors, the theoretical background needs to be considered from different perspectives. For example, international trade plays a crucial role in FAP consumption patterns [36]. Countries with a strong seafood industry often export their products to other countries, which affects the availability and consumption of certain seafood products [36]. Therefore, consumer preference may be based on imports from popular FAPs-producing countries [37].

In terms of cultural factors, different cultures have different culinary traditions and preferences for seafood [38]. Certain countries have a long tradition of eating and preparing seafood, which may influence the preference for seafood from their country of origin. In addition, certain religions may restrict seafood consumption or prescribe preparation methods [39]. Furthermore, consumers often associate certain countries with high-quality seafood [40]. Preferences may be influenced by perceptions of better taste, freshness, or safety of certain sources. In addition to the quality issue, food safety may also affect seafood source choices, such that countries with strict food safety regulations are preferred by consumers concerned about product safety [41,42]. From a health and nutritional perspective, certain types of seafood are rich in omega-3 fatty acids, which have been associated with various health benefits. Consumers may prefer seafood from countries known for species high in omega-3 [43].

Based on the literature reviewed on the effect of origin on consumer preferences for FAPs, a second Research Question can be stated as follows:

RQ2: Does the country of origin affect consumer appreciation for clams?

In addition to price and country of origin, previous contributions to the scientific literature have highlighted the importance of FAP labels and certifications for consumers, which today aim to overcome concerns caused by environmental and sustainability issues. Certifications or eco-labels are offered to reassure concerned consumers that the fish they are buying has minimal impact on the environment. Especially in the aquaculture sector, the use of eco-labels with different designs is increasing significantly [44]. These labels inform consumers about environmental attributes with the aim of reducing the information gap between producers and consumers [45,46].

Indeed, consumers may prefer imported products with valid certifications over domestic products without certifications. For example, in their study of canned tuna with eco-labelling, Lim et al. [24] found that US consumers had a higher WTP for imported canned tuna with MSC certification compared to non-certified domestic products. In fact, eco-labelling leads to higher marginal WTP for imported canned tuna than for domestic products [47]. Interestingly, increased awareness of sustainability issues and eco-labelling does not necessarily lead to higher WTP. For example, Natali et al. [48] mentioned that consumers who received information about the sustainability of white shrimp compared to pink shrimp had a lower WTP for eco-labelled white shrimp. Information on white shrimp can serve to diversify fish consumption and thus avoid fish waste and marine pollution. A possible explanation for this could be that uninformed consumers rely solely on the eco-label and have no other way to make a sustainable choice. In contrast, informed consumers know that white shrimp is basically a sustainable choice. Therefore, they do not need to rely on this label. Several key concepts play a role in influencing consumer decisions when it comes to FAP consumption and their preference for labelled or certified products. The relevant theoretical background is based on theories of consumer behaviour, trust building, information dissemination, and the alignment of consumers' values with their purchasing decisions [49,50]. FAP labels play a crucial role in the information-seeking and evaluation phase, as they provide essential information about product attributes and influence consumer perceptions of product quality and value [50]. These theoretical frameworks help explain why certain seafood labels are so popular and why consumers tend to prefer to certified products over non-certified ones. One of the concepts is information asymmetry and trust, such that information asymmetry exists when one party has more or better information than the other, leading to potential imbalances in decision making [9].

In general, previous research shows that consumers perceive labels such as MSC, FSC or organic aquaculture positively because of their awareness of environmental and economic impacts [43,51–53]. Research also suggests that this growing environmental awareness and desire for eco-labels is linked to concepts such as "ecological citizenship" [9], a concept that implies a change in lifestyle towards sustainable patterns. Galati et al. [52] studied Italian and Spanish consumers' perceptions of seafood eco-labels. Older and better-

educated consumers were interested in seafood eco-labels. The information on the labels played an important role in consumers' perceptions as it filled the information gap.

However, there are also study findings that consumers are not interested in sustainability certifications. According to McClenachan et al. [54], consumers are less interested in the benefits their consumption choices could have on coastal communities. Instead, there is a greater need for ethical and social information about the relevant certifications [9].

In addition to awareness of environmental issues, some studies also pointed to a lack of knowledge about seafood eco-labels due to consumers' unwillingness to read the information on labels. The main reason for this disinterest is said to be the lack of trust in the information on the labels and its impact on the marine environment [55]. According to the researchers, "food illiteracy" is due to a lack of general knowledge about the production process and its environmental impact. Therefore, awareness of the eco-label and the information it contains can play an important role in consumer choice or promote a sense of responsibility [56,57].

In general, empirical studies looking at consumer WTP for eco-labelled FAP products suggest that there is a positive price premium for a sustainability label. Menozzi et al. [43] found a positive price premium for different fish species and attributes with sustainability labels. However, this value was very heterogeneous across fish species in five countries (France, Italy, Germany, Spain and the UK). They pointed out that enough information and knowledge about the standard is needed for sustainability to become a purchasing criterion. This difference in WTP was also mentioned in other studies. For example, Vitale et al. [58] showed that the difference in WTP for eco-labelled seafood was caused by cultural and social background. They emphasised that the WTP should be considered as a conservative value considering the lack of consumer confidence in the increase in knowledge due to the daily presence of sustainability labels in the markets. Furthermore, Zander and Feucht [47] showed that some consumers were willing to pay a significantly higher price premium for seafood with a sustainability label from Europe because they trusted the standards of these products. The WTP value varied between +7% and +20%, depending on consumer characteristics and country. The WTP value is positively related to consumer awareness, which means that consumers who know the corresponding eco-label have a higher WTP value [25].

Based on the literature reviewed on the effect of sustainability certifications on consumer preferences for FAPs, a third Research Question can be stated as follows:

RQ3: Do sustainability certifications affect consumer appreciation for clams?

3. Materials and Methods

3.1. Labelled Discrete Choice Experiment Design

This study investigates consumer preferences for eco-innovative seafood, i.e., refrigerated clams with extended shelf-life achieved through high hydrostatic pressure and an ecological certification. Consumer preferences are determined using a discrete choice experiment (DCE). DCE is a stated preference (SP) technique that aims to understand consumers' preferences for a particular product and/or service [48]. Consumers (participants) state their preference for hypothetical alternative scenarios described by several attributes. Participants' responses are used to determine whether their preferences are significantly influenced by the attributes [59,60]. The responses (choices) are also used to determine the relative importance of the attributes. The choice experiment has been widely used in various research disciplines (e.g., marketing, health economics, environmental economics, transport economics) because of its close resemblance to real-world decision-making [59]. In terms of general experiments in DCE, the dependent variable is the choice of the alternative that individuals usually make based on a set of characteristics and levels that make up the product under study. The latter serve as independent variables.

Since chilled clams with extended shelf-life achieved by high hydrostatic pressure are not yet on the market, we designed a hypothetical labelled discrete choice experiment to understand whether these innovative chilled clams could be successful compared to the

other two options. We did not use a control treatment as we are interested in understanding and comparing preferences between the innovative product and those already on the market. The three clam alternatives are: (a) chilled clams preserved in the refrigerator (+4 °C) that can be consumed within 5 days; (b) frozen clams stored in the freezer (−18 °C) that can be consumed within 6 months; (c) chilled clams which underwent an innovative treatment with high hydrostatic pressure and are preserved in the refrigerator (+4 °C) and can be consumed within 20 days. Each pack contains 500 grams of clams—equivalent to two servings.

A multi-country consumer panel (as described in Section 3.2) was used to collect the required information. Respondents were asked to repeatedly choose between three clam alternatives which, apart from preservation, differed in terms of "country of origin", "certification" and "price" (Figure 1). Price levels were set for each alternative and country based on the average retail market price (middle price level) of benchmark products, obtained by means of market research in the three countries. The minimum price (first level) and the maximum price (third level) were set to be equidistant from the average retail price (middle price level).
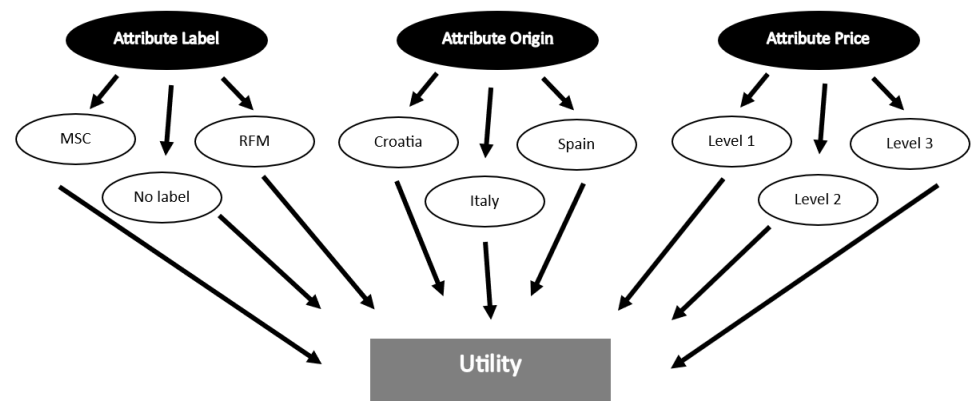

Figure 1. Structure of attributes and levels.

The attributes and levels are shown in Tables 1 and 2. The attributes and their corresponding levels for this study were chosen based on a qualitative study conducted online with consumers from the three countries: Croatia, Italy, and Spain (PRIZEFISH project deliverable 5.2.1 "Consumer Analysis Report" (document available at https://programming14-20.italy-croatia.eu/web/prizefish/docs-and-tools (accessed on 8 June 2023) [61]. Participants were asked to rate a list of attributes that were particularly important to them when buying clams. The following graph (Figure 2) shows the results obtained with 191 participants in the qualitative study (Croatia 79 participants; Italy 65 participants; and Spain 47 participants). Figure 2 shows that in all three countries the attribute of origin received the highest rating. This means that all respondents (especially the Croatian participants) believe that origin is the most important attribute when it comes to choosing products such as clams.

Table 1. Attributes and levels.

Products' Attributes	Attribute Levels		
Country of origin	Croatia	Italy	Spain
Label	No label	RFM *	MSC **
Price	Prices were different for each country and each category of product (Table 2)		

* Responsible Fisheries Management; ** Marine Stewardship Council.

Table 2. Price levels (in Euros).

	Croatia			Italy			Spain		
Refrigerated	3.20	4.80	6.40	11.50	12.50	13.50	3.40	5.10	6.80
Frozen	1.60	3.20	4.80	8.60	9.60	10.60	1.70	3.40	5.10
HHP	4.80	6.40	8.00	13.00	14.00	15.00	5.10	6.80	8.50
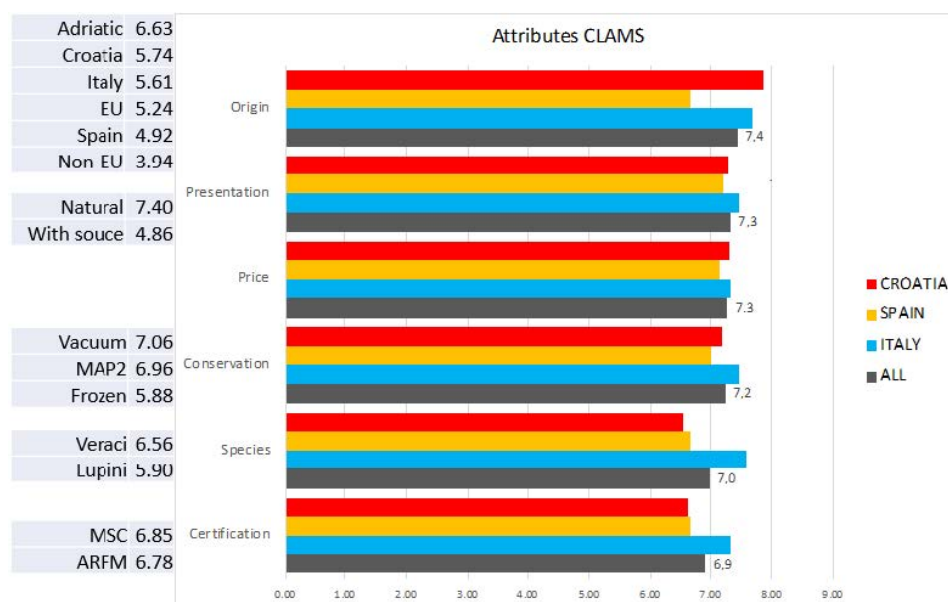
Figure 2. Attribute scoring.

Finally, participants in the discussion rooms were asked about the price they were willing to pay for clams in the three states of chilled, frozen and HHP. Meanwhile, market research on the prices of frozen and chilled clams in Croatia, Italy and Spain was carried out. It was found that the prices quoted in the discussion rooms were on average 25% below the market price for chilled clams and 50% below that for frozen clams. Therefore, we calculated the average of the prices from the discussion rooms for the innovative HHP clam, which served as the mean price. The minimum price was −25% of the mean price and the maximum level was +25% of the mean price. We used the same concept for the other two products, where the mean price was calculated as the average price from the market. Before we started with DCE, the attributes and levels were explained to the respondents. First, a detailed explanation of the products of each alternative and how they were obtained was given.

In addition, participants were shown the following options regarding certifications (Table 3):

The DCE designs were considered separately for each country. A labelled DCE design was used, i.e., all choices had four alternatives corresponding to the different shellfish, plus a "no-buy" alternative. The 'no-buy' option was included to reflect real-life purchase situations where people may refrain from making a choice between available alternatives [62,63]. In addition, the inclusion of a no-buy option had the advantage that the choice probabilities could be interpreted as market shares of the different products available for choice [64]. The experiment with the labelled choice option was considered because we assumed that the type of preservation (chilled, frozen and HHP) significantly affects consumers' perception of the product in question. In other words, we assumed that, for example, frozen mussels are perceived as a different product than chilled mussels.

Table 3. Information on certifications.

Type of Certification	Description
Responsible Fisheries Management (RFM)	The RFM fishing standard is based on three key principles:
	- an efficient and adaptive management system, with clear sustainability objectives which guarantees monitoring, control, and surveillance of fishing activity. - availability of assessments of the status of the target resource and the ecosystem that hosts it, considering the specific impact of the fishing activity concerned. - the fishing activity must be characterized by compliance with social and safety at work policies and with economic indicators that highlight profitable activities.
Marine Stewardship Council (MSC)	The MSC fishing standard is based on three key principles:
	- fishing must have a management system that leaves enough resources in the sea to ensure that the stock can reproduce, and the fishing activity can thus continue over time. - fishing must be carried out with gear and in areas that minimize its impact, allowing habitats and marine animals to thrive. - fishing must be managed by administrations and companies responsibly and in compliance with applicable laws.

Ngene 1.1.1 was used to design an optimal orthogonal design (OOD). OOD maximises the differences in attribute levels between alternatives so that the information respondents receive in stated preference surveys (SP) is maximised by forcing trade in all attributes in the experiment. OODs are orthogonal within an alternative, but have (often perfect negative) correlations between alternatives [65]. Our design generated 18 tasks to choose from. However, to reduce the number of tasks each subject faced, the design was divided into two blocks and participants were randomly assigned to one of the blocks so that each block received 9 choice tasks. Figure 3 shows an example of a choice task for mussels in Italy.

Figure 3. Task example of choice experiment in Italy.

To avoid confusion between the constants of the baseline and the constants of the model, effect coding was used in the development of the model [66].

3.2. Survey Procedure

Data were collected online via Qualtrics in June–July 2021. Consumer panel participants were recruited in collaboration with a market research company that provided access

to consumer panels in Croatia, Italy and Spain. The questionnaire was developed in English and then translated into the official languages of each country.

The questionnaire included only closed-ended questions.

A first block of screening questions included socio-demographics (gender, age and education level), seafood purchasing frequency and respondent responsability in purchasing food at home. If participants bought and consumed seafood less than once in a month (e.g., they were occasional consumers), and were not responsible for food purchases at home they were excluded from the survey.

To the best of our knowledge there are no studies that have calibrated scales for being responsible for food purchase, purchase and consumption of seafood products. Therefore, the items included in the questionnaire were developed by the authors and included as screening questions since DCE is considered a hypothetical purchasing task and it was necessary that participants in this study had some level of familiarity with seafood. We assumed that they were only familiar if they bought and consumed seafood at least once a month. In addition, it was considered necessary for them to also be responsible for food purchases at home to assure their familiarity with the prices and budget constraints of the household. Socio-demographic questions were then asked to profile the participants and check the representativeness of the sample.

The second part of the questionnaire was dedicated to the choice experiment task. First, the tasks and alternatives were explained to the participants. Then, the product, the attributes and the levels of each attribute were explained. Moreover, participants were offered a cheap talk (Supplementary Materials) to mitigate hypothetical biases, which are very common when using hypothetical discrete choice experiments [67–72]. Then respondents were asked to choose one option between four alternatives (as described in previous Section 3.1).

Table 4 describes the demographic data of all participants in Croatia, Italy and Spain. Croatia had the highest number of responses with 434 participants compared to Italy (404 participants) and Spain (427 participants). In the three countries, most participants were female and Croatia had the youngest respondents compared to Italy and Spain. The latter country had the respondents with the highest level of education; 50% of the respondents had at least a university degree.

Table 4. Socio-demographic characteristics of the sample and population * (%).

Definitions		Croatia		Italy		Spain	
		Sample	Population	Sample	Population	Sample	Population
Gender	Male	36.0	48	44.7	49	46.4	49
	Female	64.0	52	55.3	51	53.6	51
Age (years old)	18–24	10.2	8	7.9	10	7.9	11
	25–39	29.3	18	22.4	15	26.8	16
	40–54	48.4	20	30.5	24	31.8	26
	55–70	12.1	22	39.2	25	33.5	23
Education	Elementary school	2.8	21	27.8	37	6.6	36
	High school	66.1	52	47.5	43	36.1	23
	University and / or above	29.5	16	22.4	20	52.5	41
	Prefer not to respond	1.6		2.2		4.9	

* According to EUROSTAT (2022) and OECD Statistics (2021).

3.3. Statistical Analysis

The data were analysed with R 3.5.1. Responses that were given too quickly compared to the average time taken to complete the current questionnaire were excluded from the analysis.

As mentioned earlier, consumer preferences were elicited in this study using a DCE approach. The basis of the DCE approach is Lancaster's theory of consumer choice [73]. It states that the utility of a good is composed of the utility of the attributes that make up the good. In other words, the utility of a good is derived from its attributes and the level of those attributes. Thus, each time consumers make a choice, they make a trade-off between the attributes of a good and their levels [74]. Furthermore, random utility theory (RUT) states that consumers are rational and always choose the good that maximises their utility under income constraints. Finally, DCE assumes that alternatives are exhaustive, mutually exclusive and finite [75].

Thus, the utility (U) obtained from a product/good, based on the assumptions of RUT is:

$$U_{nj} = V_{nj} + \varepsilon_{nj} \quad (1)$$

where U_{nj} is the utility that decision maker n obtains from alternative j, j = 1, 2, …, J; V_{nj}—utility that is/can be observed by the researcher and ε_{nj}—error term, unknown to the researcher, not observed and treated as random.

Utility models were calculated separately for each country and estimated based on the choices of participants who completed 9 choice tasks, as mentioned earlier. To describe preferences for shellfish products, all attribute levels of the choice task (t) were considered as explanatory variables. The option "no purchase" and the other attributes and levels were included in the specific utility function (V_{njt}). With the exception of price, all other attributes were coded with effects to avoid confusion between the specific constant of the status quo alternative and the attributes of the alternatives [66]. The reference values were "Croatia" for the country of origin and "No certificate" for the certificate". The levels were given the value 1 if they occurred in the design; −1 if the reference level occurred (Croatia/No Certificate) and zero otherwise.

Thus, the utility function is:

$$V_{njt} = \alpha + \beta_1 Price_{njt} + \beta_2 OriginItaly_{njt} + \beta_3 OriginSpain_{njt} + \beta_4 CertificateRFM_{njt} + \beta_5 CertificateMSC_{njt} + \varepsilon_i \quad (2)$$

In this study, we used Multinomial Logistic Regression (MNL) to identify consumer preferences for the attributes of the seafood considered. MNL is a statistical technique for classifying multiclass problems that extends the principles of logistic regression. It allows the prediction of probabilities associated with different outcomes when dealing with a dependent variable that has more than two discrete possibilities. This modelling approach considers a range of independent variables, including those with real, binary, categorical or other data types. It differs from ordered logit regression in that the (possible) order of categories is not considered and is not applicable in this study context. Furthermore, several behavioural models applied in DCE differ from each other in the assumptions made for the error component (ε) of the utility function (U). MNL assumes that the errors are independent and identically distributed (iid) Type I extreme value.

Average willingness-to-pay (WTP) for each attribute level of origin and certificate were calculated as follows:

$$WTP(Attribute) = -(\beta n - \beta level)/\beta 1 \quad (3)$$

where β_1 is the parameter of price, β_{level} is the parameter for each level of the attributes, country of origin and certificate and β_n is the parameter for reference attribute level.

4. Results

4.1. Consumer Preferences

The parameter estimates of the MNL models for the main effect variables are shown in Table 5 below. The null hypothesis is that all coefficients are equal to zero. As the table shows, for clams, Croatian consumers are interested in buying the frozen ones. Moreover, in all three countries, Croatia, Italy and Spain, the coefficients for the innovative product with a longer shelf life are lower compared to the chilled and frozen clams, which means

that this product is the least preferred compared to the other options. In Croatia, the coefficient is not significant, which means that Croatian consumers are not interested in buying refrigerated clams with a shelf life of 20 days. However, since all coefficients are positive, it means that consumers prefer to buy one of the products rather than none at all.

Table 5. Consumers' preferences for clam products.

	Croatia	Italy	Spain
Refrigerated	0.22 *	1.05 ***	0.59 ***
Frozen	0.35 ***	0.93 ***	0.61 ***
HHP	0.52	0.87 ***	0.37 ***
Price	−0.02 ***	−0.12 ***	−0.02 ***
Origin Croatia [a]	0.89 ***	−0.46 ***	−0.24 ***
Origin Italy	−0.37 ***	0.85 ***	−0.16 ***
Origin Spain	−0.52 ***	−0.39 ***	0.40 ***
No certificate [a]	−0.02	−0.19 ***	0.10 ***
RFM certificate	0.01	0.11 ***	−0.17 ***
MSC certificate	0.01	0.08 **	0.07 *
Log-Likelihood	−4563.8	−4329.9	−4895.1
McFadden R^2	0.11052	0.12381	0.041042

Signif. codes: 0 '***' 0.001 '**' 0.01 '*'; [a] are the reference levels of the attributes, the coefficients were calculated by: coefficient (ref.lev.) = −Σ coefficients (attribute levels).

As an answer to RQ1, the attribute price is negative, which means that consumers do not like to pay additional prices. In other words, a price increase lowers consumers' utility.

Moreover, the model suggests that consumers prefer to buy clams that originate from their country, as the coefficients for the origin of the product are positive only for the country where the respondents are located, while the other two countries of origin have a negative coefficient. This result provides a clear answer to RQ2.

Following RQ3, the coefficients for certification in Croatia are not significant, which means that Croatian consumers do not pay much attention when purchasing clams. In Italy, the coefficient for "No certificate" is significant and negative, which means that Italian consumers prefer mussels with certification, and most of all the RFM certificate. However, the RFM certificate is strongly preferred in Italy, but not in Spain, which is not very trusting, as the negative coefficient means that Spanish consumers prefer not to have a certificate at all on the clams they buy rather than for them to carry the RFM certificate. On the other hand, MSC certification is highly valued in Spain.

4.2. Consumer WTP

The average WTP for each attribute level was calculated according to Equation (3). Here β1 is the parameter for price, βlevel is the parameter for the attribute's reference level, origin and certification, and $β_i$ is the parameter for the attribute level. The WTP we calculate here is the maximum price premium consumers are willing to pay for a pack of 500 grammes (equivalent to two servings) of certified clams of the specified origin. Table 6 shows the results for the WTP.

Table 6. Willingness to pay for clams in euros. Evaluating price premium comparing to products from Croatia and with no label.

Attribute	Croatia	Italy	Spain
Origin Italy	−8.3 [−63 kn *]	10.9	4.0
Origin Spain	−9.4 [70.5 kn *]	0.6	32.0
Certification RFM	NS	2.5	−13.5
Certification MSC	NS	2.3	1.5

* Price level in Croatian Kuna.

As Table 6 shows, Croatian consumers were not willing to pay a price premium for clams from Italy and Spain compared to clams from their country. However, the negative value of WTP is lower for clams from Italy, indicating that Italian clams were slightly preferred to Spanish clams. The WTP was not calculated for certification as the coefficients were not significant.

Italian consumers were willing to pay 10.9 euros more for clams from their own country than for those from Croatia. They were also willing to pay a small price premium for mussels from Spain compared to those from Croatia. This means that Italian consumers preferred mussels from Spain to those from Croatia. In terms of certification, Italian consumers indicated a similar price premium for both certificates compared to no certificate, while RFM had a slightly higher WTP than MSC.

Similar to Italian consumers, Spanish consumers were also willing to pay a price premium for clams from Italy over those from Croatia. However, Spanish consumers were not willing to pay a price premium for an RFM certificate compared to one without. Nevertheless, they expressed a price premium for the MSC certificate, but it was lower compared to Italian consumers, indicating that Italian consumers trusted the certificates the most out of the three countries.

5. Discussion

Although overfishing in the Mediterranean has decreased slightly, it is still far from sustainable standards. This is the reason for the ethical and sustainability concerns of FAP consumers who feel responsible towards society. To ensure the sustainability of marine resources and their fishing methods, producers and related organizations provide sustainability certificates and labels as information tools. Some certifications and labels are now offered to ensure the sustainability of FAPs. However, there are still marine products such as clams where producers have not yet been able to respond to consumer concerns about sustainability as they should.

Therefore, the aim of this study is to address consumers' sustainability concerns by investigating their purchasing preferences and WTP for sustainability-certified mussels. The results of consumer purchase preferences for the three options proposed show that, in general, there is not much preference for the innovative clam with a higher shelf life that undergoes innovative high hydrostatic pressure treatment compared to the other two options (frozen and chilled). The reason could be that consumers are often sceptical about innovative foods [76–79]. In line with this, Demartini et al. [29] found in their study with Italian consumers that the acceptance of shelf-life extensions for freshly packaged fish fillets was low. Demartini et al. found that consumers do not have a positive preference for eating fish products with shelf-life extension technology. Therefore, more information about this technology can easily influence consumer preferences.

Regarding the origin of clams, there is a strong country identity, which means that consumers prefer to buy products from their country of origin. In general, European consumers tend to consume marine products that are produced close to them [56], as local or national seafood has a much shorter supply chain compared to imported products. Therefore, consumers prefer local FAPs [16]. Consumers often believe that shellfish produced or farmed in their own country is of higher quality. This result is consistent with the findings of Mulazzani et al. [25], Peiró-Signes et al. [9] and Pérez-Ramírez et al. [80], where the country of origin was the main characteristic in the choice of FAP. The important point about this issue is that the origin of FAPs has a significant impact on consumers' interest in eco-labelled seafood [80].

According to the results of our study, Croatian consumers do not rely much on labels when buying clams. In some studies, food scandals [81] and in other studies, lack of trust in information on labels [55] were cited as reasons for consumer reluctance to use food labels. This problem is particularly prevalent in seafood, as the supply chain is complex and often non-transparent [82]. A study analysing 44 recent studies of more than 9,000 seafood samples from restaurants, fishmongers and supermarkets in more than 30 countries found

that about 55% of fish sold in the UK and 38% in the US were mislabelled [83]. In addition, some similar cases have been reported in Europe [83,84]. Furthermore, Croatian consumers are not willing to pay a price premium for shellfish from Italy and Spain compared to shellfish from their country. This result contrasts with Lim et al. [24], who found that consumers had a higher WTP for imported canned tuna with a valid certification compared to non-certified local or national products.

Italian consumers prefer Italian clams more than the other two optional clams in Croatia and Spain. This is to be expected as Italy is the largest producer of clams in Europe [18]. Therefore, they are willing to pay about 11 euros more for clams from their own country than for those from Croatia. They are also willing to pay a lower price premium for clams from Spain than for clams from Croatia.

Similar to Italian consumers, clams caught in Italy are preferred by Spanish consumers to clams originating from Croatia. Spanish consumers are willing to pay a higher price for clams from Italy than for those from Croatia. Spanish consumers prefer MSC clams compared to clams without any certificate. Spanish consumers are probably more used to MSC labelling than Italians and Croats [28]. This explains why they trust the MSC but not the RFM, which is not yet used [85].

Regarding the upcoming sustainability labels for clams, Italians report a similar price premium for both certificates compared to no certificate. RFM has a slightly higher WTP than MSC. This can be explained by the fact that MSC is still very little used in Italy. Therefore, consumers do not have a clear preference for a product that already exists or another that is only hypothetical [14,24,25]. Another possible explanation is that, since MSC certification is currently available in the market, they are looking for certification (such as the RFM) that includes more features or information on sustainability issues. This includes features such as an efficient and adaptable management system with clear sustainability objectives. These features guarantee the monitoring, control and surveillance of fishing activities. Finally, Proi et al. [85] mention that FAP companies should consider semiotic associations to overcome the lack of visibility of eco-labels and attract more attention from consumers looking for sustainability information in the relevant labels. This includes the use of colours and symbols associated with aquatic products and their sustainability.

6. Conclusions

The objective of this study is to investigate consumers' sustainability concerns by examining their purchasing preferences and WTP for clams with sustainability certification. The results of consumers' purchasing preferences for the three options provided show that, in general, the innovative clam with a higher shelf life is not much preferred compared to the other two options, frozen and chilled. In terms of country of origin, there is a strong country identity for clams. Moreover, sustainability labels are not much preferred in Croatia. The Italians prefer a product certified with RFM, while the Spanish prefer MSC.

6.1. Research Implications

The present research has particular implications for the seafood industry specialising in clam production. From the results of this research, it appears that consumers in the three Mediterranean countries do not particularly prefer new technologies, even if they guarantee a longer shelf life. Even if such new technologies can reduce food waste, this may not be seen as a positive initiative by consumers. Therefore, promotional campaigns addressing this issue are important to raise consumer awareness of the safety of these technologies and the positive impact they could have on reducing food waste and subsequently reducing overfishing and improving ocean conditions. Alternatively, information on processing provided to consumers on packaging should be limited to the effects of the process (i.e., shelf life) and avoid unnecessary explanations of the process itself, as these descriptions can reinforce the impression of ultra-processed food and thus unhealthy products.

A similar argument can be made in the case of eco-labelling. Ecolabels need promotional and educational campaigns to be well accepted by consumers. As can already be seen

from the existing literature, differences between countries can be relevant. Croatian consumers are probably less accustomed to distinguishing between certified and non-certified products, as eco-labelling is far from widespread in this country. Italian consumers are becoming aware of sustainability, but in general terms, and they are not able to distinguish (and appreciate) between a label that already exists on the market (MSC) and one that does not yet exist (RFM). Finally, Spanish consumers are more mature and have confidence in a label (MSC) that has already captured a significant market share. These results reinforce the idea that policy makers, environmental NGOs and companies interested in developing sustainable products need to spend more time and money to increase consumers' awareness (of the issue) and knowledge (of tools such as labels).

6.2. Research Limitations

The present study has some limitations that should be carefully considered in future research. The first limitation relates to the characteristics of the sample. Most of the participants in this study were female. However, research has found that women are most often responsible for food purchases [76]. The second limitation is related to the fact that this study used a hypothetical DCE, which could lead to biases in preferences and WTP, as participants did not have to pay for any of the options in the DCE. However, we tried to mitigate these biases by using a cheap conversation, as research has shown this to be a valuable tool in this regard [67–72]. Finally, when presenting information about the innovative technology, we did not explain the potential positive impact it may have in terms of food waste and sustainability goals. Future research can therefore explore how possible positive communication of the impact of innovative technologies in the food sector can increase consumer acceptance of these technologies.

References

1. Nelson, L.K.; Bogeberg, M.; Cullen, A.; Koehn, L.E.; Strawn, A.; Levin, P.S. Perspectives on Managing Fisheries for Community Wellbeing in the Face of Climate Change. *Marit. Stud.* **2022**, *21*, 235–254. [CrossRef] [PubMed]
2. United Nations Conserve and Sustainably Use the Oceans, Seas and Marine Resources for Sustainable Development. Available online: https://sdgs.un.org/goals/goal14 (accessed on 15 June 2023).
3. Davies, R.W.D.; Cripps, S.J.; Nickson, A.; Porter, G. Defining and Estimating Global Marine Fisheries Bycatch. *Mar. Policy* **2009**, *33*, 661–672. [CrossRef]
4. Bellido, J.M.; Santos, M.B.; Pennino, M.G.; Valeiras, X.; Pierce, G.J. Fishery Discards and Bycatch: Solutions for an Ecosystem Approach to Fisheries Management? *Hydrobiologia* **2011**, *670*, 317–333. [CrossRef]
5. FAO. Overfishing Falls in the Mediterranean and the Black Sea, but Fisheries Resources Remain under Significant Stress. Available online: https://www.fao.org/gfcm/news/detail/en/c/1623149/ (accessed on 2 June 2023).
6. Guijarro, B.; Ordines, F.; Massutí, E. Improving the Ecological Efficiency of the Bottom Trawl Fishery in the Western Mediterranean: It's about Time! *Mar. Policy* **2017**, *83*, 204–214. [CrossRef]
7. Lucchetti, A.; Virgili, M.; Vasapollo, C.; Petetta, A.; Bargione, G.; Li Veli, D.; Brĉic, J.; Sala, A. An Overview of Bottom Trawl Selectivity in the Mediterranean Sea. *Mediterr. Mar. Sci.* **2021**, *22*, 566–585. [CrossRef]
8. Hiddink, J.G.; Kaiser, M.J.; Sciberras, M.; McConnaughey, R.A.; Mazor, T.; Hilborn, R.; Collie, J.S.; Pitcher, C.R.; Parma, A.M.; Suuronen, P.; et al. Selection of Indicators for Assessing and Managing the Impacts of Bottom Trawling on Seabed Habitats. *J. Appl. Ecol.* **2020**, *57*, 1199–1209. [CrossRef]
9. Peiró-Signes, A.; Miret-Pastor, L.; Galati, A.; Segarra-Oña, M. Consumer Demand for Environmental, Social, and Ethical Information in Fishery and Aquaculture Product Labels. *Front. Mar. Sci.* **2022**, *9*, 1–14. [CrossRef]
10. Lewis, S.G.; Boyle, M. The Expanding Role of Traceability in Seafood: Tools and Key Initiatives. *J. Food Sci.* **2017**, *82*, A13–A21. [CrossRef]
11. Tinacci, L.; Guardone, L.; Castro-Palomino Rubio, J.; Riina, M.V.; Stratev, D.; Guidi, A.; Armani, A. Labelling Compliance and Species Identification of Herring Products Sold at Large Scale Retail Level within the Italian Market. *Food Control* **2019**, *106*, 106707. [CrossRef]
12. Gray, M.; Barbour, N.; Campbell, B.; Robillard, A.J.; Todd-Rodriguez, A.; Xiao, H.; Plough, L. Ecolabels Can Improve Public Perception and Farm Profits for Shellfish Aquaculture. *Aquac. Environ. Interact.* **2021**, *13*, 13–20. [CrossRef]
13. Autzen, M.; Ounanian, K. 'It's How You Catch the Fish': Debates on Ecolabelling, Yield Thinking, and Care in Denmark. *Gend. Place Cult.* **2022**, *29*, 1399–1422. [CrossRef]
14. Banovic, M.; Reinders, M.J.; Claret, A.; Guerrero, L.; Krystallis, A. A Cross-Cultural Perspective on Impact of Health and Nutrition Claims, Country-of-Origin and Eco-Label on Consumer Choice of New Aquaculture Products. *Food Res. Int.* **2019**, *123*, 36–47. [CrossRef] [PubMed]
15. Kim, B.-T.; Lee, M.-K. Consumer Preference for Eco-Labeled Seafood in Korea. *Sustainability* **2018**, *10*, 3276. [CrossRef]
16. EUMOFA. The EU Fish Market. 2021 Edition. Available online: https://www.eumofa.eu/documents/20178/477018/EN_The+EU+fish+market_2021.pdf/27a6d912-a758-6065-c973-c1146ac93d30?t=1636964632989 (accessed on 20 June 2023).
17. EUROSTAT. Catches in All Fishing Regions. Available online: https://ec.europa.eu/eurostat/databrowser/view/TAG00076/default/table?lang=en (accessed on 14 June 2023).
18. EUMOFA. The EU Fish Market. Available online: https://www.eumofa.eu/documents/20178/521182/EFM2022_EN.pdf/5dbc9b7d-b87c-a897-5a3f-723b369fab08?t=1669215787975 (accessed on 14 June 2023).
19. Eumofa. Croatia in the World and in the EU. Available online: https://www.eumofa.eu/it/Croatia (accessed on 15 June 2023).
20. Marine Stewardship Council Sustainable Seafood: The First 20 Years A History of the Marine Stewardship Council. Available online: http://20-years.msc.org/#two-the-msc-is-born-32155 (accessed on 20 June 2023).
21. Hori, J.; Wakamatsu, H.; Miyata, T.; Oozeki, Y. Has the Consumers Awareness of Sustainable Seafood Been Growing in Japan? Implications for Promoting Sustainable Consumerism at the Tokyo 2020 Olympics and Paralympics. *Mar. Policy* **2020**, *115*, 103851. [CrossRef]
22. Asche, F.; Bronnmann, J. Price Premiums for Ecolabelled Seafood: MSC Certification in Germany. *Aust. J. Agric. Resour. Econ.* **2017**, *61*, 576–589. [CrossRef]
23. Liu, T.-M.; Chen, I.-J.; Yuan, H.-C.J. Using Stated Preference Valuation to Support Sustainable Marine Fishery Management. *Sustainability* **2021**, *13*, 4838. [CrossRef]
24. Lim, K.H.; Hu, W.; Nayga, R.M. Is Marine Stewardship Council's Ecolabel a Rising Tide for All? Consumers' Willingness to Pay for Origin-Differentiated Ecolabeled Canned Tuna. *Mar. Policy* **2018**, *96*, 18–26. [CrossRef]
25. Mulazzani, L.; Piredda, L.; Cerjak, M.; Camanzi, L. Consumer Appreciation of a Shark-Free Eco-Label for Small Pelagics. *Br. Food J.* **2021**, *123*, 88–104. [CrossRef]
26. Marine Stewardship Council First Mediterranean Fishery Gains MSC Certification. Available online: https://www.msc.org/media-centre/press-releases/press-release/first-mediterranean-fishery-gains-msc-certification (accessed on 5 June 2023).
27. Myrland, Ø.; Trondsen, T.; Johnston, R.S.; Lund, E. Determinants of Seafood Consumption in Norway: Lifestyle, Revealed Preferences, and Barriers to Consumption. *Food Qual. Prefer.* **2000**, *11*, 169–188. [CrossRef]
28. Thong, N.T.; Solgaard, H.S. Consumer's Food Motives and Seafood Consumption. *Food Qual. Prefer.* **2017**, *56*, 181–188. [CrossRef]

29. Demartini, E.; Gaviglio, A.; La Sala, P.; Fiore, M. Impact of Information and Food Technology Neophobia in Consumers' Acceptance of Shelf-Life Extension in Packaged Fresh Fish Fillets. *Sustain. Prod. Consum.* **2019**, *17*, 116–125. [CrossRef]

30. Asche, F.; Bjørndal, T.; Gordon, D. V Studies in the Demand Structure for Fish and Seafood Products BT. In *Handbook of Operations Research in Natural Resources*; Weintraub, A., Romero, C., Bjørndal, T., Epstein, R., Miranda, J., Eds.; Springer: Boston, MA, USA, 2007; pp. 295–314, ISBN 978-0-387-71815-6.

31. Koeshendrajana, S.; Arthatiani, F.Y.; Virgantari, F. Price and Income Elasticities of Selected Fish Commodities in Indonesia: A Multi Stage Budgeting Framework. In Proceedings of the 4th International Symposium on Marine Science and Fisheries, Makassar, Indonesia, 5–6 June 2021.

32. de Boer, J.; Schösler, H.; Aiking, H. Fish as an Alternative Protein—A Consumer-Oriented Perspective on Its Role in a Transition towards More Healthy and Sustainable Diets. *Appetite* **2020**, *152*, 104721. [CrossRef] [PubMed]

33. Varian, H.R. *Intermediate Microeconomics*, 9th ed.; W.W. Norton & Company: New York, NY, USA; London, UK, 2014.

34. Suh, Y.; Hur, J.; Davies, G. Cultural Appropriation and the Country of Origin Effect. *J. Bus. Res.* **2016**, *69*, 2721–2730. [CrossRef]

35. Onozaka, Y.; Honkanen, P.; Altintzoglou, T. Sustainability, Perceived Quality and Country of Origin of Farmed Salmon: Impact on Consumer Choices in the USA, France and Japan. *Food Policy* **2023**, *117*, 102452. [CrossRef]

36. Natale, F.; Borrello, A.; Motova, A. Analysis of the Determinants of International Seafood Trade Using a Gravity Model. *Mar. Policy* **2015**, *60*, 98–106. [CrossRef]

37. Rodriguez-Salvador, B.; Calvo Dopico, D. Differentiating Fish Products: Consumers' Preferences for Origin and Traceability. *Fish. Res.* **2023**, *262*, 106682. [CrossRef]

38. Petereit, J.; Hoerterer, C.; Krause, G. Country-Specific Food Culture and Scientific Knowledge Transfer Events—Do They Influence the Purchasing Behaviour of Seafood Products? *Aquaculture* **2022**, *560*, 738590. [CrossRef]

39. Supartini, A.; Oishi, T.; Yagi, N. Changes in Fish Consumption Desire and Its Factors: A Comparison between the United Kingdom and Singapore. *Foods* **2018**, *7*, 97. [CrossRef]

40. Peterson, A.M.; McBride, G.E.; Jhita, S.K.; Hellberg, R.S. An Investigation into Country of Origin Labeling, Species Authentication and Short Weighting of Commercially Sold Frozen Fish Fillets. *Heliyon* **2021**, *7*, e06713. [CrossRef]

41. Paolacci, S.; Mendes, R.; Klapper, R.; Velasco, A.; Ramilo-Fernandez, G.; Muñoz-Colmenero, M.; Potts, T.; Martins, S.; Avignon, S.; Maguire, J.; et al. Labels on Seafood Products in Different European Countries and Their Compliance to EU Legislation. *Mar. Policy* **2021**, *134*, 104810. [CrossRef]

42. Vergis, J.; Rawool, D.B.; Singh Malik, S.V.; Barbuddhe, S.B. Food Safety in Fisheries: Application of One Health Approach. *Indian J. Med. Res.* **2021**, *153*, 348–357.

43. Menozzi, D.; Nguyen, T.T.; Sogari, G.; Taskov, D.; Lucas, S.; Castro-Rial, J.L.; Mora, C. Consumers' Preferences and Willingness to Pay for Fish Products with Health and Environmental Labels: Evidence from Five European Countries. *Nutrients* **2020**, *12*, 2650. [CrossRef] [PubMed]

44. Ankamah-Yeboah, I.; Jacobsen, J.B.; Olsen, S.B.; Nielsen, M.; Nielsen, R. The Impact of Animal Welfare and Environmental Information on the Choice of Organic Fish: An Empirical Investigation of German Trout Consumers. *Mar. Resour. Econ.* **2019**, *34*, 247–266. [CrossRef]

45. Grunert, K.G. Sustainability in the Food Sector: A Consumer Behaviour Perspective. *Int. J. Food Syst. Dyn.* **2011**, *2*, 121943.

46. Thøgersen, J.; Haugaard, P.; Olesen, A. Consumer Responses to Ecolabels. *Eur. J. Mark.* **2010**, *44*, 1787–1810. [CrossRef]

47. Zander, K.; Feucht, Y. Consumers' Willingness to Pay for Sustainable Seafood Made in Europe. *J. Int. Food Agribus. Mark.* **2018**, *30*, 251–275. [CrossRef]

48. Natali, F.; Cacchiarelli, L.; Branca, G. There Are Plenty More (Sustainable) Fish in the Sea: A Discrete Choice Experiment on Discarded Species in Italy. *Ecol. Econ.* **2022**, *196*, 107413. [CrossRef]

49. Pieniak, Z.; Verbeke, W.; Scholderer, J.; Brunsø, K.; Olsen, S.O. European Consumers' Use of and Trust in Information Sources about Fish. *Food Qual. Prefer.* **2007**, *18*, 1050–1063. [CrossRef]

50. van Bussel, L.M.; Kuijsten, A.; Mars, M.; van 't Veer, P. Consumers' Perceptions on Food-Related Sustainability: A Systematic Review. *J. Clean. Prod.* **2022**, *341*, 130904. [CrossRef]

51. Ferfolja, M.; Cerjak, M.; Matulić, D.; Maksan, M.T. Consumer Knowledge and Perception about Fresh Fish from Organic Farming in Croatia. *Croat. J. Fish.* **2022**, *80*, 7–16. [CrossRef]

52. Galati, A.; Miret-Pastor, L.; Siggia, D.; Crescimanno, M.; Fiore, M. Determinants Affecting Consumers' Attention to Fish Eco-Labels in Purchase Decisions: A Cross-Country Study. *Br. Food J.* **2022**, *124*, 2993–3013. [CrossRef]

53. Salladarré, F.; Guillotreau, P.; Perraudeau, Y.; Monfort, M.-C. The Demand for Seafood Eco-Labels in France. *J. Agric. Food Ind. Organ.* **2010**, *8*. [CrossRef]

54. McClenachan, L.; Dissanayake, S.T.M.; Chen, X. Fair Trade Fish: Consumer Support for Broader Seafood Sustainability. *Fish Fish.* **2016**, *17*, 825–838. [CrossRef]

55. Thomas Travaille, K.L.; Lindley, J.; Kendrick, G.A.; Crowder, L.B.; Clifton, J. The Market for Sustainable Seafood Drives Transformative Change in Fishery Social-Ecological Systems. *Glob. Environ. Chang.* **2019**, *57*, 101919. [CrossRef]

56. Jonell, M.; Crona, B.; Brown, K.; Rönnbäck, P.; Troell, M. Eco-Labeled Seafood: Determinants for (Blue) Green Consumption. *Sustainability* **2016**, *8*, 884. [CrossRef]

57. Winson, A.; Choi, J.Y.; Hunter, D.; Ramsundar, C. Ecolabeled Seafood and Sustainable Consumption in the Canadian Context: Issues and Insights from a Survey of Seafood Consumers. *Marit. Stud.* **2022**, *21*, 99–113. [CrossRef]

58. Vitale, S.; Biondo, F.; Giosuè, C.; Bono, G.; Okpala, C.O.R.; Piazza, I.; Sprovieri, M.; Pipitone, V. Consumers' Perception and Willingness to Pay for Eco-Labeled Seafood in Italian Hypermarkets. *Sustainability* **2020**, *12*, 1434. [CrossRef]

59. Hensher, D.A.; Rose, J.M.; Greene, W.H. *Applied Choice Analysis*; Cambridge University Press: Cambridge, UK, 2015; ISBN 9781316136232.

60. Louviere, J.J.; Hensher, D.A.; Swait, J.D. *Stated Choice Methods: Analysis and Applications*; Cambridge University Press: Cambridge, UK, 2000; ISBN 9780521788304.

61. Verza, M.; Camanzi, L.; Rota, C.; Cerjak, M.; Mulazzani, L.; Malorgio, G. Consumer Sentiments and Emotions in New Seafood Product Concept Development: A Co-Creation Approach Using Online Discussion Rooms in Croatia, Italy and Spain. *Foods* **2023**, *12*, 1729. [CrossRef]

62. Pouta, E.; Heikkilä, J.; Forsman-Hugg, S.; Isoniemi, M.; Mäkelä, J. Consumer Choice of Broiler Meat: The Effects of Country of Origin and Production Methods. *Food Qual. Prefer.* **2010**, *21*, 539–546. [CrossRef]

63. Van Loo, E.J.; Caputo, V.; Nayga, R.M.; Meullenet, J.; Ricke, S.C. Consumers' Willingness to Pay for Organic Chicken Breast: Evidence from Choice Experiment. *Food Qual. Prefer.* **2011**, *22*, 603–613. [CrossRef]

64. Haaijer, R.; Kamakura, W.; Wedel, M. The "no-Choice" Alternative in Conjoint Choice Experiments. *Int. J. Mark. Res.* **2001**, *43*, 93–106. [CrossRef]

65. Street, D.J.; Burgess, L.; Louviere, J.J. Quick and Easy Choice Sets: Constructing Optimal and Nearly Optimal Stated Choice Experiments. *Int. J. Res. Mark.* **2005**, *22*, 459–470. [CrossRef]

66. Bech, M.; Gyrd-Hansen, D. Effects Coding in Discrete Choice Experiments. *Health Econ. Lett.* **2005**, *14*, 1079–1083. [CrossRef] [PubMed]

67. Alfnes, F.; Guttormsen, A.G.; Steine, G.; Kolstad, K. Consumers' Willingness to Pay for the Color of Salmon: A Choice Experiment with Real Economic Incentives. *Am. J. Agric. Econ.* **2006**, *88*, 1050–1061. [CrossRef]

68. Lusk, J.L.; Hudson, D. Willingness-to-Pay Estimates and Their Relevance to Agribusiness Decision Making. *Rev. Agric. Econ.* **2004**, *26*, 152–169. [CrossRef]

69. Neill, H.R.; Cummings, R.G.; Ganderton, P.T.; Harrison, G.W.; Economics, S.L.; May, N.; Neill, H.R.; Cummings, R.G.; Ganderton, P.T.; Harrison, G.W.; et al. Board of Regents of the University of Wisconsin System Hypothetical Surveys and Real Economic Commitments Surveys Commitments. *Land Econ.* **1994**, *70*, 145–154. [CrossRef]

70. Yue, C.; Tong, C. Organic or Local? Investigating Consumer Preference for Fresh Produce Using a Choice Experiment with Real Economic Incentives. *HortScience* **2009**, *44*, 366–371. [CrossRef]

71. Silva, A.; Nayga, R.M.; Campbell, B.L.; Park, J.L. Revisiting Cheap Talk with New Evidence from a Field Experiment. *J. Agric. Resour. Econ.* **2011**, *36*, 280–291. [CrossRef]

72. Cummings, R.G.; Taylor, L.O. Unbiased Value Estimates for Environmental Goods: A Cheap Talk Design for the Contingent Valuation Method. *Am. Econ. Rev.* **1999**, *89*, 649–665. [CrossRef]

73. Lancaster, K.J. A New Approach to Consumer Theory Author. *J. Political Econ.* **1966**, *74*, 132–157. [CrossRef]

74. James, S.; Burton, M. Consumer Preferences for GM Food and Other Attributes of the Food System. *Aust. J. Agric. Resour. Econ.* **2003**, *47*, 501–518. [CrossRef]

75. Train, K.E. *Discrete Choice Methods with Simulation*; Cambridge University Press: New York, NY, USA, 2009.

76. Pakseresht, A.; Ahmadi Kaliji, S.; Canavari, M. Review of Factors Affecting Consumer Acceptance of Cultured Meat. *Appetite* **2022**, *170*, 105829. [CrossRef] [PubMed]

77. Gutkowska, K.; Czarnecki, J. Consumer Attitudes Towards Innovative Food Products Including Functional Products—Implications for Marketing in Terms of Nutrition and Health Claims. *Mark. Sci. Res. Organ.* **2020**, *38*, 107–128. [CrossRef]

78. Albertsen, L.; Wiedmann, K.-P.; Schmidt, S. The Impact of Innovation-Related Perception on Consumer Acceptance of Food Innovations—Development of an Integrated Framework of the Consumer Acceptance Process. *Food Qual. Prefer.* **2020**, *84*, 103958. [CrossRef]

79. Canavari, M.; Castellini, A.; Xhakollari, V. Chapter 2—A Short Review on Willingness to Pay for Novel Food. In *Case Studies on the Business of Nutraceuticals, Functional and Super Foods*; Woodhead Publishing: Sawston, UK, 2023; pp. 21–30. ISBN 978-0-12-821408-4.

80. Pérez-Ramírez, M.; Almendarez-Hernández, M.A.; Avilés-Polanco, G.; Beltrán-Morales, L.F. Consumer Acceptance of Eco-Labeled Fish: A Mexican Case Study. *Sustainability* **2015**, *7*, 4625–4642. [CrossRef]

81. Moreira, M.J.; García-Díez, J.; de Almeida, J.M.M.M.; Saraiva, C. Consumer Knowledge about Food Labeling and Fraud. *Foods* **2021**, *10*, 1095. [CrossRef]

82. Lawrence, S.; Elliott, C.; Huisman, W.; Dean, M.; van Ruth, S. The 11 Sins of Seafood: Assessing a Decade of Food Fraud Reports in the Global Supply Chain. *Compr. Rev. Food Sci. Food Saf.* **2022**, *21*, 3746–3769. [CrossRef]

83. Leahy, S. Revealed: Seafood Fraud Happening on a Vast Global Scale. Available online: https://www.theguardian.com/environment/2021/mar/15/revealed-seafood-happening-on-a-vast-global-scale (accessed on 15 June 2023).

84. Pardo, M.Á.; Jiménez, E.; Viðarsson, J.R.; Ólafsson, K.; Ólafsdóttir, G.; Daníelsdóttir, A.K.; Pérez-Villareal, B. DNA Barcoding Revealing Mislabeling of Seafood in European Mass Caterings. *Food Control* **2018**, *92*, 7–16. [CrossRef]
85. Proi, M.; Dudinskaya, E.C.; Naspetti, S.; Ozturk, E.; Zanoli, R. The Role of Eco-Labels in Making Environmentally Friendly Choices: An Eye-Tracking Study on Aquaculture Products with Italian Consumers. *Sustainability* **2023**, *15*, 4659. [CrossRef]