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EXECUTIVE SUMMARY

This work has been undertaken as part of the SUCCESS project (Work Package 2: Consumer preferences, market acceptance and social awareness towards seafood) funded by the EC (H2020, GA 635188).

GOALS

The present report explores the role of internet communication in informing consumers about seafood products. To do so, the report first looks into the use of online sources and the content consumers are looking for with respect to seafood¹. Next, it explores the content and consumers' perceptions of seafood information websites. For this research step two German websites are taken as examples, one funded by the German government and the other directed by the seafood sector. Based on the outcomes, recommendations are made for an improved online communication with consumers in order to increase awareness and consumption of seafood.

KEY HIGHLIGHTS / OUTCOMES

- Our analysis shows that the internet is the most important information source for consumers and has become even more important than labels as an information source about seafood. Given this, web offers are now a must-have for the seafood sector.
- On the internet, consumers mostly use producer offers to inform themselves about seafood, followed by offers of consumer organizations and NGOs. Thus, producers, consumer organizations and NGOs have a great potential to support consumers in making sustainable seafood choices.
- Content of seafood websites:
 - Online, consumers look foremost for practical advice about seafood. Independent of the country studied, consumers are mostly interested in information about recipes, healthiness and the quality of seafood. Subsequently, sustainability issues are of interest in all investigated countries.
 - Interest in online information about sustainability issues differed between countries. For example: Germany and the UK show the highest interest in online information about the eco-friendliness of seafood. Polish consumers are particularly interested in animal welfare issues. These cultural differences have to be considered in the composition of seafood information websites.
 - Consumers in all countries generally welcome more complex, in-depth information about seafood in addition to more practical and specifically consumer-oriented information.

¹ Throughout this report the term 'seafood' comprises fish as well as seafood where appropriate.

- Consumers in Germany expect information about labelling schemes to be present on seafood information websites.
- A universal search tool and visual content is very much appreciated by consumers.
- Visual content is particularly important because it allows for story-telling, which in turn offers a way to build a bridge between the seafood sector and consumers, and thus might increase trust.
- Although, online information has become very important, seafood labels remain a major source of information. Keeping this in mind, consumers might not use all the information available to them, but they favour, and sometimes even expect, the availability of seafood labels and online information about seafood.

1 INTRODUCTION

As for other products, consumers need information about seafood and its production methods in order to make purchase choices which are in line with their preferences. But, compared to other food markets the seafood market is very diverse and complex from a consumers' point of view, and consumers' knowledge about seafood is rather low (Feucht and Zander 2015; Vanhonacker et al., 2011). Consumers are facing a huge amount of information every day, and some form of fatigue has been observed with respect to information acquisition. Therefore, information has to be offered to consumers in a well-targeted manner. The internet, as a nearly omnipresent and interactive information source, which allows for tailored information retrieval, is of increasing importance in this respect (Pieniak et al., 2013).

The aim of this report was to analyse the potential of consumer communication about seafood via internet. In this context, the present report elicited the use of online sources and the content consumers are looking for with respect to seafood. Additionally, we explored consumers' perceptions of two seafood information websites. We first conducted an online survey to assess the web-usage behaviour of consumers with respect to seafood. Then we conducted a website analysis through interviews with consumers in order to analyse their perceptions of seafood information websites and to deduce expectations for such offers. Based on the outcomes, recommendations are made for improved online communication with consumers in order to increase awareness and the consumption of seafood.

The present report is structured as follows: First, the methodological approaches applied are described. Second, the results of the online survey and the website analysis are presented and discussed. Finally, the conclusion section summarizes the outcomes and makes recommendations for improved online communication with consumers.

2 METHODOLOGICAL APPROACH

For the present report we followed a two-step approach. In the first step we conducted an online survey to elicit the use of online sources and the content consumers are looking for with respect to seafood. In the second step we explored two central German seafood information websites with regard to the information given and the ease of use for consumers. Based on the outcomes of the two steps, recommendations are made for improved online communication with consumers to increase awareness and the consumption of seafood.

In the following we first describe the online survey and then the analysis of the webpages.

2.1 ONLINE SURVEY

The online survey was conducted with 4103 consumers in eight European countries (Finland-FI, France-FR, Germany-DE, Ireland-IR, Italy-IT, Poland-PL, Spain-ES and United Kingdom-UK) in March 2016. An online panel run by a private market research agency was used for purposive quota sampling. Quotas were set for gender relations (two thirds women and one third men) considering the fact that more women than men are still responsible for shopping (e.g., Vanhonacker et al. 2013). Representativeness was required with regard to age and regional distribution. All participants had to be seafood consumers.

Over all countries, people between the age of 55 to 70 were the most (25%) represented group in the sample while the youngest age group (18 to 24 years) had, with 12%, the lowest share (Table 1). The participants in Poland were slightly younger than those in the other countries. The Italian and German participants were somewhat older compared to the other countries. In comparison to census data, people with higher education (college or university degree – tertiary level) were overrepresented in our data for FR, IR, IT, ES, PL and UK. In contrast, in FI and DE participants with a low to medium education (no formal education and up to 10 years of school visit) had a higher presence in the sample compared to the census. The dominance of more highly educated people in the majority of the studied countries might be due to the fact that only seafood consumers were allowed to take part in the survey. Myrland et al. (2000) and Hicks et al. (2008) found that people with a higher education level tend to have higher seafood consumption.

Table 1 Summary statistics for variables on socio-demographic criteria (%)

Variable / Description	Country								
	All	DE	ES	FI	FR	IR	IT	PL	UK
Number of observations	4103	530	534	500	517	500	513	502	507
Age of test persons									
18 to 24 years	11.7	11.1	9.9	12.2	11.6	12.2	9.6	13.9	12.8
25 to 34 years	20.9	18.3	24.3	18.0	19.7	26.0	17.3	23.9	19.9
35 to 44 years	21.8	24.0	23.4	21.2	20.7	22.0	23.8	18.1	21.3
45 to 54 years	20.7	20.4	19.1	23.2	21.7	19.2	22.8	18.7	20.3
55 to 70 years	24.9	26.2	23.2	25.4	26.3	20.6	26.5	25.3	25.6
Gender									
Female	65.3	65.7	64.6	65.2	66.7	64.2	65.3	64.7	66.1
Male	34.7	34.3	35.4	35.8	33.3	35.8	34.7	35.3	33.9
Education (years of school visit)									
No formal qualification	2.5	0.4	0.6	11.0	2.7	0.6	0.0	1.2	3.6
About 10 years of school visit	22.5	48.1	5.1	39.4	15.1	26.8	10.3	8.0	27.8
12 or 13 years of school visit	37.1	32.1	48.7	30.2	35.6	23.2	56.1	41.8	28.4
College or university degree	37.9	19.4	45.7	19.4	46.6	49.4	33.5	49.0	40.2
Seafood consumption									
Occasional seafood consumers	47	57	21	68	43	54	30	59	46
Less than once per month	9	8	4	13	9	14	4	10	10
Once per month	10	13	3	17	9	13	4	14	9
Two to three times per month	28	36	14	38	25	28	22	35	27
Regular seafood consumers	53	43	79	32	57	46	70	41	55
About once per week	32	33	33	22	40	28	37	32	33
More than once per week	21	10	46	10	17	18	33	9	21

The survey was developed in English and German and then translated into the other languages by professional translation services by means of the back-translation method. The content of the survey and the translations were discussed and reflected upon with the project partners in the respective countries. The survey was pretested with 15 participants in Germany. On average participants spent between 20 to 25 minutes to complete the survey.

Statistical analyses were performed using the statistical software SPSS version 24. Bivariate analyses including cross-tabulation with chi-square statistics and one-way ANOVA comparison of means with Tukey post-hoc tests were used to analyse the data. Differences were considered statistically significant if $p < 0.05$.

2.1.1 Content of the survey

The online survey was part of Task 2.3, and a full description of the questionnaire and further results are presented in the Deliverable report 2.2. In the following, we will focus on the questions relevant for the present report.

At the outset of the information section of the questionnaire, we asked participants if they sometimes look for information about seafood when they are not in a shopping situation. Participants could either answer with 'yes' or 'no'. Afterwards, we inquired about the information they mainly sought and offered a list of seven options out of which the participants had to choose up to three:

- Quality of a seafood product
- Eco-friendliness of a seafood product
- How species-appropriate a seafood product is produced
- Production conditions of a seafood product
- Recipes
- Healthiness of a seafood product
- Convenience of a seafood product
- Other

Next, participants were asked to indicate what they consider to be the **most important sources of information** with respect to seafood. Again they could indicate up to three options. The following information sources were included:

- Label on products
- Television
- Newspapers and magazines
- Internet
- Consumer associations
- Cookbooks
- Brochures / handouts from retailers
- Staff at the point of sale
- Displays in the shopping environment (e.g., poster, banners)
- Others

Following this question, participants had to indicate the **online** information sources which they used the most. Again participants could indicate up to three sources. The included sources were:

- Websites of producers
- Websites of NGOs (e.g., WWF, Greenpeace...)
- Websites of consumer associations
- Offers of producers in social media
- Official websites of the government and the EU
- Others, which...

Finally, we asked participants about the **kind of information** they mainly look for on the internet with respect to seafood. The number of answers was limited to three. The topics offered were:

- Quality of a seafood product
- Eco-friendliness of a seafood product

- How species-appropriate a seafood product is produced
- Production conditions of a seafood product
- Recipes
- Healthiness of a seafood product
- Convenience of a seafood product
- Others, which...

2.2 ANALYSIS OF WEBPAGES

For the analysis of webpages we focused on two major seafood information websites in Germany, one issued by the German government ('Fischbestände online') and one directed by the seafood industry ('Fischinfo'). The two German websites were chosen to demonstrate the status quo of information websites about seafood and to check for potentials of improvement.

Both websites are described in a first step and in a second step we present the data collection procedure used for this research step.

2.2.1 DESCRIPTION OF THE ANALYSED WEBPAGES

In the following the two websites 'Fischinfo.de' and 'Fischbestände online' are described with respect to their hosts, the parties responsible for the content, their objectives, their target groups and the content offered with particular focus on information for consumers (if applicable).

2.2.1.1 'Fischinfo'

'Fischinfo' is a seafood information website which is hosted and directed by the Fisch-Informationszentrum e.V.. The Fisch-Informationszentrum e.V. is an association which conducts public relations work for the German seafood sector. According to its own statements, the website aims to increase the importance of seafood and its products in general and for a 'contemporary and healthy' nutrition in particular. The website centers on 'informative and consultant communication' with the press, consumers and other multipliers.

It offers a special section for consumers. This section is divided into six subsections which focus on:

- nutrition and health aspects,
- purchase and preparation,
- a fish dictionary for foreign travel,
- videos,
- booklets,
- recipes.

All topics addressed in these subsections are related to seafood. The subsection about nutrition and health aspects informs about health advantages of seafood consumption and how seafood consumption can contribute to a balanced diet. The subsection 'purchase and preparation of seafood' offers information about how to grill seafood and how to otherwise prepare seafood, how to calculate portion sizes per person with respect to the purchase of a whole fish and mussels, how to recognize the freshness and how to preserve fish correctly. The fish dictionary offers translations of commercial designations of common fish species into English, French, Italian and Spanish.

In the video subsection, seven different clips are presented which are linked to the video platform 'Youtube'. The clips show how different fish products, like frozen fish and fish fingers, are produced. One clip is directed in particular to school children in explaining how fish can contribute to a healthy diet, where it originates from and addresses the reasons why an increasing share of fish and seafood is produced in aquaculture. The subsection 'booklets' includes different booklets which can be ordered in print, downloaded as PDF or browsed through online. The topics of the booklets range from thematic recipe collections (e.g., fish and beer), to statistical data about the German seafood sector and a brochure explaining how to purchase sustainable fish as well as educational material. The subsection 'recipes' displays different recipes with seafood. In addition, to the recipes presented in this subsection, the main page displays a 'fish recipe of the month'.

Further sections besides the consumer section of the website are an encyclopedia about seafood, a section focusing on sustainability, a section dedicated to market information, a section for the press and one informing about the Fisch-Informationszentrum e.V. and its information network. The encyclopedia about fish and seafood contains 35 flyers each portraying a fish species with respect to its economic relevance, available conservation forms, preparation methods, nutritional information, living conditions, appearance and fishing method. The section entitled 'sustainability' displays a world map with the FAO fishing areas and the most important wild fish species for the German market. Furthermore the section contains a link to the data base 'Fischbestände online' which informs about the state of different fish species. The database also informs whether the fishing of a respective fish species is certified under labelling schemes. Another topic addressed in the section 'sustainability' is the national initiative 'Förderung einer bestandserhaltenden Fischerei' (Support of a sustainable fishery). The initiative aims to embed the fundamental features of sustainable fishing practices in purchasing agreements. The commitment to these features becomes visible to consumers through the display of the logo of the Marine Stewardship Council on the respective products.

The section about market information presents facts about the seafood sector in Germany like market shares of different seafood products and of different species. It hosts a list of permitted commercial designations and informs about the labelling provisions issued by the EU. Additionally, the section offers information graphics on the most preferred seafood products by German consumers and seafood purchasing behavior in Germany. The section for the press contains press releases.

The website offers no search tool and no direct information about existing labelling schemes for sustainable seafood. Information about some labelling schemes for caught fish can be obtained by following the link to the webpage 'Fischbestände online'.

2.2.1.2 'Fischbestände online'

'Fischbestände online' is a fish information website which is hosted by the German Federal Office for Agriculture and Food and directed by the Thuenen-Institute of Baltic Sea Fisheries. The website was initiated by the roundtable for sustainable fisheries of the German Federal Ministry of Food and Agriculture. Members of the roundtable are the Federal Ministry of Food and Agriculture, the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, the Federal Office for Agriculture and Food, the Thuenen-Institute, the Federal Association of the German Food Trade, the Trade Association Fish, the Federal Association of the German Fish Industry and Fish Wholesale, the Waren-Verein der Hamburger Börse e.V., the German Fisheries Association, Greenpeace, the WWF and the Federation of German Consumer Organizations.

According to its own statements, the website targets the interested public, and in particular trading companies and manufacturing industries, aiming to support the development of a sustainable fish purchasing policy based on scientifically accurate information. Additionally, it presents itself as an information source for environmental associations, students and journalists. Given the explicit (professional) target group of the website, a specific section dedicated to consumers does not exist.

The website depicts information regarding the conditions of fish species relevant for the German market. The database is steadily expanded. A general overview about each fish species is given and more detailed information is presented for each related fish population. The more detailed information contains all aspects which, from a scientific point of view, are central to assess the sustainability of the fishery. All statements are verified by scientific sources.

'Fischbestände online' offers the following sections to users:

- FAO fishing areas
- Fish species
- Fishing gears
- Glossary
- Search
- News
- Contact
- Imprint

The section 'FAO fishing areas' centers on the fishing areas defined by the Food and Agriculture Organization (FAO). A map with all the catching areas is given and a list with the areas and related fish species relevant for the German market is presented. In addition, a list with codes for the fishing areas is depicted. The codes are voluntarily applied by the German fish industry to detail the origin of a product. Also the section offers subsections for all fishing areas relevant for the German market. The subsections connect to the fish species found in the respective fishing area and to the ecoregions belonging to the specific area. The different ecoregions are further linked to the particular fish populations found in these regions.

The section 'fish species' offers an overview of all the fish species included in the website. All in all, 27 fish species and 176 populations were listed at the time of this report. All fish species are presented with a schematic picture and the number of populations and related information sides, the catch size/landings and the spawning biomass of all populations are reported. Each presented fish species includes a subsection detailing general information such as biological characteristics, resilience and fecundity for the particular fish species. To this overview further information sites for the respective populations are linked if existent. For example the website 'Fischbestände online' offers an overview about Alaska Pollock. This overview links to Alaska Pollock populations in the Gulf of Alaska, the Sea of Okhotsk and the eastern Bering Sea. The information sites for the different populations offer more detailed information such as the condition of the population (e.g., fishing mortality rate) and the development of the population over time. Also the existent sustainability certifications applied to the particular population are described.

The section 'fishing gear' informs about the gear nomenclature and aims to support the German fish sector to correctly indicate the used gear. A schematic of gear nomenclature is offered in English and German. The presented gear nomenclature is based on the description of the FAO. The section is divided into two subsections, one which focuses on active gear and one centering on passive gear. Each subsection defines the respective term and is linked to different gear belonging to the respective umbrella term. For example the subtopic 'active gear' is further divided into trawls, surrounding nets, seines and other active gear. The listed gear links to further subgroups of the chosen gear. Each subgroup defines the gear in question and informs about potential environmental impacts of the gear.

The 'glossary' offers definitions for terms used on the website. The presented search tool allows searching for all fish species presented on the website. The tool also offers the possibility to define the search in more detail by entering the specific fish species, literature, population name and the FAO fishing area. The section 'news' mainly informs about updates on the different fish species.

The website understands itself not as a competition to seafood guides (information material which offers advice on which seafood to buy or not to buy in line with different criteria) but as a basis for them. All presented information is gathered by the Thuenen-Institute and is updated annually. Presented facts are referenced. It is underlined on the website that the facts presented there are explicitly displayed without any evaluation. Therefore, an assessment of different fish species or fishing gear does not exist on this website. The assessment is explicitly left to the user.

2.2.2 ANALYSIS OF WEBSITES, CONSUMER RESEARCH

Computer assisted personal interviews with 17 consumers were conducted in order to elicit the usability of the analysed websites and to explore possibilities for improvement with respect to consumer needs. Usability can be translated as the ease of use of a website. It can be assessed by analysing user's perceptions and interactions with a website (Bressolles et al. 2007). For this purpose users are asked to perform tasks related to the website in question and to assess their experience with the website (Bressolles et al. 2007; Kincl and Štrach 2012). Based on the outcomes of the interviews, the usability of the sites for consumers in particular with respect to information about European and sustainable production, are assessed and suggestions for improvement are made.

The interviews in Germany took place in May 2017 in Brunswick. Participants were recruited by means of a snowball scheme. All participants were seafood consumers, used the internet to look up information about seafood (e.g., recipes) and had to be at least partially responsible for the grocery shopping of their household. The socio-demographic characteristics of the participants are shown in table 2.

Table 2 Socio-demographic characteristics of the interview participants

Age	
23-34	7
35-44	3
45-54	4
55-70	3
Gender	
Female	13
Male	4
Education	
About 10 years of school visit	4
12 or 13 years of school visit	3
College or university degree	10

Each interview was conducted with one person at a time. An interviewer was present to guide the participants through the interview. Each participant was placed in front of a computer with two screens, one showing the websites to be explored by the participant and one displaying the questions.

The usability of the websites was assessed by first asking participants to navigate the respective websites and fulfil several tasks by using the selected internet offers. The tasks given to the participants focused on presented information on European and sustainable production as far as possible. The degree of success in working on these tasks was taken as one indication for usability. Next, participants were asked to assess the content and design of the websites on the basis of 10 questions. The questions explored the comprehensibility of the websites, the layout as well as the informativeness. All these quality dimensions are commonly used to assess the usability of websites (e.g., Berk et al. 2013; Kincl and Štrach 2012). In the following, we describe the given questions in detail.

With respect to the tasks, participants were first asked which information they look for about seafood on the internet and which online sources they prefer for their search. Next, they were either first introduced to 'Fischinfo.de' or to 'Fischbestände online'. They were

asked if they were already familiar with the respective website and then were given a minute to freely browse the site.

In the following, participants were introduced to five questions related to the website they just browsed. In order to be able to answer the questions participants had to browse the respective website and look for the correct answer(s).

The questions for 'Fischinfo' were:

- How many recipes for trout can be found on 'Fischinfo'?
- As rule of thumb: How many grams of fish flesh should be calculated per person for a meal?
- How old can a Herring become?
- Which fish species originate from the fishing area 'Eastern Central Atlantic'?
- According to which standards is the Alaska Pollock in the Gulf of Alaska certified?

The questions for 'Fischbestände online' were:

- In which fishing areas can the Alaska Pollock be caught?
- How high was the discard of the North Sea plaice between 2012 and 2015?
- What is a beam trawl?
- What is the IUCN status of the European eel?
- What is the fishing mortality rate?

A list of possible answers for each question was offered to the participants. Additionally, participants could indicate: 'I could not find the answer'.

After answering the respective questions for the websites, participants were further asked to assess the usability of both websites by means of 10 questions for each website. On a five point Likert scale ranging from 'totally disagree' to 'totally agree', participants had to indicate if the answers to the questions asked in the exercises were easily found on the respective website, whether the website in question offered comprehensible information and if it was comfortable to use. Next, participants assessed the helpfulness of the two websites on a five point Likert scale ranging from 'not at all helpful' to 'very helpful'. Then, they were asked to rate the design of the websites on a five point Likert scale ranging from 'not at all appealing' to 'very appealing' and from 'not at all a clear' to 'very clear'. Afterwards, participants were asked if they would consider using the respective website again and if they would recommend it. Answer options were 'yes', 'no' and 'maybe'. Finally, participants had to answer to four open questions for each website. We asked them what they liked and disliked about the shown websites, if they missed any information on the websites and if they had any further recommendations for an improvement of the websites.

The data of the interviews was analysed with descriptive statistical methods and thematic content analysis.

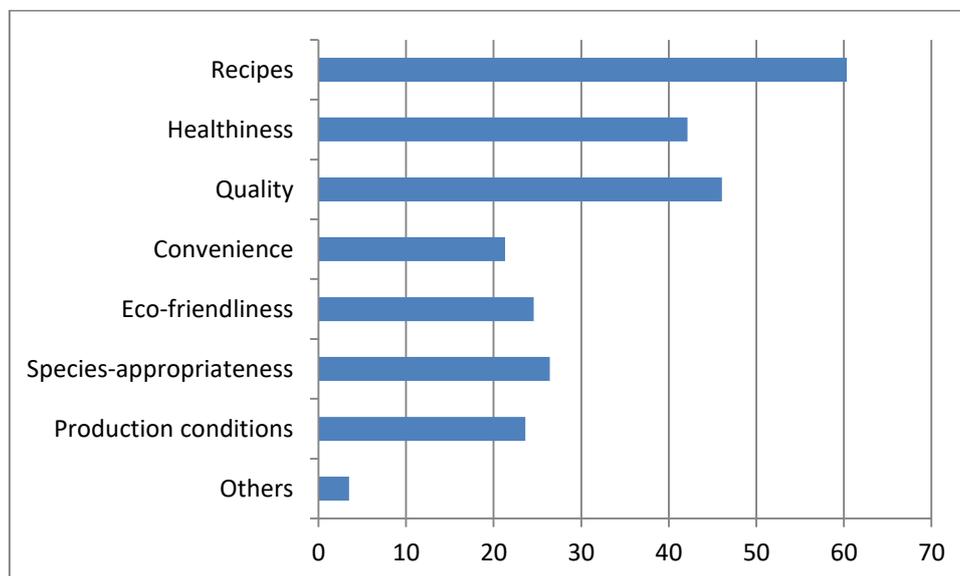
3 RESULTS AND DISCUSSION

In this section we first describe and discuss the results of the online survey and afterwards the results of the webpage analysis.

3.1 ONLINE SURVEY

At the beginning of the information section of the questionnaire we asked participants if they sometimes look for information about seafood when they are not in a shopping situation. On average of all study countries, 43% of the participants looked for information about seafood independently from the shopping act. This share was significantly higher in Italy (57%) and in Spain (53%). Participants mainly looked for seafood recipes (60%), information on the quality (46%) and healthiness (42%) of a seafood product. They searched nearly equally often for information about the eco-friendliness (25%), species-appropriateness (26%), the production conditions (24%) and convenience (21%) of a seafood product (see Figure 1). Given this, information about hedonic/egoistic attributes of seafood were of higher interest for consumers than sustainability considerations. The lower interest for information about sustainability issues compared to hedonic/egoistic issues is consistent with earlier findings by, for example, Altintzoglou et al. (2014); DG Mare (2008) and Pieniak et al. (2013).

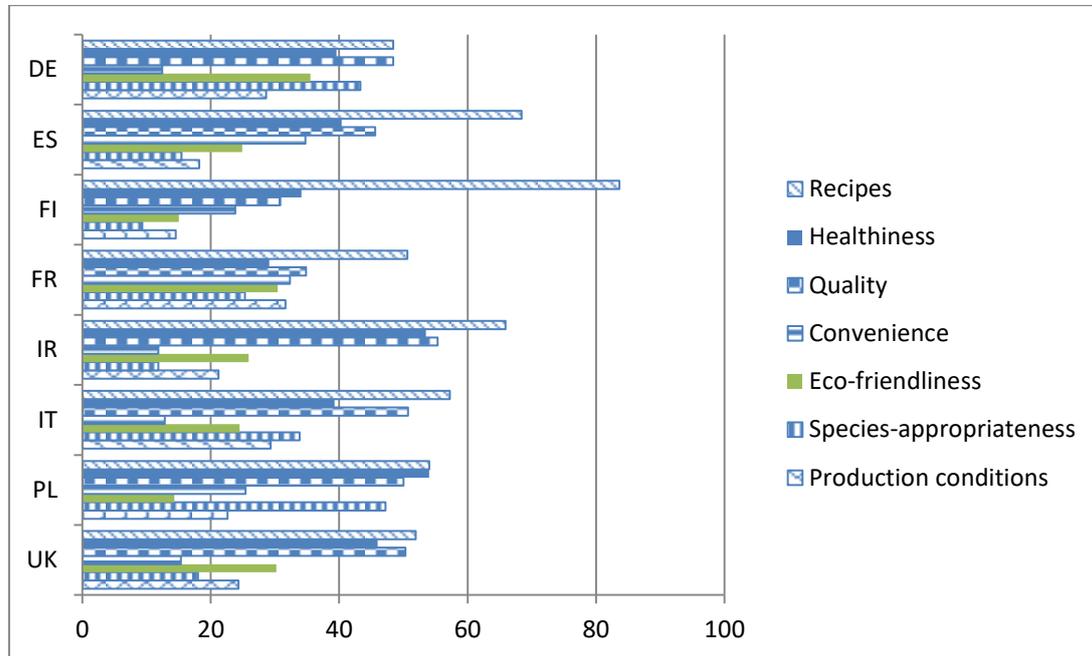
Figure 1: Topics of interest independent of the shopping act (% of respondents)



Question: Which kind of information are you mainly looking for? Please indicate the most suitable answers! Please indicate up to three answers.

Comparison between study countries revealed that Finnish participants had the highest interest in recipes, while Irish participants looked in particular for information about quality, and, together with Polish participants, for cues linked to the healthiness of fish (see Figure 2). Interest on information about species-appropriateness was in particular indicated by Polish and German participants. Eco-friendliness was predominantly a topic of interest in Germany, France and the UK.

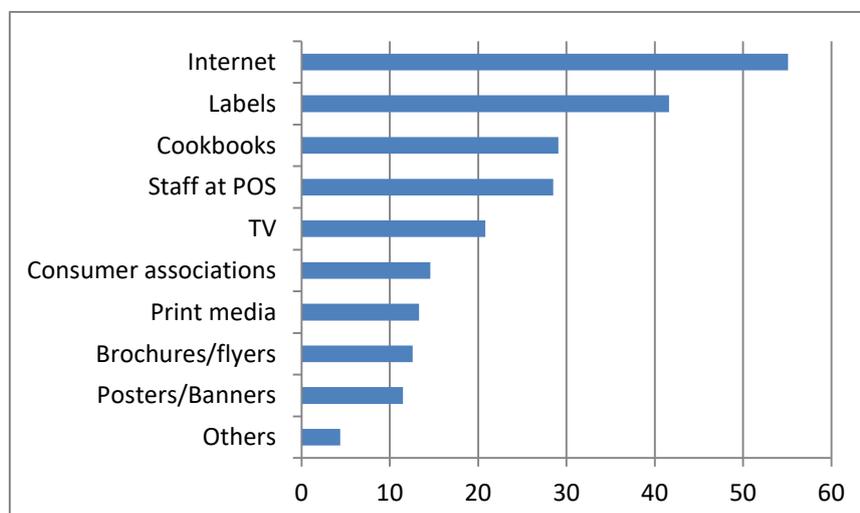
Figure 2: Topics of interest independent of the shopping act per country (% of respondents)



Question: Which kind of information are you mainly looking for? Please indicate the most suitable answers! Please indicate up to three answers.

When asked for the preferred source of information, the internet was indicated most frequently (see Figure 3). Labels on products ranked second. Cookbooks and the staff at the point of sale (POS) were equally often chosen followed by print media (newspapers and magazines) and printed information offered by retailers (brochures, flyers, posters, banners). Our results show that labels on fish products are an important information source for many consumers (see also Pieniak et al. 2011, 2013). However, the internet seems to have outrun labels as the most favored information source, which might be due to the increasing use of the internet by society.

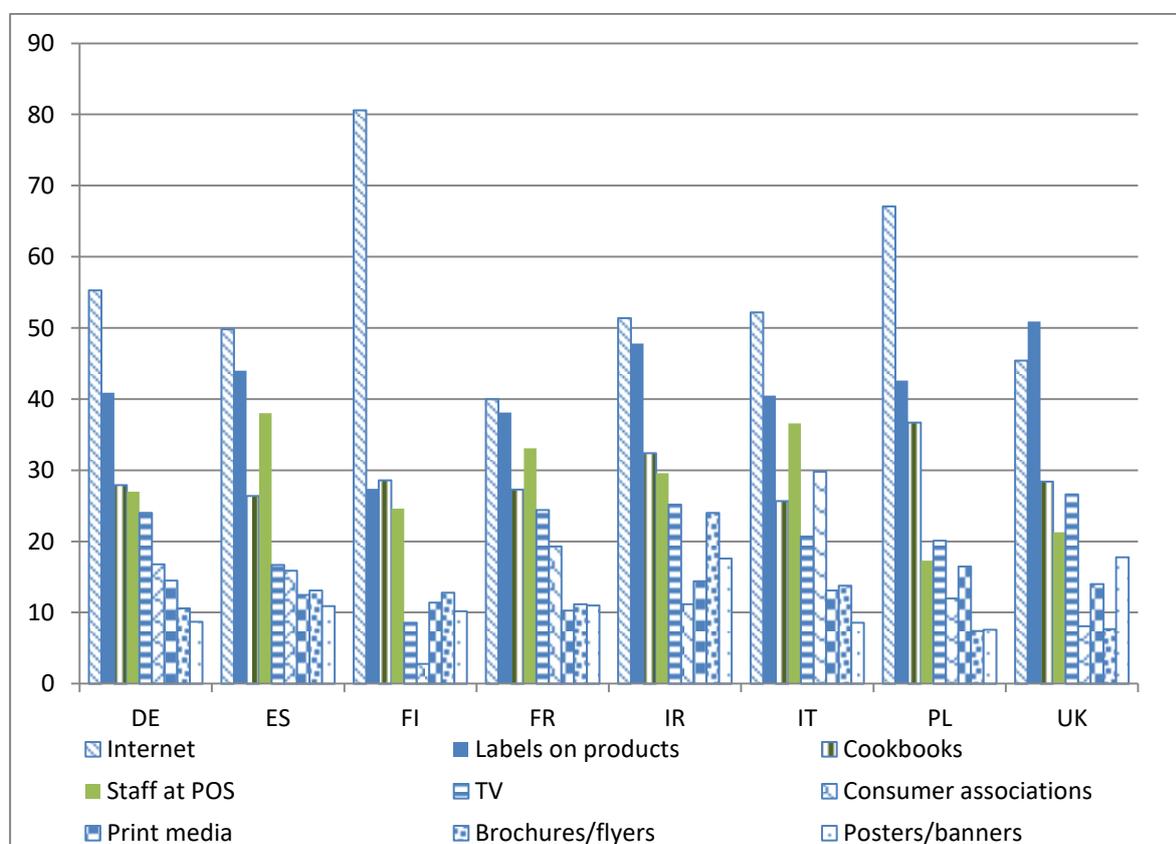
Figure 3: Preferred information sources about seafood (% of respondents)



Question: Which of the following are the most important sources of information to you with respect to seafood? Please indicate up to three answers!

The importance of various information sources differed significantly between the study countries (see Figure 4). While the majority of the Finnish consumers perceived the internet as one of the most important information sources about seafood, less than half of the French participants shared this view. Labels on products were most appreciated in the UK, and least in Finland. Polish participants indicated cookbooks most frequently as one of the most important information sources, while Spanish participants most appreciated the staff at the POS (point of sale). Irish participants most frequently preferred brochures and flyers. Banners and posters in stores were equally appreciated by participants from UK and Ireland. Differences between countries with respect to print media were not significant.

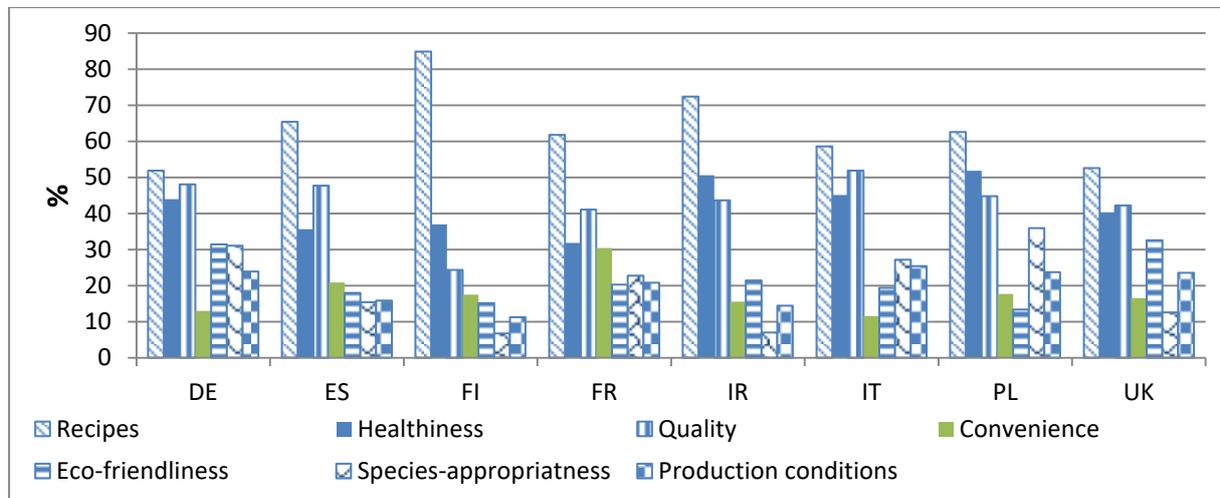
Figure 4: Preferred information sources about seafood per study country (% of respondents)



Question: Which of the following are the most important sources of information to you with respect to seafood? Please indicate up to three answers!

On average of all countries, participants stated that they mostly look for information about recipes (65%), healthiness (42%) and quality (42%) online (see Figure 5). Species-appropriateness, production conditions, eco-friendliness and convenience were again, with about 20%, equally often indicated. This is similar to the general interest in seafood related topics (see above).

Figure 5: Topics of interest online per country (% of respondents)



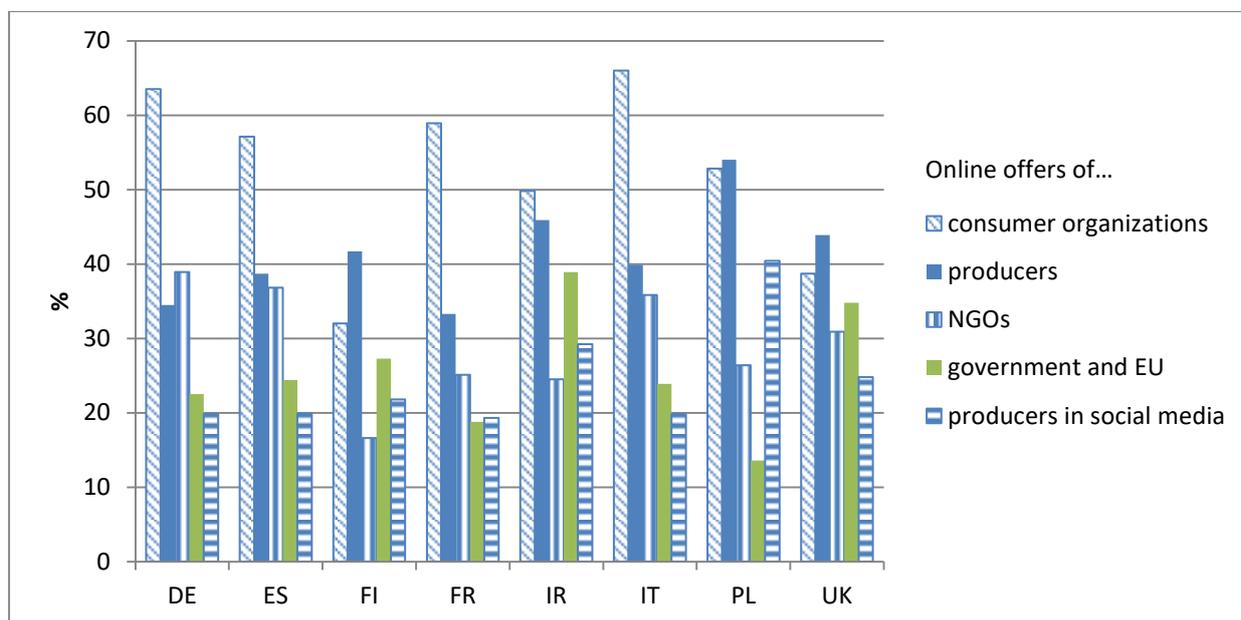
Question: For which kind of information are you mainly looking for in the internet?

When comparing the interest in topics online between countries, Finnish participants were the most interested in recipes while information about the healthiness of a fish product was most indicated by Polish and Irish participants. Italians looked most frequently for quality information cues online. French participants looked in particular for information related to the convenience of a fish product. The eco-friendliness of a fish product was most frequently of interest for participants from UK and Germany. Species-appropriateness was especially an interesting online topic for Polish participants.

Regarding the use of online information sources, participants mostly referred to websites of consumer organizations (51%). Websites of producers (42%) and NGOs (29%) were the second and third most often mentioned sources. Social media offers by producers (25%) and homepages of governments and the EU (25%) were equally often indicated as most used websites offers. Other mentioned web offers were search engines (e.g., Google), cooking/recipe websites, news offers and encyclopedias such as Wikipedia.

Homepages of consumer organizations were the most popular in Italy and Germany while websites of NGOs were the most favored in Germany, Spain and Italy (see Figure 6). Polish participants indicated most frequently that they use homepages and the social media offers of producers. Irish and consumers from the UK used government and EU web offers the most of all study countries.

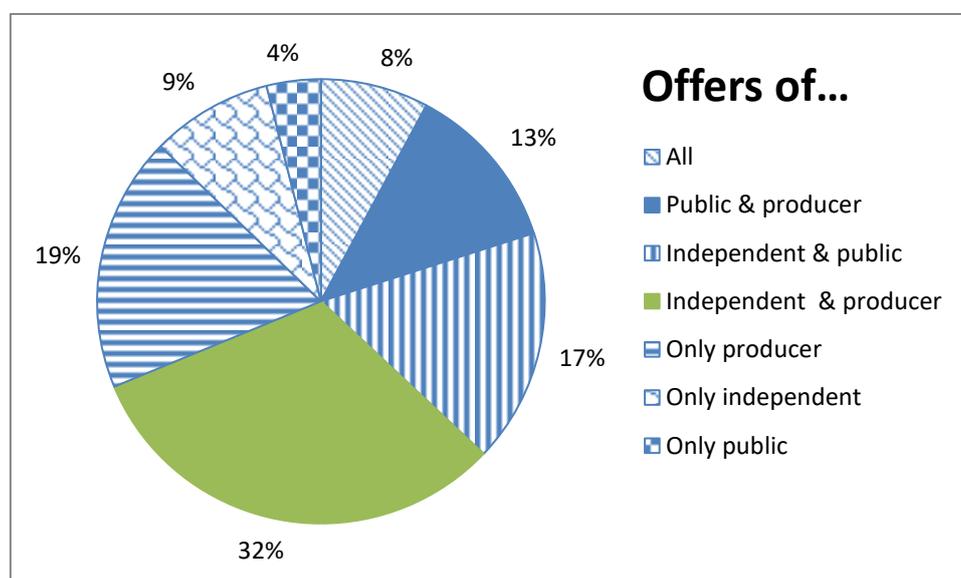
Figure 6: Use of online information sources about seafood (% of respondents)



Question: Please tick the online information sources you use the most.

Further exploring the use of different web offers, we found that 32% of the participants used independent offers (websites of NGOs and consumer organizations), while simultaneously also using offers of producers (see Figure 7). In contrast, only 17% of the participants indicated that they use webpages of independent sources and public offers (government and EU offers) in combination. The least indicated combination was the use of public websites and offers by producers (13%). Also just 8% of the participants used all three groups of web offers. Of all web offers, the offers of producers were the most frequently used without using other offers. These findings point out the potential producers, as well as NGOs and consumer organizations, have to support consumers in making informed seafood choices.

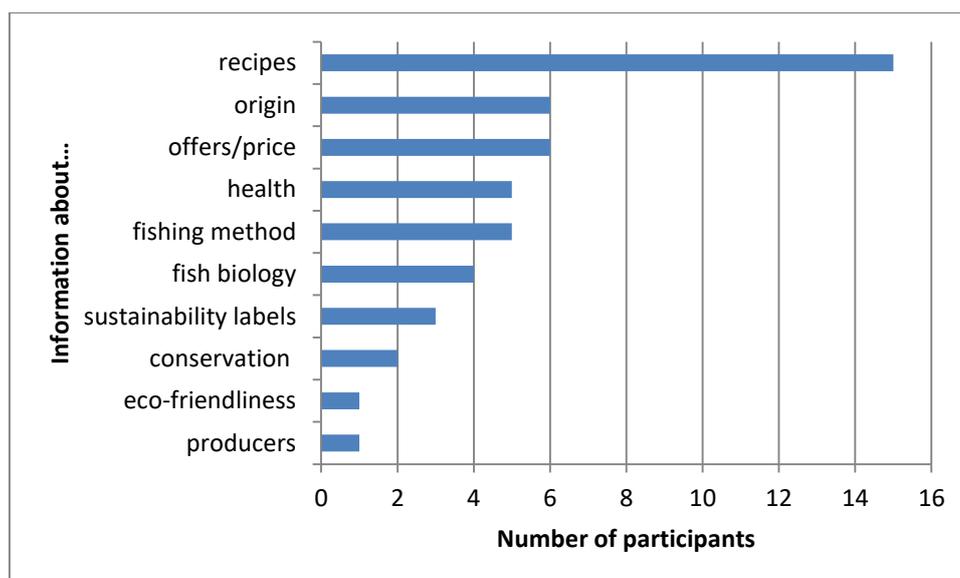
Figure 7: Share of participants who use combinations of web offers or only one offer



3.2 WEBSITE ANALYSIS

Analogous to the results of the survey, participants of the interviews looked mainly for recipes online. Information about seafood origin and about offers, respectively the price, were looked up equally often and are the second most searched topics (see Figure 8). Similar to our findings in the survey, topics related to eco-friendliness and convenience were less frequently sought-after by the participants.

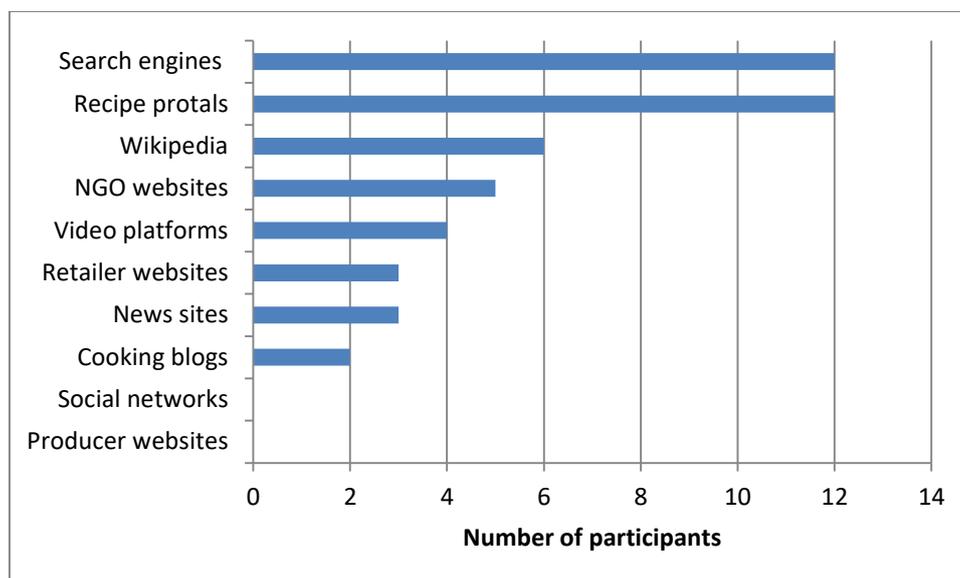
Figure 8: Information about seafood mainly searched for online



Question: If you look for information about fish and seafood, for which kind of information do you mostly look? Please indicate up to three answers.

Participants mainly searched for information about seafood via search engines, such as Google, and recipe portals (see Figure 9). The online encyclopaedia Wikipedia was the second most mentioned online source. Similar to our findings in the survey web offers of NGOs were also frequently mentioned. In contrast to the survey results, none of the participants indicated using mainly social networks and producer websites to retrieve information about seafood.

Figure 9: Online sources mainly used to search for information about seafood



Question: Where do you mostly look for information about fish and seafood online? Please indicate up to three answers.

In the following, the results for the website 'Fischinfo' are presented and then the results for the webpage 'Fischbestände online'. Afterwards the results for the two webpages are discussed together to point out lessons to be learned for the design and content of fish information websites.

3.2.1 Perception of 'Fischinfo'

Most of the participants (82%) were unaware of the website 'Fischinfo.de' prior to our research. The majority of the consumers was able to indicate the correct answers to the questions which could be answered by browsing 'Fischinfo' without using links to 'Fischbestände online' (correct answer rate between 76 and 88%).

Information which needed to be retrieved from 'Fischbestände online' via a link on 'Fischinfo' was harder for participants to find. In particular participants had difficulties finding the labelling standards according to which Alaska Pollack was certified. Less than half of the participants indicated both of the correct labelling standards.

More than half of the participants stated that it was easy to retrieve the answers for the asked questions from 'Fischinfo'. Nearly all participants agreed that 'Fischinfo' offers easily understandable information. Additionally, a majority of participants perceived 'Fischinfo' as being comfortable to use. All participants described 'Fischinfo' as helpful. With respect to the design of the webpage most of the participants perceived 'Fischinfo' as pleasing. Also 12 out of 17 participants described 'Fischinfo' as clearly structured. Participants appreciated the contemporary design and were pleased by the use of pictures and videos. However, they wished for the inclusion of a search tool in order to retrieve information faster.

Nine out of 17 participants indicated that they might use 'Fischinfo' in the future, while the other eight participants stated that they will use the website in the future. Even more participants (11) indicated that they would be willing to recommend 'Fischinfo' to others. None of the participants stated that they would not be willing to recommend the website.

Participants were particularly pleased that 'Fischinfo' displayed consumer-oriented information in a short and informative manner. Especially the presence of recipes was

appreciated. Furthermore, participants valued that 'Fischinfo' presented wide-ranging information covering production as well as consumption topics. Nonetheless, participants missed information about labelling schemes addressing sustainability and other quality issues.

3.2.2 Perception of 'Fischbestände online'

The majority of consumers (16 participants) was unaware of the existence of 'Fischbestände online' prior to this research. Most of the participants were able to correctly answer the questions presented in the search tasks (correct answer rate between 71 to 94%)

More than half of the participants stated that the tasks could easily be solved with the information presented on 'Fischbestände online'. Additionally, the majority of participants stated that 'Fischbestände online' offers easily comprehensible information. And more than half of the participants assessed the use of 'Fischbestände online' as comfortable. A total of 14 out of 17 participants perceived 'Fischbestände online' as a useful addition to other web offers.

The views were mixed with respect to the design of 'Fischbestände online'. Nine participants perceived the design of the website as pleasing, while six participants were unhappy with the design. Participants wished for more pictures to support the displayed information and criticized the text-intensive presentation. But nearly all participants (14) deemed the website to be clearly structured.

Five out of 17 participants were willing to use the website in the future, while the same amount was unwilling to do so, and seven participants indicated that they might use the webpage. However, more than half of the participants would recommend the website to others and six participants stated that they might recommend the website.

Participants were particularly pleased that 'Fischbestände online' presents neutral, concrete, scientific information about fish. The depth of information was highlighted. But due to this scientific presentation, participants deemed the website less appropriate for consumers and lay persons in general. It was argued that both groups lack insights to understand the given information. Furthermore, some participants criticized the limited search options and wished for the implementation of a universal search tool. Additionally, participants would appreciate the display of information about sustainability and other quality labels including an assessment of the different schemes. In this context, some underlined that they would particularly appreciate it if more scientifically oriented websites like 'Fischbestände online' would present information about labelling standards since they perceived scientists as particular trustworthy information sources.

3.2.3 Discussion

Prior to our research 'Fischinfo' and 'Fischbestände online' were unknown to the majority of the participants. This is not surprising considering that most of the participants looked foremost for recipes online. Even though 'Fischinfo' offers recipes, this is not the main focus of the website. 'Fischbestände online' solely aims to inform people about the conditions of fish species relevant for the German market, it does not present any recipes. However, both websites were generally received positively by the participants. All participants described 'Fischinfo' as helpful and most of them perceived 'Fischbestände online' as useful addition to other web offers. Both websites were successful in supporting consumers to inform themselves about seafood since the correct answer rate of the participants was above 70%

for both websites. The majority of the participants deemed 'Fischinfo' as well as 'Fischbestände online' as comprehensible. More than half of the participants would recommend either website to others.

Regarding the design of the two websites, the design of 'Fischinfo' was favoured by the participants over the design of 'Fischbestände online'. The participants appreciated the use of pictures and videos by 'Fischinfo' and criticized the lack of both and the amount of text on 'Fischbestände online'. Participants missed a universal search tool on both websites as well as (more) information about sustainability and other quality labels. When comparing the two websites, 'Fischinfo' was preferred by the participants over 'Fischbestände online' since it was more consumer oriented. With respect to these results (e.g., comprehensibility, design etc.) from a consumers' point of view the usability of 'Fischinfo' was higher than of 'Fischbestände online'.

4 CONCLUSIONS

Our analysis shows that the internet is the most important information source for consumers and has become even more important than labels as an information source about seafood. Given this, web offers are now a must-have for the seafood sector. The internet serves as an extended packaging in offering the possibility to present more information in a differentiated manner and thus catering to the different levels of information needs of consumers.

On the internet consumers mostly use offers of producers to inform themselves about seafood followed by offers of consumer organizations and NGOs. The majority of consumers uses a combination of offers from different sources. The most frequent combination found was offers issued by producers together with offers by NGOs and consumer organizations. These findings point out the potential producers as well as NGOs and consumer organizations have to support consumers in making informed seafood choices.

Our research reveals that consumers foremost look for practical advice about seafood online independent of the studied country. In particular the display of recipes can support consumers in their seafood consumption. Seafood is considered a too expensive product to risk inappropriate preparation. A lack of preparation skills is an important barrier to fish consumption (e.g., Olsen 2003; Verbeke and Vackier 2005). Thus, consumers would be willing to consume more seafood if they would be provided with new recipes and guided on how to prepare seafood successfully (Altintzoglou et al. 2010). Studies show that less knowledgeable fish consumers as well as consumers who show a high trust and use of information about fish are most interested in recipes (Almeida et al. 2015; Altintzoglou et al. 2014; Pieniak et al. 2007).

Other important topics which should be addressed online are health and quality issues of seafood. Following this, sustainability issues were of interest in all countries. The interest in specific sustainability topics differed between countries. These cultural differences have to be considered in the composition of seafood websites. For example, it is advisable to address fish welfare issues more prominently in Poland, France and Germany than in the other investigated countries. Additionally, our research shows that at least German consumers expect to find information about existing labelling schemes on seafood information websites. Also consumers in all countries generally welcomed more complex, in depth information about seafood in addition to more practical and specifically consumer-oriented information. With respect to the design of seafood information websites consumers appreciated a universal search tool and visual content. Visual content like videos and pictures allow for story telling about products and the seafood sector in general. This helps consumers to connect themselves with seafood and might also increase trust (see also Ólafsdóttir et al. 2014).

Although online information has become very important, seafood labels remain a major source of information. Research highlights that European consumers want to be assured that they are buying a safe and high quality product and therefore, are interested in labels (Pieniak et al. 2013). Keeping this in mind, consumers might not use all of the information that is available to them, but they favour and sometimes even expect labels for and online information about seafood to be present.

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