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Consumer perceptions of farmed fish: A cross-national segmentation in five European countries

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# Consumer perceptions of farmed fish

Consumer  
perceptions of  
farmed fish

## A cross-national segmentation in five European countries

2581

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### Abstract

**Purpose** – The purpose of this paper is to investigate possible cross-cultural consumer segments in the EU aquaculture market and provide direction and focus for marketing strategies for farmed fish products.

**Design/methodology/approach** – Selected psychographic constructs (i.e. category involvement, domain-specific innovativeness, subjective knowledge, suspicion of novelties and optimistic bias) are tested as segmentation basis with the objective of defining a number of cross-border consumer segments with distinctive and clear-cut profiles in terms of consumer perceptions towards farmed fish.

**Findings** – Based on the consumer psychographic profiles, three distinct segments are found: involved traditional, involved innovators and ambiguous indifferent, of which the first two constitute especially interesting targets for market positioning strategies for aquaculture products.

**Practical implications** – The results of the segmentation analysis opens new horizons in terms of positioning and differentiation of fish products from the aquaculture industry according to the most important potential market segments.

**Originality/value** – The current research brings insights into different pan-European consumer segments and their characteristics that allow for a corresponding differentiation strategy within the aquaculture industry. The fact that the segments tend to be uniform across all countries suggests a relatively homogeneous or converging European fish-related culture.

**Keywords** Segmentation, Consumer perceptions, Involvement, Fish (food)

**Paper type** Research paper

### Introduction

Because of the health benefits of eating fish, fish consumption has been increasing over the past decades (FAO, 2014). Additionally, studies show that consumer perceptions of safety, environmental benefits, taste and nutritional value play a role in determining



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consumers' behaviour towards fish (Fernández-Polanco and Luna, 2012; Polymeros *et al.*, 2015). To keep up with this increase in fish consumption, fish supply has to increase further (Thurstan and Roberts, 2014). However, unsustainable fishing practices have led to the depletion of wild fish stocks (Pauly and Zeller, 2016). Given these circumstances, aquaculture seems to be an efficient alternative that could be deployed to face the expected increase in global consumer demand (Cahu *et al.*, 2004). However, consumers have generally had less than positive perceptions towards farmed fish (Claret *et al.*, 2014; Polymeros *et al.*, 2015). For example, Claret *et al.* (2014) recently investigated consumer beliefs of farmed and wild fish and found that, compared to farmed fish, wild fish was believed to be healthier, fresher, better quality and more natural.

Taking into account consumers' less positive perceptions towards farmed fish, it would be valuable to better understand how to attract the right consumers. To boost the EU market for aquaculture products, detailed information about different consumer segments and their characteristics would allow for a corresponding differentiation strategy and increased marketing efficiency. The current study therefore aims to define a number of cross-cultural consumer segments with the highest potential of buying farmed fish products across five European markets (i.e. France, Germany, Italy, Spain and the UK). These countries were selected either because they represent main aquaculture producing countries (i.e. France, Italy, Spain and the UK)[1] or because they represent important growing EU markets for farmed fish (i.e. Germany). We acknowledge that Germany has lower levels of seafood consumption when compared to other countries. However, it is also important to consider large European countries that consume less fish, as they can provide valuable insights into barriers for farmed fish consumption. A number of psychographic constructs, which have been shown to play an important role in consumer behaviour towards food and food products, are used as a basis for defining consumer segments with different configurations of perceptions and behavioural outcomes regarding farmed fish. Based on the presented consumer segments, a set of managerial implications for successful positioning of farmed fish against the identified cross-border segments will be provided.

### **Background and conceptual framework**

As a basis for a segmentation analysis, we use five psychographic constructs that have been shown to play an important role in consumer behaviour towards food products in general, namely, category involvement, subjective knowledge, domain-specific innovativeness, suspicion of novelties and optimistic bias (Papista and Krystallis, 2012). Previous studies have found that food involvement positively affects consumers' intention to consume or buy fish (Pieniak *et al.*, 2010; Verbeke and Vackier, 2005). Furthermore, several studies have found that subjective knowledge affects perceptions and purchase behaviour with regard to different types of food products (Klerck and Sweeney, 2007) as well as evaluations of fish products information (Altintzoglou *et al.*, 2014; Pieniak *et al.*, 2007). Several studies have noted that aquaculture is a relatively new source of fish production (Fernández-Polanco and Luna, 2012). Consumers' concerns with regard to innovative food production methods could negatively affect the perceptions and evaluations of aquaculture (Loureiro and Hine, 2004), especially for consumers who are less familiar with the proposed technology, as lower familiarity generally leads to a lower willingness to try these products (Vidigal *et al.*, 2015). As such, we included domain-specific innovativeness and suspicion of novelties in our study. Domain-specific innovativeness is a psychographic characteristic that positively impacts consumers' adoption of specific food products. For example, previous studies

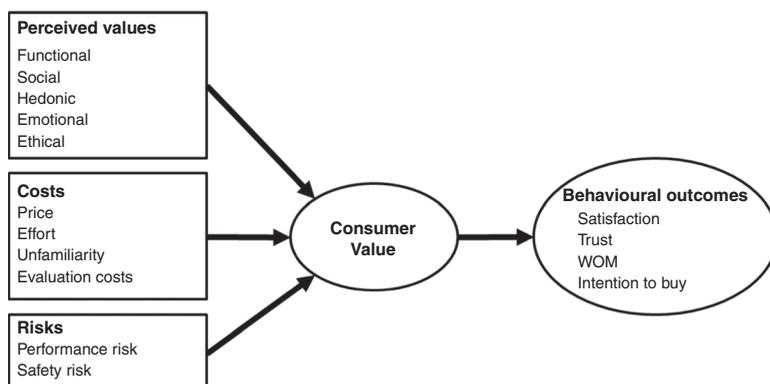
have shown that this construct is an important predictor of the purchase intention of organic foods (e.g. Bartels and Reinders, 2010). In addition, Bäckström *et al.* (2004) showed that suspicion of novelties has a negative influence on consumers' willingness to try new foods. This construct has a positive correlation with food neophobia, suggesting a restrained view on food innovation. Finally, optimistic bias is another construct proven to be effective in explaining different food-related behaviours (Guerrero *et al.*, 2009). People who are more optimistic about personal benefits associated with fish consumption may be more motivated to increase their consumption of fish compared to people who are not optimistic about the benefits, because they perceive their personal benefits as being relatively high (van Dijk *et al.*, 2011). Drawing on the exploratory nature of the current study, the supposition here is that these selected psychographic constructs have large discriminating power and can indeed constitute solid segmentation bases that lead to consumer segments with different configurations of consumer perceptions of farmed fish.

More specifically, we look at the consumer value perceptions of farmed fish, as well as associated costs and risks and possible outcomes that could bring more insight into the different consumer segments and their characteristics. Previous literature has identified a number of values that fall into different categories and could impact consumers' value perceptions. Functional (or economic) value is seen as the perceived utility acquired from an alternative product's capacity for functional or physical performance (Sheth *et al.*, 1991), also equivalent to product quality perceptions (Dodds *et al.*, 1991). Social value, in contrast, represents the perceived utility acquired from an alternative product's image congruence with relevant requirements from a specific social group (Sheth *et al.*, 1991; Sweeney and Soutar, 2001). Another type of value that consumers may perceive is hedonic value, which may be defined as value arising from consumers' own pleasure derived from consumption experiences appreciated for their own sake as ends in themselves (Mathwick *et al.*, 2001; Sweeney and Soutar, 2001). In addition, in the area of food consumer behaviour, past exploratory research has identified an emotional type of value in the context of innovative food products (Perrea *et al.*, 2015). Furthermore, emotional value can be defined as value related to emotions of excitement, enthusiasm and happiness from the purchase of products. Finally, ethical value, represented in a situation in which "virtue is its own reward" (Holbrook, 2006), is experienced when consumers associate buying and use of products with ethically desirable practices.

Different costs act as important factors in consumer perceptions of food products, such as price (Dodds *et al.*, 1991; Grewal *et al.*, 1998), effort required to physically purchase the product (Cronin *et al.*, 1997; Petrick, 2002; Yoo *et al.*, 2000), unfamiliarity with the product (Perrea *et al.*, 2015) and evaluation costs (i.e. the costs associated with the effort to collect the right information (Burnham *et al.*, 2003). Perceived risks surrounding a food product's functional or physical performance (Sweeney *et al.*, 1999) and the fear of physical health risk or harm (Rollin *et al.*, 2011; Ronteltap *et al.*, 2007) could also impact consumer perceptions of food products in terms of their performance and safety.

The above types of values, costs and risks form a composite "consumer value" component that affects outcomes. In this study, we distinguish between satisfaction, trust, word-of-mouth and intention to buy. Evidence supports that perceived consumer value represents the direct antecedent to customer satisfaction (Palmatier *et al.*, 2006), trust (Palmatier *et al.*, 2006; Chaudhuri and Holbrook, 2001) and word-of-mouth behaviour (Oh, 1999), as well as behavioural intentions (Grewal *et al.*, 1998). Figure 1 summarizes the conceptual model described above.

Figure 1.  
Conceptual model



## Methodology

### *Sample and procedure*

An online consumer survey in five European countries (i.e. France, Germany, Italy, Spain and the UK) was conducted in July 2014. The survey was part of a European research project on exploring the potential of emerging fish species for expansion of the European aquaculture industry funded by the European Union's Seventh Framework Programme for Research, Technological Development and Demonstration. The sample consisted of approximately 500 consumers in each country ( $n = 2,511$  households in all). The survey was administered by a professional market research company and was identical for all countries, created in English, translated into the different national languages and back-translated as appropriate. The final sample consisted of 49.2 per cent men and 50.8 per cent women; the age of participants in the survey ranged from 18 to 64 years ( $M = 41.4$ ); 46.2 per cent of the respondents had a university degree or higher; 73.2 per cent of the respondents indicated that he/she was the main decision maker for doing the grocery shopping of the household and 45.6 per cent of the respondents had children in their household.

Participants completed a self-administered questionnaire on values, costs and behaviour towards farmed fish. First, they received a realistic scenario of a hypothetical "new marine finfish species from the European aquaculture industry that has entered the market recently". In this scenario, several characteristics of the fish are described (e.g. quality, nutritional and sensory characteristics and sustainability), based on the characteristics of the fish species that are currently being examined for their potential in the European aquaculture industry[2]. Subsequently, considering the fish that was described in the scenario, respondents had to indicate what values, costs and risks they perceived with regard to this fish. Furthermore, respondents had to indicate their overall value and response to outcome variables regarding this farmed fish. A number of well-established scales were used to measure these various constructs. For most measures, seven-point Likert scales were used with end-points: 1 = "strongly agree" to 7 = "strongly disagree". Intention to buy was captured by two items using a seven-point probabilistic scale with end-points: 1 = "Most probable" to 7 = "Least probable": "I intend to purchase this fish next time I buy fish" and "I intend to replace my current fish with this fish". In addition, we measured the five psychographic characteristics discussed in the previous section: consumer involvement with the product category, domain-specific innovativeness, subjective knowledge,

suspicion of novelties and optimistic bias. All measures were averaged across their scale items to create a composite construct score. The measures, their origins, the number of items, means, standard deviations and Cronbach's  $\alpha$ s are shown in Table I.

Finally, respondents had to fill out some questions regarding their socio-demographic characteristics as well as their current consumption of different types of fish and seafood. With regard to the latter, respondents were asked about six different categories (i.e. farmed fish, wild fish, seafood, frozen fish, whole fish and processed fish such as fish fingers) the following question: "How often did you eat the following fish products in the last month? (in percentages)?" The following answer options were used: "Once a month or less", "2-3 times a month", "Once a week or more" and "I don't know".

### *Segmentation analysis*

A segmentation analysis was conducted with the data set obtained from the online consumer survey. The clusters were identified based on the scores of the five psychographic variables (i.e. category involvement, domain-specific innovativeness, subjective knowledge, optimistic bias and suspicion of novelties), while socio-demographic characteristics as well as fish consumption were used to characterize the clusters. According to the reliability (Cronbach's  $\alpha$ ) of each of the five constructs and their uni-dimensionality, the mean value for each construct was calculated and retained. A two-step clustering analysis was carried out for each country and for the complete data set ( $n = 2,511$ ). First, an agglomerative hierarchical cluster analysis (AHCA; using the Ward method and Euclidian distance) was applied over the standardized data set per participant to block idiosyncratic use of the scale. The final number of clusters to retain in each case was based on the percentage of within-cluster variance drop when adding a new cluster. Second, a k-means clustering was performed (using the "Determinant (W)" as clustering criterion) after selecting as initial cluster centres the centroids obtained in the previous AHCA.

## **Results**

### *Consumer segmentation*

Table II shows the centroids (i.e. mean scores) for category involvement, domain-specific innovativeness, subjective knowledge, optimistic bias and suspicion of novelties obtained for the cluster solutions for each of the five countries (i.e. France, Germany, Italy, Spain and the UK) and for the pooled data set. The final number of clusters are selected according to the parsimony rule, i.e., the simplest possible structure or lowest number of clusters that still represents homogenous groups assessed by the number of constructs that differed significantly between clusters. As similar cluster solutions were obtained across five European countries, the decision was made to pool the data from the five countries and proceed with the analyses at the overall sample level (all countries pooled). The overall sample showed a three-cluster solution with the most statistically robust properties in terms of the psychographic moderators' ability to discriminate among pooled sample members (95 per cent of the respondents correctly classified). The first two clusters (i.e. O1 and O2 in Table II) had a similar level of subjective knowledge and a higher category involvement in fish products. However, both clusters differed significantly on domain-specific innovativeness, with O1 scoring significantly higher than O2 on this characteristic. Consequently, these clusters were named involved innovators and involved traditional, respectively. The third segment (i.e. O3 in Table II) was called ambiguous indifferent, as

**Table I.**  
Constructs and  
construct-level  
statistics

Construct	Source	Number of items	Sample item	M	SD	$\alpha$
Functional value	Sweeney and Soutar (2001)	5	This fish would have consistent quality	3.06	1.39	0.95
Social value	Sweeney and Soutar (2001), Sanchez-Fernandez <i>et al.</i> (2009)	4	This fish would give those who buy it social approval	3.86	1.43	0.88
Hedonic value	Sweeney and Soutar (2001)	3	This fish would make me feel good	3.34	1.46	0.90
Ethical value	Sanchez-Fernandez <i>et al.</i> (2009)	4	Buying this fish is coherent with my ethical values	3.33	1.36	0.88
Emotional value	Perrea <i>et al.</i> (2015)	3	Buying this fish makes me feel happy	3.79	1.52	0.91
Price	Sweeney and Soutar (2001)	3	This fish would have higher price than the average of farmed fish	3.37	1.27	0.80
Effort	Yoo <i>et al.</i> (2000), Petrick (2002)	3	This fish would require too much time to find	3.54	1.32	0.87
Unfamiliarity	Perrea <i>et al.</i> (2015)	3	I won't feel as familiar as I want with this fish	3.82	1.33	0.81
Evaluation costs	Burnham <i>et al.</i> (2003)	4	I could not afford the time to get the information to fully evaluate this fish	3.80	1.22	0.81
Performance risk	Sweeney <i>et al.</i> (1999)	4	There might be a chance that this fish would not taste properly	3.96	1.22	0.82
Safety risk	Perrea <i>et al.</i> (2015)	3	This fish would not be safe to consume	3.88	1.31	0.79
Consumer value	Cronin <i>et al.</i> (1997), Dodds <i>et al.</i> (1991)	6	I would consider this fish to be good value for money	3.38	1.13	0.90
Satisfaction	Henning-Thurau <i>et al.</i> (2002)	3	Overall, I would be satisfied with this fish.	3.35	1.35	0.94
Trust	Chaudhuri and Holbrook (2001)	4	I would trust this fish	3.44	1.33	0.94
Word-of-Mouth	na	2	I would recommend this fish to my friends and family	3.46	1.42	0.90
Intention to Buy	na	2	I intend to purchase this fish next time I buy fish	3.84	1.48	0.85
Category involvement	Beatty <i>et al.</i> (1988)	3	Generally, choosing the right fish products is important to me	2.52	1.35	0.94
Domain-specific innovativeness	Goldsmith and Hofacker (1991)	3	In general, I am among the last in my circle of friends to purchase new fish products	4.13	1.52	0.87
Subjective knowledge	Pieniak <i>et al.</i> (2007)	4	I consider that I know more about fish than the average person	3.57	1.44	0.94
Optimistic bias	Miles and Scaife (2003), Van Dijk <i>et al.</i> (2011)	3	Compared to the average person of my age and sex, the likelihood of me getting health problems when eating new product from a new farmed fish is [1 = much less/ 7 = more likely] than the average person	3.32	1.30	0.86
Suspicion of novelties	Bäckström <i>et al.</i> (2004), Onwezen and Bartels (2013)	3	I have some doubts about food novelties	3.82	1.28	0.75

**Notes:** *M*, mean value; *SD*, standard deviation;  $\alpha$ , Cronbach's  $\alpha$ . For all constructs, Likert-type agreement questions are used with end-points: 1 = "strongly disagree" to 7 = "strongly agree"

Cluster	Category involvement	Domain-specific innovativeness <sup>e</sup>	Subjective knowledge	Optimistic bias	Suspicion of novelties	<i>n</i>	Consumer perceptions of farmed fish
<i>Overall (n = 2,511)</i>							<b>2587</b>
O1	1.95 <sup>b</sup>	2.81 <sup>c</sup>	2.84 <sup>b</sup>	3.89 <sup>a</sup>	3.00 <sup>c</sup>	728	
O2	1.77 <sup>c</sup>	5.37 <sup>a</sup>	2.92 <sup>b</sup>	2.62 <sup>c</sup>	4.43 <sup>a</sup>	911	
O3	3.77 <sup>a</sup>	3.94 <sup>b</sup>	4.78 <sup>a</sup>	3.57 <sup>b</sup>	3.87 <sup>b</sup>	872	
<i>France (n = 500)</i>							
F1	3.23 <sup>a</sup>	3.87 <sup>b</sup>	4.92 <sup>a</sup>	3.75 <sup>b</sup>	3.71 <sup>b</sup>	250	
F2	1.50 <sup>b</sup>	5.18 <sup>a</sup>	3.19 <sup>b</sup>	4.77 <sup>a</sup>	3.15 <sup>c</sup>	68	
F3	1.75 <sup>b</sup>	5.22 <sup>a</sup>	2.90 <sup>bc</sup>	2.30 <sup>c</sup>	4.78 <sup>a</sup>	107	
F4	1.79 <sup>b</sup>	2.18 <sup>c</sup>	2.70 <sup>c</sup>	4.44 <sup>a</sup>	2.69 <sup>c</sup>	75	
<i>Germany (n = 506)</i>							
D1	1.94 <sup>c</sup>	2.56 <sup>c</sup>	2.61 <sup>c</sup>	3.62 <sup>a</sup>	2.54 <sup>c</sup>	106	
D2	1.74 <sup>c</sup>	5.82 <sup>a</sup>	2.81 <sup>c</sup>	2.39 <sup>c</sup>	4.40 <sup>a</sup>	171	
D3	3.79 <sup>a</sup>	3.66 <sup>b</sup>	5.15 <sup>a</sup>	3.15 <sup>b</sup>	3.66 <sup>b</sup>	89	
D4	2.50 <sup>b</sup>	3.78 <sup>b</sup>	3.34 <sup>b</sup>	3.42 <sup>ab</sup>	4.12 <sup>a</sup>	140	
<i>Italy (n = 500)</i>							
I1	1.60 <sup>bc</sup>	2.13 <sup>d</sup>	2.38 <sup>c</sup>	3.65 <sup>a</sup>	4.71 <sup>a</sup>	38	
I2	3.91 <sup>a</sup>	3.92 <sup>b</sup>	4.71 <sup>a</sup>	3.58 <sup>a</sup>	4.11 <sup>b</sup>	145	
I3	1.95 <sup>b</sup>	2.85 <sup>c</sup>	3.18 <sup>b</sup>	3.80 <sup>a</sup>	2.76 <sup>c</sup>	147	
I4	1.50 <sup>c</sup>	5.39 <sup>a</sup>	2.68 <sup>c</sup>	2.60 <sup>b</sup>	4.45 <sup>a</sup>	170	
<i>Spain (n = 500)</i>							
E1	4.38 <sup>a</sup>	4.25 <sup>b</sup>	4.85 <sup>a</sup>	3.76 <sup>a</sup>	4.06 <sup>a</sup>	107	
E2	2.17 <sup>b</sup>	3.02 <sup>c</sup>	2.93 <sup>c</sup>	3.83 <sup>a</sup>	3.02 <sup>b</sup>	147	
E3	2.09 <sup>b</sup>	4.85 <sup>a</sup>	3.35 <sup>b</sup>	2.54 <sup>b</sup>	4.30 <sup>a</sup>	246	
<i>UK (n = 505)</i>							
GB1	2.33 <sup>b</sup>	2.67 <sup>c</sup>	2.88 <sup>b</sup>	4.22 <sup>a</sup>	2.95 <sup>c</sup>	121	
GB2	2.12 <sup>b</sup>	5.10 <sup>a</sup>	2.95 <sup>b</sup>	2.74 <sup>c</sup>	4.24 <sup>a</sup>	226	
GB3	4.24 <sup>a</sup>	4.09 <sup>b</sup>	4.93 <sup>a</sup>	3.58 <sup>b</sup>	3.93 <sup>b</sup>	158	

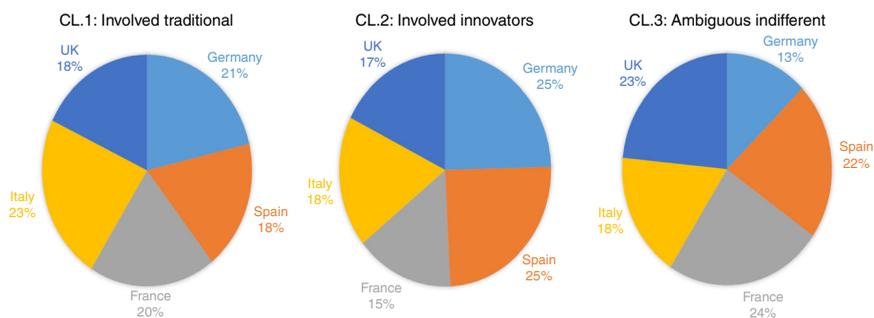
**Notes:** 1 = strongly agree, 7 = strongly disagree. <sup>a-d</sup>For each country and construct, means with different superscripts differ significantly from each other ( $p < 0.05$ ); <sup>e</sup>Domain-specific innovativeness has negative polarity, meaning that higher agreement scores actually indicate lack of innovativeness and vice versa

**Table II.**  
Means for each cluster, per country and construct

this segment did not show any specific interest in the criteria at hand. Hence, the first and second cluster were of particular interest as they were more likely to engage in new farmed fish products. Moreover, the segment of involved innovators had a higher predisposition towards new fish products and was more able to adopt new fish products from farmed fish species. Minimal differences were observed among the countries with respect to the five underlying psychographic moderators (Figure 2).

#### *Profiling of the consumer segments – socio-demographics and fish consumption*

One-way ANOVAs were used to test whether the members of the three clusters of the pooled sample differed in socio-demographic and behavioural profile. Tukey's HSD *post hoc* tests were used to test whether the means were significantly different from one another. In terms of the socio-demographic profile of the segments (Table III), differences among the segments can be observed with regard to age, marital status,



**Notes:** Involved traditional,  $n=728$ , 30 per cent; involved innovators,  $n=911$ , 36 per cent; ambiguous indifferent,  $n=872$ , 34 per cent

Characteristic	Cl1 Involved traditional	Cl2 Involved innovators	Cl3 Ambiguous indifferent	Sig.
Age (mean in years)	40.7	43.7	39.6	0.002
Gender (male)	51.9	47.0	49.3	0.138
Married (yes)	51.6	53.9	43.1	0.000
Children in household (yes)	48.1	44.5	44.7	0.279
Education (university or higher)	44.2	45.9	48.0	0.369
<i>Employment</i>				
Employee-various	32.2	30.5	30.6	
Non-working	11.7	14.3	15.3	0.026
<i>Income</i>				
More than average	13.5	17.3	9.9	
Average	61.1	59.5	57.7	
Less than average	25.4	23.2	32.5	0.000
<i>Social class: (A/B)</i>	17.3	14.9	13.1	0.130
<i>Main decision maker: yes</i>	74.6	74.1	71.2	0.242
<i>Consumption of farmed fish</i>				
Once a week or more	23.1	22.9	16.5	
Two-three times a week	29.7	32.4	27.2	
Once a month or less	42.4	39.8	46.6	0.000
<i>Consumption of wild fish</i>				
Once a week or more	21.6	17.9	11.9	
Two-three times a week	27.9	26.8	22.6	
Once a month or less	44.2	48.2	56.0	0.000
<i>Consumption of seafood</i>				
Once a week or more	22.1	20.6	13.9	0.000
<i>Consumption of frozen fish</i>				
Once a week or more	31.7	31.8	25.1	0.003
<i>Consumption of whole fish</i>				
Once a week or more	28.7	24.4	17.1	0.000
<i>Consumption of processed fish</i>				
Once a week or more	29.3	21.7	21.3	0.001

**Table III.** Segmentation analysis – socio-demographic and fish consumption profiles of the segments, per cent

employment and social class. Generally, involved innovators were older, married and with higher income than the other two segments. This is also consistent with their psychographic characteristics. When considering fish consumption of the segments (see also Table III), the three segments differ significantly; involved innovators consume much more wild and farmed fish in general, as well as seafood, followed by involved traditional, and finally the third segment, ambiguous indifferent.

*Profiling of the consumer segments – consumer perceptions using conceptual model*

To profile consumer segments for the overall sample, the variables of the conceptual model (i.e. perceived values, costs and risks, and the outcome variables, see Figure 1) were used as dependent variables and cluster membership and country as factors in conducting MANOVAs. Furthermore, Tukey’s HSD *post hoc* tests were used to test means differences.

*Values.* To validate the clusters with the value variables of the conceptual model, MANOVA was conducted with functional, social, hedonic, ethical, and emotional value as dependent variables and cluster membership and country as factors (Table IV). Country was added as a control variable. The main effects for country and cluster membership reveal that all value variables differ across clusters, whereas social value and emotional value also differ across countries. Significant interactions between cluster membership and country were reported for social value, hedonic value and ethical value. An inspection of the means demonstrates that the cluster with the highest scores on the different values is ambiguous indifferent, whereas involved innovators is generally low on functional, hedonic and ethical value. This finding indicates that the segment of involved innovators agrees more often than the other two segments that

Cluster		Functional value	Social value	Hedonic value	Ethical value	Emotional value
<i>Involved traditional</i>						
C1 (n = 728)		3.03 <sup>a</sup>	3.60 <sup>a</sup>	3.21 <sup>a</sup>	3.20 <sup>a</sup>	3.52 <sup>a</sup>
<i>Involved innovators</i>						
C2 (n = 911)		2.54 <sup>b</sup>	3.60 <sup>a</sup>	2.85 <sup>b</sup>	2.87 <sup>b</sup>	3.46 <sup>a</sup>
<i>Ambiguous indifferent</i>						
C3 (n = 872)		3.65 <sup>c</sup>	4.34 <sup>b</sup>	3.98 <sup>c</sup>	3.91 <sup>c</sup>	4.36 <sup>b</sup>
Main effect cluster (C)	<i>F</i>	157.15***	78.22***	148.00***	146.16***	98.06***
	(df1, df2)	(2, 2,496)	(2, 2,496)	(2, 2,496)	(2, 2,496)	(2, 2,496)
	Partial $\eta^2$	0.112	0.059	0.106	0.105	0.073
Main effect country	<i>F</i>	1.73	6.62***	0.66	1.54	2.47*
	(df1, df2)	(4, 2,496)	(4, 2,496)	(4, 2,496)	(4, 2,496)	(4, 2,496)
	Partial $\eta^2$	0.003	0.010	0.001	0.002	0.004
Main effects	<i>F</i>	1.39	2.94**	2.39*	3.17**	1.23
cluster × country	(df1, df2)	(8, 2,496)	(8, 2,496)	(8, 2,496)	(8, 2,496)	(8, 2,496)
	Partial $\eta^2$	0.004	0.009	0.008	0.010	0.004

**Notes:** Answer scales ranged from 1 (strongly agree) to 7 (strongly disagree). <sup>a,b,c</sup>Means with a different superscript indicate a significant difference ( $p < 0.05$ ) (means are compared two at a time). \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

**Table IV.** Cluster-level estimated marginal means for value variables for pooled sample (all countries)

these values actually matter in the evaluation of farmed fish. Across all clusters, functional value is given the highest value, while social value and emotional value are perceived as less important.

*Costs and risks.* To validate the clusters with the *costs* and *risks* variables of the model, MANOVA was conducted with price, effort, unfamiliarity, evaluation costs, performance risk and safety risk as dependent variables and cluster membership and country as factors (Table V). The main effects for country and cluster membership reveal that all cost and risk variables differ across clusters, as well as across countries. In addition, a significant interaction between cluster membership and country was only reported for unfamiliarity. An inspection of the means demonstrates that the cluster with the highest scores on the different cost and risk variables is involved innovators, whereas involved traditional is generally low on these variables. This finding indicates that the segment of involved traditional agrees more often than the other two segments that these costs matter in the evaluation of farmed fish. Across all clusters, the hypothetical farmed fish species received perceptions of a relative high price, while performance risk and safety risk are perceived to be less of an issue.

*Outcome variables.* To validate the clusters with the outcome variables of the model, MANOVA was conducted with consumer value, satisfaction, trust, word-of-mouth and intention to buy as dependent variables and cluster membership and country as factors (see Table VI). Country was added as a control variable. The main effects for country and cluster membership reveal that all outcome variables differ across clusters, whereas trust, word-of-mouth and intention to buy also differ across countries. Significant interactions between cluster membership and country were reported for satisfaction, trust and intention to buy. An inspection of the means demonstrates that the cluster with the highest scores on the different outcome variables is ambiguous

Cluster		Price	Effort	Unfamiliarity	Evaluation costs	Performance risk	Safety risk
<i>Involved traditional</i>							
C1 (n=728)		3.07 <sup>a</sup>	3.26 <sup>a</sup>	3.37 <sup>a</sup>	3.41 <sup>a</sup>	3.43 <sup>a</sup>	3.29 <sup>a</sup>
<i>Involved innovators</i>							
C2 (n=911)		3.49 <sup>b</sup>	3.71 <sup>b</sup>	4.17 <sup>b</sup>	4.13 <sup>b</sup>	4.39 <sup>b</sup>	4.28 <sup>b</sup>
<i>Ambiguous indifferent</i>							
C3 (n=872)		3.49 <sup>b</sup>	3.57 <sup>b</sup>	3.85 <sup>c</sup>	3.77 <sup>c</sup>	3.97 <sup>c</sup>	3.96 <sup>c</sup>
Main effect cluster (C)	<i>F</i>	29.04***	25.08***	81.72***	75.53***	140.26***	129.09***
	(df1, df2)	(2, 2,496)	(2, 2,496)	(2, 2,496)	(2, 2,496)	(2, 2,496)	(2, 2,496)
	Partial $\eta^2$	0.023	0.020	0.061	0.057	0.101	0.094
Main effect country	<i>F</i>	5.76***	5.29**	25.69***	13.52***	14.80***	13.35***
	(df1, df2)	(4, 2,496)	(4, 2,496)	(4, 2,496)	(4, 2,496)	(4, 2,496)	(4, 2,496)
	Partial $\eta^2$	0.009	0.008	0.040	0.021	0.023	0.021
Main effects Cluster × country	<i>F</i>	1.56	1.83	2.11*	1.24	2.48*	1.74
	(df1, df2)	(8, 2,496)	(8, 2,496)	(8, 2,496)	(8, 2,496)	(8, 2,496)	(8, 2,496)
	Partial $\eta^2$	0.005	0.006	0.007	0.004	0.008	0.006

**Notes:** Answer scales ranged from 1 (strongly agree) to 7 (strongly disagree). <sup>a,b,c</sup>Means with a different superscript indicate a significant difference ( $p < 0.05$ ) (means are compared two at a time). \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

**Table V.** Cluster-level estimated marginal means for costs and risks variables for pooled sample (all countries)

Cluster		Consumer value	Satisfaction	Trust	Word-of-mouth	Intention to buy
<i>Involved traditional</i> C1 ( <i>n</i> = 728)		3.15 <sup>a</sup>	3.20 <sup>a</sup>	3.31 <sup>a</sup>	3.25 <sup>a</sup>	3.53 <sup>a</sup>
<i>Involved innovators</i> C2 ( <i>n</i> = 911)		3.05 <sup>a</sup>	2.86 <sup>b</sup>	2.96 <sup>b</sup>	2.99 <sup>b</sup>	3.46 <sup>a</sup>
<i>Ambiguous indifferent</i> C3 ( <i>n</i> = 872)		3.93 <sup>b</sup>	3.99 <sup>c</sup>	4.06 <sup>c</sup>	4.16 <sup>c</sup>	4.48 <sup>b</sup>
Main effect cluster (C)	<i>F</i>	171.99***	181.39***	175.58***	179.86***	137.81***
	(df1, df2)	(2, 2,496)	(2, 2,496)	(2, 2,496)	(2, 2,496)	(2, 2,496)
	Partial $\eta^2$	0.121	0.127	0.123	0.126	0.099
Main effect country	<i>F</i>	0.98	0.96	3.75**	5.45***	3.19*
	(df1, df2)	(4, 2,496)	(4, 2,496)	(4, 2,496)	(4, 2,496)	(4, 2,496)
	Partial $\eta^2$	0.002	0.002	0.006	0.009	0.005
Main effects	<i>F</i>	1.56	2.15**	2.34*	1.85	2.32*
Cluster $\times$ country	(df1, df2)	(8, 2,496)	(8, 2,496)	(8, 2,496)	(8, 2,496)	(8, 2,496)
	Partial $\eta^2$	0.005	0.007	0.007	0.006	0.007

**Notes:** Answer scales ranged from 1 (strongly agree) to 7 (strongly disagree). <sup>a,b,c</sup>Means with a different superscript indicate a significant difference ( $p < 0.05$ ) (means are compared two at a time). \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

**Table VI.** Cluster-level estimated marginal means for outcome variables for pooled sample (all countries)

indifferent, the same cluster that has generally the highest scores on the value variables of the model. In contrast, the cluster with the lowest scores on the outcome variables is involved innovators, which is the same cluster that has the highest scores on the cost and risk variables of the model. This indicates that the segment of involved innovators is most positive towards farmed fish in terms of consumer value, satisfaction, trust and word-of-mouth. With regard to intention to buy, involved traditional and involved innovators do not differ.

## Discussion

The objective of this study was to explore the possibility that a number of psychographic characteristics (i.e. category involvement, domain-specific innovativeness, subjective knowledge, suspicion of novelties and optimistic bias) could identify cross-cultural consumer segments and provide the direction and focus for farmed fish products marketing strategies. Selected psychographic constructs provided a number of consumer segments with distinctive and clear-cut profiles in terms of consumer perceptions towards new farmed fish species and a number of additional behavioural and demographic characteristics across five countries that comprise the top fish markets in Europe (i.e. France, Germany, Italy, Spain and the UK). Based on the consumer psychographic profiles, three distinct segments of consumers emerged across the study countries: the involved traditional, involved innovators and ambiguous indifferent. Notice that both the involved innovators and the involved traditional are the more knowledgeable segments. Previous studies show that consumers' receptiveness towards aquaculture is also determined by their ability to understand the available information and their acquired knowledge (Claret *et al.*, 2014; Fernández-Polanco and Luna, 2012). The findings of the current study show that,

beyond increasing consumer awareness regarding aquaculture's products benefits (Schlag and Ystgaard, 2013), European aquaculture could also profit from a market segmentation strategy to take full advantage of the market potential. More specifically, the outcomes of this study allow for selection of the most important potential market segments to enter with new fish products from the aquaculture industry. The fact that we found similar cluster solutions across five European countries indicates that the consumer segments are relatively uniform across all investigated countries, suggesting a relatively homogeneous or converging European fish-related culture. This finding is in line with previous pan-European studies on fish, which have also identified cross-cultural segments (i.e. Pieniak *et al.*, 2007). The future market for farmed fish in Europe seems to be less dependent on geography and more dependent on consumer lifestyles and their psychographic profiles.

Next, the findings of this study also provide some additional insights relative to previous studies on perceptions with regard to farmed fish (Claret *et al.*, 2014; Fernández-Polanco and Luna, 2012; Fernández-Polanco *et al.*, 2013). This study shows that consumers attach the highest scores to perceptions of functional value. Apparently, consumers believe that new farmed fish species that would be introduced on the European market have consistent quality and would be healthy and nutritious. This is an interesting finding given the fact that, generally, European consumers perceive farmed fish as being of lower general quality than wild fish (Verbeke *et al.*, 2007). Instead, safety risk and performance risk are perceived as less of an issue for farmed fish. This is in line with findings from Claret *et al.* (2014), which showed that most consumers assume that the fish they find on the market is safe to eat, regardless of the way it is obtained (wild vs farmed fish). In addition, this study revealed relatively high scores on price perceptions, indicating that consumers may be afraid that the introduction of new farmed fish species on the European market may lead to higher prices for farmed fish. This is a point that deserves attention, because several studies showed that one of the advantages of farmed fish is the perceived lower price compared to wild fish (Claret *et al.*, 2014; Vanhonacker *et al.*, 2013).

### *Practical implications*

Companies may use the cross-cultural segments provided in this paper to strengthen their position by tailoring their product offerings to target segments. They may either do this by developing different farmed fish products for specific segments or by developing the same products for multiple segments and positioning them differently in each of these segments. Notice that even when products are developed, marketers must constantly evaluate progress and communicate applicable regulations and potential issues with their target groups, as unfamiliarity with new technologies could lead to neophobic behaviour and consumer resistance. In the end, such interaction with consumers during the product development process could lead to more successful farmed fish products that are better targeted to the specific segments.

Furthermore, these cross-cultural segments also warrant a differentiated approach in companies' communication strategies. Targeted communication should aim to evoke positive perceptions and emotions by emphasizing those elements that are in line with the needs and concerns of the consumers in the specific segment. In doing so, companies could use a differentiated targeting approach by first stimulating involved innovators or involved traditional to adopt their farmed fish products. Many companies and retailers have purchase and usage data that can tell them about their customers and assist them in categorizing their customer base into the different

segments distinguished in this study. For example, companies can first target the involved innovators by emphasizing the value of the product (e.g. in terms of health benefits, sustainability, quality and taste) or can try to interest the involved traditional in their farmed fish products by focusing on potential costs such as price and safety. When doing so, companies should make use of communication channels that best suit these types of consumers (e.g. advertising, online and social media). In addition, policy makers in governmental or non-governmental organizations may use the segmentation provided in this study to improve their communication with consumers. We will next further elaborate on the practical implications resulting from each of the identified cross-cultural segments.

*Involved innovators.* The most interesting segment that could be a target of marketing positioning strategies for farmed fish production is the involved innovators. The involved innovators segment represents consumers who are involved in, knowledgeable and at the same time quite innovative with regard to fish products. As a result, this segment is open to new experiences with regard to fish products and fish species. Consumers in this segment show the highest perceived value and the lowest perceived costs in association with new farmed fish products, as well as the highest expected outcomes in terms of satisfaction, trust and word-of-mouth behaviour. More specifically, the involved innovators attach the highest functional, hedonic and ethical value to new farmed fish products. Altogether, marketing managers can target this segment by elaborating on the different benefits (e.g. health, taste and sustainability) that their farmed fish products may offer. Developing recipes or preparation advice for specific products may appeal to the consumers of this segment. For example, supermarkets or other retail outlets may be stimulated to provide information about the different farmed fish products that they offer and how consumers can prepare and eat them. In addition, this segment is potentially interested in value-added products made from farmed fish. For example, added value may be accomplished by linking specific fish products to health issues and by communicating that farmed fish fits into a healthy lifestyle.

*Involved traditional.* Even though the involved traditional are involved in and knowledgeable about fish consumption, this segment also perceives the highest costs with regard to new farmed fish products compared to the other two segments. This indicates that involved traditional are much more conservative than the other two segments by showing higher awareness of the possible risks involved with fish consumption. However, this segment also perceives relative value in new farmed fish, leading to an overall consumer value that does not significantly differ from that of the involved innovators. They also exhibit the same buying intention towards new farmed fish compared to the involved innovators. Nevertheless, in targeting this segment, it could be wise to focus on potential costs and risks that members of this segment may perceive. For example, when marketing farmed fish products for this segment, attention should be paid to safety issues as well as price sensitivity by offering safe products that offer good value for money. In addition, given the characteristics of the consumers that belong to this segment, when focusing on the traditional segment it would be wise to avoid words like “new” and highlight culinary traditions (e.g. traditional recipes).

*Ambiguous indifferent.* Finally, the segment of ambiguous indifferent consumes less fish in general and perceives the lowest values with regard to new farmed fish products compared to the other segments. Although their cost perceptions are not as high as

those of the involved traditional, the fact that they have relatively low value perceptions leads this segment to score lowest on all outcome variables: they clearly attach lower overall value to new farmed fish, resulting in lower intention to buy new farmed fish products and lower scores on satisfaction, trust and word-of-mouth behaviour. In developing market strategies for this segment, it is important to keep in mind that these consumers seem to care less about the attributes of the fish itself and may be triggered by other benefits or product attributes that were beyond the scope of this study, such as convenience or image. Future research could further explore how this segment could be stimulated to consume farmed fish.

Taken together, the results of the segmentation analysis open new horizons in terms of positioning and differentiation of farmed fish. Marketers should consider involving these consumer segments in generating ideas for new aquaculture products.

### Conclusions

The knowledge obtained in this segmentation study provides a better understanding of the existing consumer segments in the top five fish markets in Europe and opens new possibilities for efficient marketing of products from farmed fish species.

Overall, there is support for the supposition that the selected psychographic characteristics (i.e. category involvement, domain-specific innovativeness, subjective knowledge, suspicion of novelties and optimistic bias) have large discriminating power and can indeed constitute a solid segmentation basis that leads to consumer segments with different perception configurations towards farmed fish products. In addition, these results are applicable to both existing farmed fish species and potential new species. Given the exploratory nature of the paper, the identified psychographic segments should be further validated in future research.

### Notes

1. See also the website of the European Commission: [ec.europa.eu/fisheries/cfp/aquaculture/facts/index\\_en.htm](http://ec.europa.eu/fisheries/cfp/aquaculture/facts/index_en.htm)
2. The hypothetical scenario was informed by six aquaculture fish species developed and studied within the European research project: pikeperch, meagre, greater amberjack, grey mullet, Atlantic halibut and wreckfish.

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