“Piloting of eco-innovative fishery supply–chains to market added–value Adriatic fish products”

Priority Axis: Blue innovation

1.1- Enhance the framework conditions for innovation in the relevant sectors of the blue economy within the cooperation area

D5.2.1 Consumer Analysis Report

WP5: BUILDING UP VALUE CHAIN AND MARKETING OF ADRIATIC ECO-INNOVATIVE FISHERY PRODUCTS / A5.2 CONSUMER ATTITUDE TOWARDS ECO-INNOVATIVE SEAFOOD PRODUCTS

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1 INTRODUCTION

This report addresses the current consumption trends of seafood products in the EU, with a particular focus on Italy, Spain and Croatia. It tends to evaluate customers' perceptions and appreciation towards fishery products, including main social and psychological drivers and barriers to seafood consumption. This is going to be investigated both for traditional and eco-innovative products, searching for discrepancies and peculiarities. Collecting reactions and feedbacks from consumers on these aspects will be fundamental for the future development of eco-innovative products.

The report is structured as follow. Chapter 2 provides an overview on the main European market trends, including aspects of supply balance, consumption, consumer behavior and sustainability; Chapter 3 presents the objective and scope of the deliverable, Chapter 4 presents the results of the qualitative analysis and finally Chapter 5 presents the results of the quantitative analysis.

In the annexes from 1 to 5, additional results from the qualitative analysis as well as full results from the models of the quantitative analysis have been included. Annex 6 presents the results from the Crofish consumer survey.

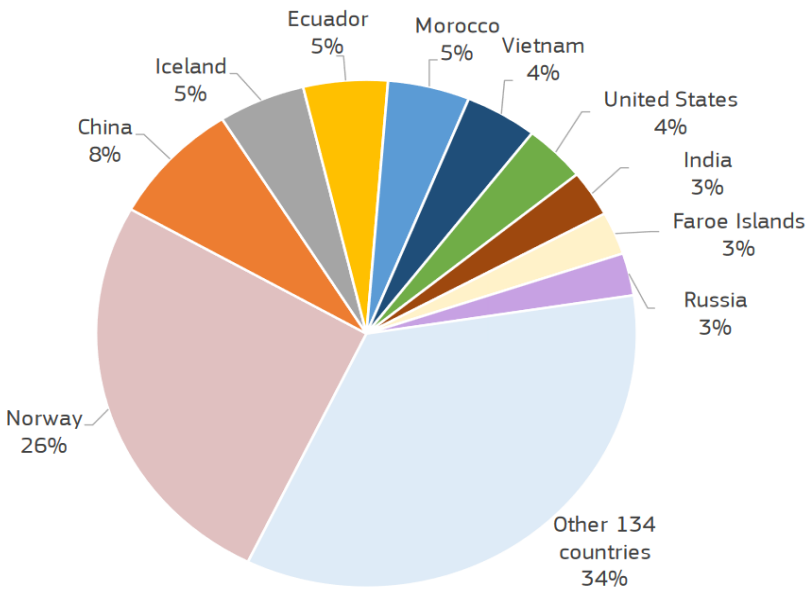
2 EUROPEAN MARKET TRENDS

The European Union is one of the most relevant world's markets for fishery and aquaculture products, in terms of consumption and economic relevance.

2.1 SUPPLY BALANCE AND APPARENT CONSUMPTION

Despite being a globally-relevant producer, the European demand is such significant that can be fulfilled and sustained only through imports from outside the Union. As a matter of fact, the EU fish-balance position is being a *net importer* whose specific commercial deficit for FAP's amounted at around 21 Billion Euros during 2019. This deficit was in real terms the 33% higher than it was on 2010, indicating a clear and solid trend.

Figure 1 Major Extra-EU Import partners, by value, 2018. Eumofa's elaboration from Eurostat-Comext data



The need for import of the European Union is so extensive that considering the year 2018, 9,41 million tonnes (upon the 12,48 Million tonnes of total Apparent Consumption) were provided through this way (Eumofa, 2020). Within this scenario it is of staple importance for the European countries to have stable commercial relationships with the other FAPs producers. During 2019 the most relevant (in terms of value) commercial partners from extra-EU, and thereby the main supply source, have been Norway (with more than a quarter of the total value provided) followed

at a great distance by China, Iceland, Ecuador, Morocco, Vietnam and others. The following map describes the share of extra-EU import by value per partner country during 2018. As it is immediately clear to the observer, it is worth noticing that a very important share of imports (34%) derives from the sum of the singularly-taken small supplies originated from "other countries". Along with some staple and fundamental partners there is in fact a plethora of smaller exporters who jointed provide a not negligible part of the total supply.

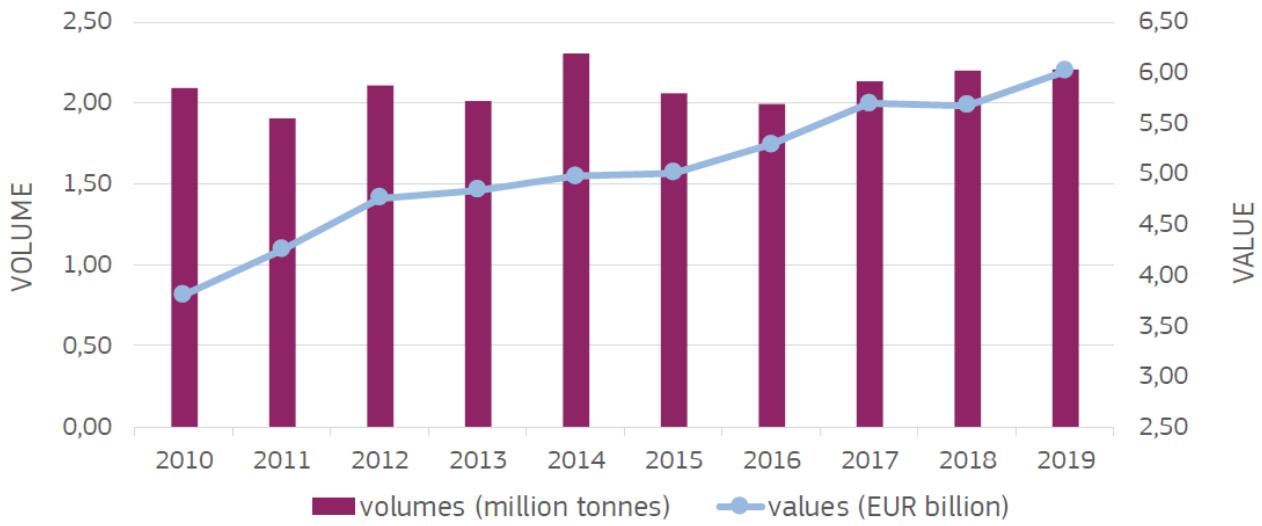
Deeper into the import analysis, speaking about species, Salmon results to be the most imported from extra-EU countries (mainly from Norway), followed by Shrimps (primarily from Ecuador and Vietnam), Cod (from Norway and Iceland), Skipjack Tuna (from Ecuador) and Alaska pollock (from China and the US).

Despite being import-dependent, the European countries also maintains an export vocation. From 2018 to 2019, European countries exported 6,43 Million tonnes (worth 27,41 Billion €) of fishery and aquaculture products in intra-EU commerce. At the same time, extra-Eu exports recorded about 2.21 Million tonnes (a volume +10% higher than the last decade).

It has to be highlighted that due to the high interrelation of the internal European markets, importers from extra-European countries should be considered as simple *"points of entry"* for raw or processed material. A point of entry where FAPs enter the customs union ready to be furtherly traded, handled and/or re-exported. Clear examples of this behavior are Sweden and Denmark, who are the major import connection from Norway due to geographical proximity and often acts as the European distributor for Norwegian Salmon. The partial distribution of the European supply chain, together with the deep interrelation of the markets, made possible the specialization of countries like Poland who now has a flourish processing industry, focused on smoking, enabled and mainly fueled by Norwegian Salmon (Eumofa, 2020).

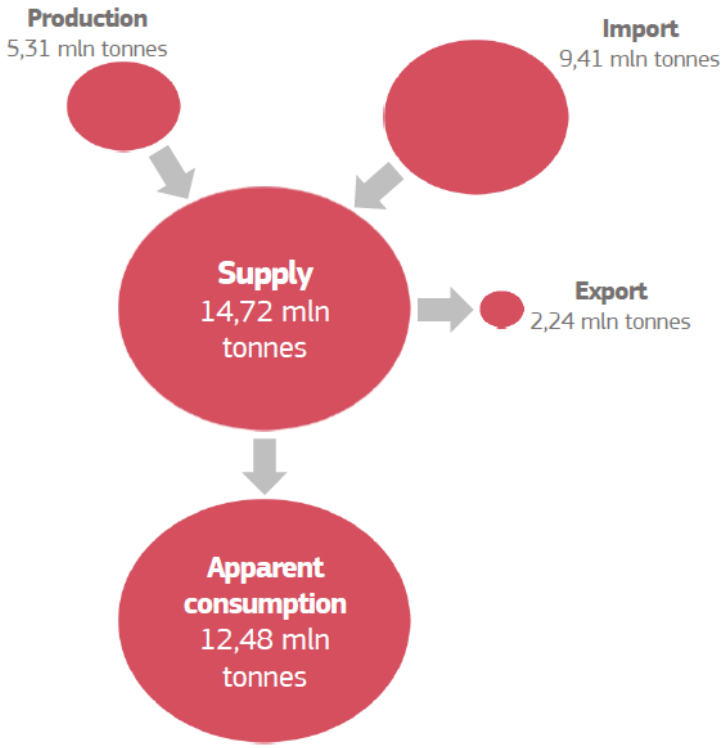
The value of fishery and aquaculture products exported to extra-UE countries does present a clear ascending trend, while the volume does not. Volumes have been in fact in the last decade oscillating around 2 million tonnes, while the volume didn't experience one year of negative growth since 2010. This means that price and quality of European exported products are rising year by year.

Figure 1 Extra-Eu exports of FAPs. Source: EUMOFA elaboration of Eurostat-COMEXT data (online data code: DS-016890). Values are deflated by using the GDP deflator (base=2015)



The main species exported by European countries comprehend Herring, Blue whiting, Skipjack tuna, Mackerel, Salmon, Cod and Greenland halibut. Moreover, there is a noticeable export of non-food-use products (i.e., fishmeal or fish oil) (Eumofa, 2020).

Figure 2 EU Supply Balance (2018, LIVE WEIGHT EQUIVALENT, FOOD USE ONLY) Source: EUMOFA, based on EUROSTAT (online data codes: fish_aq2a, fish_ca_main and DS-016890) and FAO data.



During 2018, European citizens presented an average per capita apparent consumption of 24,36 Kg of live weight of fishery and aquaculture products. This data represents a slight decrease (-2%, -0,43 Kg per person) if confronted with the data reported on the previous year.

Around three-quarters of the total apparent consumption are made by wild-caught products (that also compose the major part of the 2018's reduction in apparent consumption). For that year in fact, Eumofa reports as apparent European consumption 6.636.664t of wild fisheries and 2.832.656t of aquaculture products, corresponding with 18,82Kg and 5,52Kg of pro-capite consumption.

According to Eumofa (2020), the drop on supply for European citizens for the past year has to be researched on a mix of reasons comprehending the lower volume of available catches, the reduced production of farmed fish and the increased export of wild-caught products.

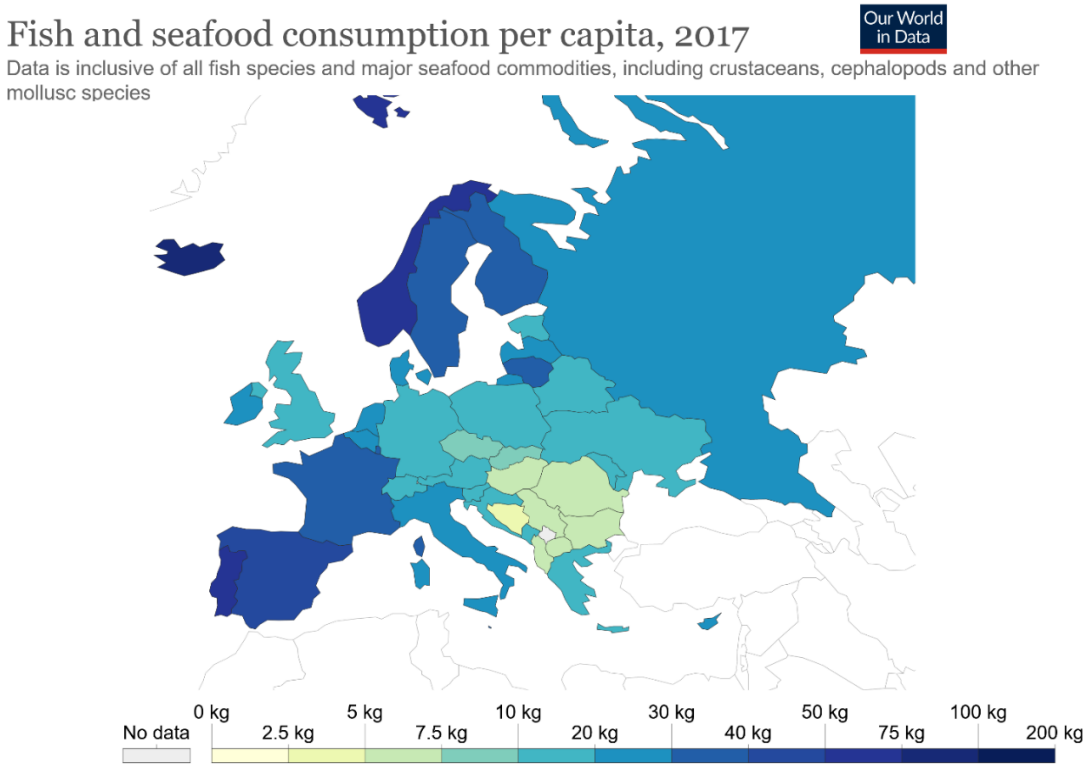
Despite this average decrease, some countries moved against the general trend or in the same direction but with a different and thereby noticeable magnitude. In example, from 2017 to 2018, Italian apparent consumption increased in volume by 1% (up to 31.02 Kg/capita/year) and Croatian increased by a strong 6% (to 19,19 Kg/capita/year). Spain instead presented a reduction of 1% (to 46,01 Kg/capita/year).

It is an historical fact that European markets doesn't share the same characteristics on fish consumption and should be considered, for a deeper understanding, as separated but highly interrelated markets. A study from the *Center for the Promotion of Imports*, an agency dependent from the Dutch *Ministry of Foreign Affairs*, grossly divides the European Union into three homogeneous blocks (CBI Ministry of Foreign Affairs, 2020):

2 Southern Europe (Portugal, Spain, France, Italy and Greece): contains the main producers and consumers of FAPs. Those are also the major processing nations of the continent.
3 Northwestern Europe (Netherland, Belgium, Germany and the United Kingdom until Brexit): contains countries with relevant consumption and a strong commercial trade vocation.
4 Eastern Europe (Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia): contains eleven countries with a lower consumption but greater growth possibility. According to the *European Bank for Reconstruction and Development (EBRD)*, Eastern Europe could play a key role in the shifting supply chains post-COVID-19, benefitting from the willingness of being less dependent from China.

Most of those assumptions can be visibly confirmed in the following map, which reports the fish and seafood consumption per capita for the year 2017.

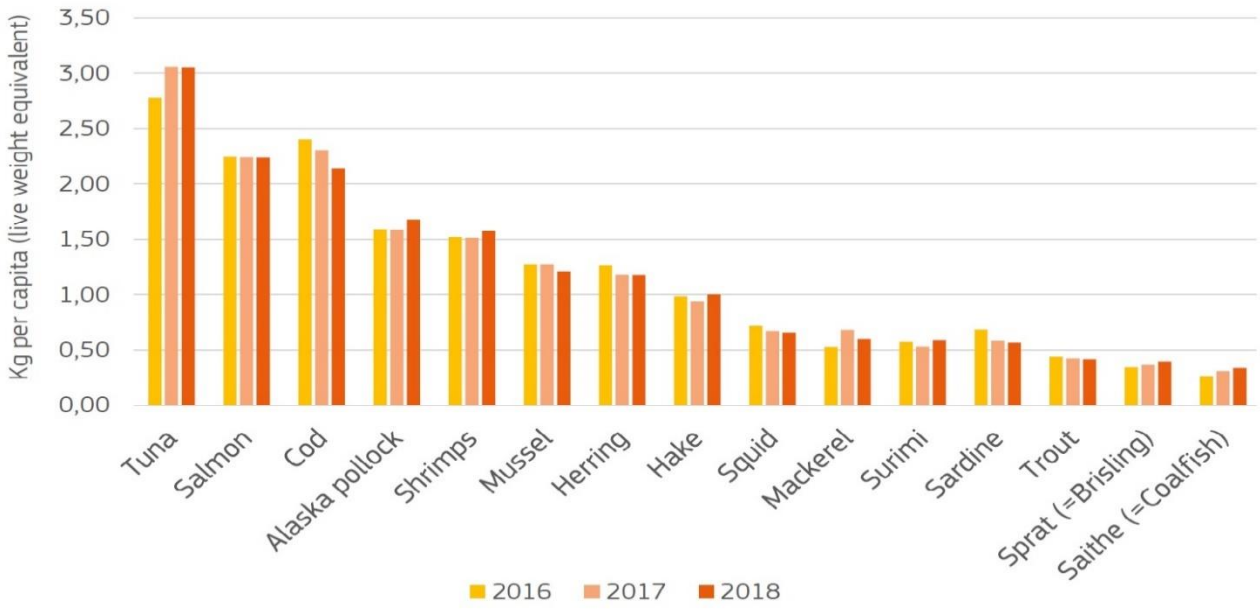
Figure 3 Fish and seafood consumption per capita, 2017, Source: UN Food and Agriculture Organization (FAO)



Research on apparent consumption made by Eumofa shows that during the year 2018, in decreasing order, the most consumed species within the European Union have been Tuna, Salmon, Cod, Alaska Pollock, Shrimps, Mussel and Herring.

Between those, it has to be observed that consumed Salmon and Mussel are almost completely originated from farmed production (>93%), while the shrimp production is quite equally divided (>47,5% farmed). In the list of the fifteen most consumed species, also the Trout (13rd, 0.42 Kg/year) does present a wholly farmed production (>97,5%). The rest is to be considered as species whose availability exclusively derive from wild captures (Eumofa, 2020). In the last three years, no major shock on the chart happened on apparent consumption, but still a ± 20% yearly movements have been recorded, signaling the possibility of rapid changes in consumer's demand, basing on different drivers as social factors or the offer's consistency.

Figure 4 EU average Apparent consumption (Kg per capita). Source Eumofa, data based on Eurostat



Considering only the European household expenditures, the FAP's bought during 2019 were worth 56,6 Billion €, a net increase of the 3% on a 10-years base. During 2019, all the EU household spent more than the previous year on fishery and aquaculture products. The per capita nominal household expenditure in 2019 increased by 1% for Spain, by 2% for Italy (who historically is the member state with highest total expenditure) and by 5% for Croatia (Eumofa, 2020).

Part of this expenditure's expansion can be explained with the movement of consumer prices, that in the last decade increased by an average 3% on yearly base (also higher than the average general food price increase, 2%). The drift between those two indexes' increase started to enlarge from 2014 on.

As sometimes fish is seen as an alternative to meat, it's important to know that nowhere in EU the expenditure for fishery and aquaculture products is higher than that for meat. If during 2019 the EU average was about spending on fish around one quarter of the meat spending, this ratio greatly varies between countries. In example the Portuguese expenditure on fishery (and aquaculture) represent the 47% of the (FAPs + meat) expenditure, while in Italy the FAP's expenditure is three times lower than for the meat and in Spain it's twice lower. At the same time, the very marginal share of fishery expenditure for some EU countries (usually those

landlocked), signals the possibility of an intra-EU commerce expansion in almost virgin markets, as i.e., Hungary, who spent during 2019 only the 5% on FAP'S products, or Romania that spent 8%.

2.2 PRODUCT CATEGORY SEGMENTATION

After several decades of moderate value growth experienced by the European Fishery and Aquaculture Products (FAPs) market (with a reported yearly CAGR of 3,3% between 2015 and 2019), forecasts for the near future do now indicate a deceleration in terms of value and especially volume. If the increase has been leaded and actively supported by the expanding European population and the increasing disposable income, the revision of the forecast for the period 2019-2024 has mainly been caused by the disruptive direct and indirect impacts of the Covid-19 outbreak which almost halved the expected market growth for the year 2020 (from CAGR=3,6% to CAGR=2%) and it will take years to fully recover from. Previsions considering this effect sees the EU fish market growing at a Compounded Annual Growth Rate of 2,7% in terms of value and 0,5% in terms of volume in the 2019-2024 period, while in the "business as usual" forecast made before the virus outbreak it was expected to be at a rampant CAGR=3,5%.

As reported in a report made by Marketline during 2019, the whole FAPs market can be disassembled into six different product segments. The most consistent sector, in terms of value, is represented by *Fresh Fish & Seafood*, collecting just slightly under the 30% of the whole business. *Frozen Fish & Seafood* follows with the 20,8%, just less than one point over *Ambient Fish & Seafood* (a category including all the shelf-stable fisheries products, i.e., those sold in jars, tins or shelf-stable vacuum pack). Down the list, at around 13% each, lie *Chilled Raw Packaged Fish & Seafood – Processed* and *Chilled Raw Packaged Fish & Seafood – Whole Cuts* (MarketLine, 2021).

2.3 A CONSUMER IDENTIKIT, CONSUMER ATTITUDES AND BEHAVIOUR

A Eurobarometer survey investigated the consumer habits, preferences and information regarding the FAP's, returning an archetype of the fish consumer in the European Union (Eurostat, 2018). The survey has been conducted during June and July 2018 including samples from all the 28 Member States.

From the results, it is clear how the overwhelming majority of European citizens regularly buys FAP's at a grocery store or a supermarket, while a smaller (but still very relevant as it's slightly under the 50%) fraction does buy FAP's at a fishmonger or at a specialist store. Results on this topic really differs from State to State, reflecting differences in the national supply chain structure, social mores and local traditions. In example, the LSRT's supremacy has been reported

to be consistent for all the European MSs but three: Italy, Greece and Malta, where instead it is more common to buy FAPs from a fishmonger than from a supermarket. Also Spanish and Croatians' respondents reported a relevant percentage (>50%) of people buying FAP's at specialized shops. A deeper socio-demographic analysis has been conducted for this point in order to better distinguish how customer segments act. It has been pointed out that young (15-24 years old) and middle-aged (25-54), as well as *people who finished their education aged* 20 *or over* and *people who never or almost never have difficulties paying bills*, are more likely to buy at a grocery store or a supermarket (Eurostat, 2018).

The most frequently requested kind of product is *Fresh product, including live*, followed by *Frozen products* and *Tinned product*. Even if there isn't a noticeable difference between Fresh and Frozen fish considering the sum of people buying at least *from time to time*, the point of view changes as long as under consideration are the share of people who affirm to buy with a regular timing (*often*), in that case in fact customers are strongly more likely to buy fresh products (+50%). Other kind of processed products (such as smoked, salted, breaded or ready meals) do lie in the bottom of the chart, but still share a consistent *from time to time + often* share, bigger than 40%. According to Eurobarometer, *breaded products and ready meals* are generally more requested and consumed by young people (15-24 years old) and by large household (four or more people).

In the act of buying a FAP, the customer considers some aspects more relevant than others. The Eurobarometer's inquiry identifies as main choice drivers (listed on decreasing EU average order) the *product's appearance (freshness, presentation etc.), the cost of the product* and *the origin of the product.* Other possible drivers, such as *quality labels, preparing ease* and *socio-environmental impact* are way less referred than the first three (but still worry the 10-20% of the respondents). The product appearance has been mentioned with a major frequency by respondents who prefer wild fish, by women and by people who use to buy from a fishmonger/specialist. Moreover, it seems to be unrelated with the consumption frequency.

More in detail on the products provenance, the local origin is widely preferred to the outside of the EU. The majority of interviewed Europeans, with an even higher approval rate from the Italians, agree to opt for products of their country and secondarily of their region, if a choice is given. Anyway, still a consistent share of Europeans thinks that their preferences depend on the specific product or doesn't have any preference at all.

Speaking about openness to new habits, a large majority of the European respondents affirmed that would totally like to try new products and species. This majority is even more accentuated between Italian respondents (+13%) and shows that the demand is open to be met with new products and innovations.

The largest and strongest majority of the interviewed sample reported to try new FAPs at home. Secondarily, but with very similar shares, new products are enjoyed at the restaurant, on special occasions or when there are promotional events (i.e., at the supermarket).

The scientific production highlights how the consumers general expectations about food are based upon the concept of *good quality products derived by healthy animals raised in a healthy environment, to be natural, fresh tasting and nutritious* (Kaimakoudi et al.,2013).

Part of those characteristics are attributes which cannot be clearly determined even after the consumption and are called for that reason *credence attributes* (Baron, 2011). The presence of this kind of properties is particularly self-evident for seafood products, if compared with meat or other kind of foods. The fishing method, the attention spent by producer on animal welfare, the avoidance of by-catch or the quality of the environment where the fish was caught/farmed can in fact be considered intangible features (Di Vita et al., 2020) as they cannot be clearly observed starting from the final product. The attitude of the customers towards *Credence goods* is thereby strongly bonded with the concept of individuals perception of those attributes. Within the seafood market, the rational consumer develops the willingness to consume FAPs (and the relative price) filling the asymmetric information about credence characteristics by simulating information mixing the individual experience (by taste and other observable attributes) with the trust accorded to the retailer and its reputation (Kaimakoudi et al.,2013). According with this view, it is of staple importance the degree of trust conferred to control organizations of the seafood market, namely consumers organizations, industries/processors of the sector, retailers, the EFSA (European Food Safety Authority), along with national food safety authorities and independent control organizations (Jacobs et al., 2015).

According to many past studies, food choice for seafoods appears to be motivated for the majority of the customers (still being a subjective trait) by four main drivers: Health benefits, Taste, Convenience and Process characteristics (Brunsø, et al., 2008). This synthesis helps summing up the complex and variegated set of variables behind the food choice, among which surely deserve to be named attitude, health-orientation, price, ethical concerns, personal values, social influence, availability, perceived risk and self-identity (Honkanen et al, 2005).

Some elements are named in various previous studies as pure barriers to FAPs consumption: the price (mentioned in almost all the literature on the argument), the aversion to fresh fish bones (which has been demonstrated to be more common and incisive within kids/young and low-frequency consumers) and the perception of fish being a time-consuming food (in terms of buying, preparing and cooking) (Brunsø, et al., 2008). The latter argument is often related to the lack of specific seafood preparing skills. Informative action on those topics should be addressed as part of an effective FAPs marketing strategy.

2.4 CONSUMPTION CHANNELS: DOMESTIC OR OUT-OF-HOME

The whole industry of fishing and aquaculture does provide a flow of raw and processed material that then takes different direction being destinated to distinct sale channels: **Retail** (aimed at the domestic consumption, includes fishmongers and LSRT) and **Out-Of-Home** (composed by *foodservice* like restaurants, and *institutional channel* like canteens or hospital). The retail is almost everywhere in Europe the most important channel in terms of volume, as during 2019 it collected the 80% of unprocessed FAPs in Italy and France, the 77% in Spain, the 72% in Germany and the 63% in United Kingdom (where foodservice increased its role up to 34%, from an average 20% of the other named countries) (Eumofa, 2020).

Basing on a multiple answer question from a Eurobarometer survey, within the retail channel the majority of European citizens declared to buy FAPs products at the grocery store, supermarket or hypermarket (77%), while only the 42% declared to buy fishery or aquaculture's product from a fishmonger or a specialist store. An interesting data is that the European average can strongly differ from the national trends. In example, Italian respondents affirmed to primarily (64%) buy at the fishmonger and only secondary from large scale retailers (60%) (Eurostat, 2018).

2.5 HEALTHINESS AND SAFETY

Food quality is one of the most substantial aspects of the human life. *Nutrition, food safety and environmental issues* became thereby essentials elements of food product's acceptance, whose main dimensions are included into sensory and health characteristics, convenience and processing activities (Conte et al., 2014).

Fish and seafood have been recognized as a *health-promoting food for human consumption* since a very long time, and nowadays doctors and nutritionists strongly recommend its presence in the human diet (Kaimakoudi et al., 2013). Health authorities and producers do have a *joint interest* on raise the frequency of seafood consumption (Brunsø et. al 2008) and recommend to include seafood in the diet twice a week.

It's healthy fame mainly derives by the high presence of omega-3 fatty acids, whose effects have been very stressed by scientific community and by medias during the last two decades. It is indeed a fact that fish oil and seafood are the main natural source of this beneficial element. Omega-3 assumption at sufficient level has been proved being directly connected with lower risks of coronary diseases and playing a major role in preventing dyslipidaemia, artheriosclerosis and other non-cardiac benefits.

Moreover, FAPs are also rich in other important and not so common essential nutrients, such as high-quality protein, retinol, Vitamin D and E, iodine and selenium. It doesn't have thereby to astonish if many other beneficial effects have been proved within a large range of issues as

asthma, allergies, cancer, diabetes, inflammatory conditions and cystic fibrosis (Rahmaniya et al.,2017). Benefits have moreover been demonstrated on some chronic degenerative diseases (Brunsø et. al 2008).

Along with those positive elements, fish consumption is also perceived by a partiality of consumers as a possible source of major safety risk. The possible presence of contaminants, pollutants, Methyl mercury level, PCB, microplastics, hormones or antibiotics can reflect on some customers' purchasing attitude. Those concerns are valid both regarding wild catches (basing on the oceans' well-known pollution issues) and aquaculture (basing on potential uncorrect/unhealty breeding practices).

Those perceived safety risks are considered as obstacles to the effective consumption of aquaculture and fishery products. There is indeed a correlation, shown by many researches, between the health risk-benefit perception linked with fish consumption and the consumption frequency (Jacobs, S., et al., 2015). As consumers are nowadays looking for higher food security standards, consumer behavior studies became even more important for a correct and effective marketing campaign. A positive strategy for FAPs producers should indeed include actions aimed at perceived risk reduction, rebuilding the consumer confidence through instruments as could be an accurate labelling (Rahmaniya et al.,2017). According to previous studies this is especially indicated for aquaculture products, where the lack of awareness is particularly felt about the possibility of chemical residuals (mainly veterinary drugs and hormones) inside the fish meat or other safety issues (Kaimakoudi et al., 2013).

Along with all those worries connected with the resource "fish" and its environmental issues, the food-safety theme declined into the FAPs has to be considered also from another major matter of relevance: the correct conservation of the products. Fish is one of the most perishable (or degrading) food kind present on our tables. Moreover, not all the consumers know how to evaluate the product's state of conservation only by first saw (which is a skill mainly shared between those who live along the coast). It is thereby of staple importance to set standards, praxis or innovations which could reassure the unskilled consumers and extend the product quality.

Regarding standards, a plethora of institutions and organizations from the global to the local level are differently entitled to pose practices as standards. Some of the most important among them are the FAO and the WTO - which in the framework of the Joint FAO/WHO Food Standards Programme formed the Codex Alimentarius Commission - and, at European level, the European Commission.

2.6 RECENT DEMAND TRENDS: READY-TO COOK, CONVENIENT AND SUSTAINABLE SEAFOOD

As happens for many foods and other tradable goods, the specific demands for fish may change in a very short time, reflecting changes in the society that usually happen for social, environmental, political or economic aspects.

According to *Euromonitor International*[1], the main barrier to the volumetric expansion (or by an opposite point of view, the main driver of the recent reduction) of fish consumption in western Europe has to be traced in the modern lack of cooking skills and the reluctance to experiment preparing meals from raw ingredients. Moreover, other barriers are identified in the high price of fresh seafood and the limited availability of quality FAP's in some distribution channels, especially if located in the deep inland.

At the same time, Euromonitor[2] identifies three different trends that are already boosting the consumption, being more attractive in particular within the "millennials" and the newer generations:

1) **Convenience and practicality**: the modern lifestyle (in particular referring to those living in big cities or metropolitan areas) typically includes and requires a full familiar employment. This imply that families averagely have less time to spend on grocery shopping and preparing the food, becoming thereby more sensible to convenience and to the possibility to buy ready-to-eat or ready-to-cook dishes without wasting part of the spare time to dedicate to the family or other interests. Moreover, a longer shelf-life guaranteed to the product can also be seen as *convenience,* as the product can be bought without an already organized occasion to consume it.

2) **Health and well-being**: The growing interest on well-being good practices, in particular referring to food habits and correct diets, could boost the demand. In fact, the FAO considers fish *an irreplaceable*, *key element in a healthy diet* due to high value proteins and Omega-3 fatty acid (FAO, 2020).

3) **Sustainability and responsible consumption**: the fishery sector present endemic problems of sustainability. In the search for an equilibrium between business profitability and safeguard of the wild fish stock, a new approach could help finding a balance. New generations and consumers in generals appear to be more focused on the environmental impact of their actions, a fact summed up in the *conscious consumerism movement* emersion.

1 Euromonitor International (2017). Western Europeans Aren't Eating as much Fresh Fish and Seafood, available at https://blog.euromonitor.com/western-europeans-arent-eating-much-fresh-fish-seafood/

2 ConnectAmericas (2015). *3 trends in fish and seafood consumption in Europe*, available at https://connectamericas.com/content/3-trends-fish-and-seafood-consumption-europe

A staple challenge for nowadays producers is thereby how to combine those attributes with a product that is often seen as traditional.

2.6.1 CONVENIENCE FOOD

As previously anticipated, one of the main drivers of consumers behavior on seafood products is the notion of *Convenience.*

Although *convenience food* appeared in the literature since the 1920's, many different definitions succeeded, in order to adapt to the changes in the real world of food producers and consumers, a world in constant evolution. The modernization of the food chain in fact brings as an effect the obsolescence of the previous food convenience definitions, as new products appears and others are substituted in the common use. In other words, *convenience fully mirrors its epoch* (Scholliers, 2015).

Scientific studies of the past decades outpointed definitions that focus on different partialities. Charles and Kerr (1988) state that can be regarded as convenience food *"any food which has had work performed on it outside the home*". Brunner et al. (2010) outline convenience food as "*those that help consumers minimalize time as well as physical and mental effort required for food preparation, consumption and clean-up*" while Dixon et al. (2006) identify convenience food as "*the domestic outsorcing of food planning, preparation and/or cooking*". Another definition, enunciated by the British Ministry of Agriculture, Fisheries and Food on 1959, is the *"products of the food industries in which the degree of culinary preparation has been carried out to an advanced stage and which are purchased as labour-saving versions of less highly processed products"* (British Ministry of Agriculture, Fisheries and Food, 1961, p.16).

As noticed by Olsen et al. (2007), the notion of convenience can be furtherly split into *convenience orientation* and *perceived product convenience*. While the first refers to a characteristic of the consumer (its *inclination degree*), the latter is referred to attributes proper of the food itself.

As the convenience is indicated as a key consumer behaviour driver, a supplementary investigation needs to be conducted on the convenience orientation. Its definition is not univocal. One of the most important delineation of convenience orientation has been given by Candel (2001) who defined it as ''*the degree to which a consumer is inclined to save time and money in regard to meal preparation*'' (Candel, 2001, p.17).

From what we just reported, a common ground within all those definitions is the multi-dimensionality of the concept of convenience. This kind of food is nowadays strictly related with home-consumption, and is aimed to simplify the home cooking procedures. It is connected with the potential of saving energies (in terms of both physical and mental efforts, "it makes life

easier" (Scholliers, 2015, p.4). and assumes that part of the domestic work to prepare the meal is outsourced to the producer.

The rapid growth of convenience food consumption can be explained within a drivers' set composed both by social and individual transformation. Belong to this set the change in household structure, the higher female participation in the labour force, ownership in kitchen technology, individualism, time usage, lack of cooking skills, as well as the inventive attitude of manufacturers and the support given by appealing advertising (Scholliers, 2015).

Despite its potentially positive aim, many empirical studies outpoint that frequently consumers do have a general negative attitude towards convenience food. Altintzoglou et al. (2010) conducted a research based on three semi-structured focus groups in Denmark, Norway and Iceland. During those focus groups the participants revealed that the negative attitude is mainly driven by the belief that the least processed the healthiest the food is. In this way, an effortless meal preparation could even lead to a guilt feeling that can be balanced by adding a "personal touch" to the recipe.

Stressing the correlation within convenience and its time-saving properties, some participants pointed out that convenience food is often perceived as an "emergency food" rather than "real food". The determinants of its consumption are thereby to be searched into the fact of it being a "popular choice when trying to balance time, money, knowledge and good taste" (Altintzoglou et al, 2010).

2.6.2 INNOVATIVE PACKAGING SYSTEMS

Many innovations have been tested and applied in the last decades in order to raise the product's quality at its final step, the retailing. One of the most staple point of attention in the FAPs R&D food safety field has been the packaging. Far away from merely being a protective box, it also is an effective way to improve the shelf-life and the marketability of the product itself. Being the fish one of the most perishable (and dangerous if rotten) food on our tables, the strong focus on preservation methods progresses have to be considered as a way to preserve the freshness and the quality of the fish as long as possible, also incidentally limiting the food wasted during all the phases following the production. A secondary effect, mostly interesting for the producers, is that through an enhanced sealability period it is possible to also preserve the value of the packaged product for a longer time, admitting more far-reaching sales and/or higher sale prices. A perfect packaging concept should adequately respond to the need of protecting and preserving appearance, texture and flavor, as those attributes are part of the customers' purchase evaluation process.

As FAPs freshness rapidly decrease even if stored under chilled condition, and normal packaging methods still admits the action of oxygen accelerating the spoilage of the product, R&D in past

decades focused on alternative packaging techniques which could avoid this issue and resulted with some improved packaging concepts that will be here explained more in detail.

- **Vacuum Packaging**: Considering the oxygen one of the most dangerous enemies of easily spoilable foods, the control of its level is very important in order to limit deteriorative and spoilage reactions. A quite diffused way to obtain this result is the complete removal of the air contained in the pack, resulting in a completely vacuum –and sealed- pack. With this oxygen control system, oxidation and microbes are constrained within acceptable levels and the product's deterioration rate is limited. Direct effect of vacuum packaging system is to generally double the expected shelf-life of the products it contains. This is particularly effective with regards to fatty fish, where the oxidation of the fats rapidly become source of unpleasant odors. From the logistic point of view, a secondary benefit is the reduced volume of the bulk packs requested by vacuum packaging. This helps to limit transportation and stocking costs. Well known disadvantages are the unsuitability for sensitive crispy products (or products with sharp edges), the fact of being a capital-intensive practice and, from the safety side, the inducted anaerobic condition that may trigger the production of *Clostridium Botulinum* and *Listeria Monocyogenes*. Nowadays this packaging methodology is widely adopted, known and accepted in the markets.
- **MAP (Modified Atmosphere Packaging**): Experimented with FAPs for the first time in the 1930s, it became widely diffused only in the past decades. As for the vacuum packaging, the main objective of MAP is to protect the food from the natural spoilage process mainly caused by oxygen and it is fulfilled by *altering the normal composition of air […] to provide an optimum atmosphere for increasing the storage length and quality of food* (Mohan et al., 2019). The protective atmosphere is generally composed by a mix of Co2, O2 and N2. Its exact composition has to be experimented and calibrated basing on the very specific product to protect, but common mixes are 60% CO2 and 40% N2 for fatty fishes and 40% CO2, 30% O2 and 30% N2 for lean variety fishes (Mohan et al., 2019). MAP's use presents many positive effects: from the organoleptic point of view it preserves the original form, the texture of the product and its color without the need of using other preserving agents (often chemicals). If correctly stored (should be stocked at lower temperatures than normal packaging), this system can extend the shelf-life two-threefold, admitting commercialization even on distant markets. On the negative side this methodology has two critical issues: costs and logistics. Its application is costly and capital-intensive as it requires specific and expensive machines at the beginning of the production and further continuous costs for the gases. Moreover, typically a MAP deployment involves boxes with bigger volume, hereby affecting transportation and other logistic operations in terms of further costs and other efforts (wharehouse dimension, staff required, etcetera). An effective MAP deployment includes an accurate supplementary

control of cold-chain maintenance, with particular attention on avoiding temperature fluctuations, which can eliminate the beneficial effects of CO2 (Mohan et al., 2019).

- **Smart Packaging Technologies:** A third packaging option is the application of smart packaging technologies, a category that comprehend two sub-classes: Active Packaging and Intelligent Packaging. Its use is increasingly growing as it is its market acceptance. Some of them are only in development stage as R&D on this field is very active. Different combinations of Active packaging systems or Intelligent packaging can be jointly applied on the same box to obtain a more effective result. Active packaging mainly aimed at protection, transforms the packaging into more than an inert barrier between the product and the external conditions. The general concept is to insert into the packaging film (or with an internal sachet/sticker or, more recently, directly incorporated into the material) additives who can scavenge or emit particular gasses from the inside to the outside of the box. In this way it's possible to obtain a packaging system able to change and maintain the most desiderate conditions of the product for as long as possible. Intelligent Packaging answers to the consumers' (but also the retailers' and the manufacturers') need of information about the product's conservation. Intelligent packaging in fact continuously *monitors the condition of the products during transport and storage* by returning indicators as temperature, pack integrity, overall freshness or microbial growth (Mohan et al., 2019). A typical intelligent packaging system is the time-temperature indicator, signaling by mechanical deformation, color change or other ways if and for how long the product has been exposed to dangerously high temperatures. In other words, it can serve as a guarantee of a correct cold-chain deployment. Another common intelligent packaging concept is the freshness indicator, providing quality information by detecting volatile metabolites produced during the food spoilage process, such as CO2, diacetyl, ammonia or hydrogen sulphide.

2.6.3 SUSTAINABILITY AND ECO-INNOVATIONS

General interest of the society upon sustainability and sustainable food production and consumption greatly rose in the past decades. Along with this interest, how to preserve for the next generations the possibility to inherit sea resources became in recent years a commonly discussed topic, from television programs to academic debate. This concern has also been inserted into the United Nations' agenda as the Sustainable Development Goal 14: *the conservation and sustainably use of the oceans, seas and marine resources for sustainable development*[3].

3 Department of Economic and Social Affairs Sustainable Development SDG Goal 14 available at https://sdgs.un.org/goals/goal14

Regarding FAPs, the noticeable increase experienced in demand (driven mostly by higher wages and a larger population) and in the offer (driven by higher capture operation's efficiency and other technological improvements) directly participated to the overfishing phenomenon, a process that can lead to the exhaustion of some natural fish species' stock within years. Moreover, on 2020 the FAO declared the 34,2% of global fisheries exploited *beyond sustainable limits* (FAO, 2020). This last data from FAO is even more optimistic than other scientific studies: Sovacool (2009) claims that the 70% of the global fisheries is beyond their sustainable limit, while Kalfagianni and Pattberg (2013) indicate this level near the 80%.

With those levels of environmental pressure exercised by fishing activities, it is a commonly recognized fact that acting as soon as possible and as strongly as possible is a matter of necessity. The aforementioned changes in demand and offer in fact had their major disruptive application during the '60s and the 80's (i.e., freezer trawlers, mechanized purse seine vessels, sonars). Direct effect of those "productive" innovation has been a steady growth of the catches and the environmental pressure, to the extent that FAO dates back at the late '80s the point when fishing was not anymore able to sustain uncontrolled development (Hollingsworth, 2017).

As the matter of sustainability is not relegable to a single dimension, the challenges facing a new development model include scientific, economic, legal, social, political and technological approaches (Hollingsworth, 2017). Having this in mind, even compiling an unambiguous definition of sustainability for fish stocks may be very difficult. For the sake of this deliverable, Hollingsworth's consideration (2018) will be followed, stating that from the consumer point of view he most adherent definition is the one made by UK's department for Environment, Food and Rural Affairs (2011): *Sustainably sourced fish is key to ensuring that stocks do not decline to dangerously low levels and that the ecosystem upon which the fishery depends is maintained. Fish species, fishing method and location of fishing all contribute to whether a fish is from sustainable stock.*

This trend caused and motivated the emergence of the figure of the ethical consumer: a consumer who feels responsibility towards the society and perceives a direct link between what is consumed and the social issue itself (Verbeke et al., 2007).

From the producers' perspective, this emergency in the wild fish industry reflected into the need to intercept this new kind of demand and attention with a faster adoption and a more scientific use of *eco-innovations*. As commonly happens to new concepts, the literature doesn't present a univocal definition of eco-innovation. The OECD defined it as: "*a positive contribution that industry can make to sustainable development and a competitive economy*"[4]. Shared

4 Sustainable Manufacturing and Eco-Innovation, Synthesis Report. Framework, Practices and Measurement. OECD 2009

characteristic of eco-innovations' definitions is also the *explicit emphasis* on the environmental impact's reduction, whether the spillover effect is intentional or not. With a broader meaning, we could accept the definition formulated by the European Commission, which stated that an eco-innovation is *"any innovation that makes progress towards the goal of sustainable development by reducing impacts on the environment, increasing resilience to environmental pressures or using natural resources more efficiently and responsibly"*[5].

Due to the positive effects on environment and economic indicators, the European Commission expressly named eco-innovations as part of its strategy to reach a sustainable growth model. In this perspective in 2011 an Eco-Innovation Action Plan (EcoAP) has been established by the European Commission as a core component of the Europe 2020 Strategy, hoping to accelerate the eco-innovation's market uptake[6].

Basing on the existent literature, the wide concept of eco-innovations has three dimensions to be analyzed and categorized on: the target (main focus), the mechanism (how it provokes changes in the target) and its impact (how it effects the environmental conditions)[7].

Considering the fish market in its whole, the main power of eco-innovations is to be able to act beyond their direct effects. It is in fact commonly accepted that *environmental practices* are part of a "blue ocean practice" as they can create a comparative advantage from the competitors inasmuch as they permit a visible differentiation from the challengers, a higher product quality and a stronger "green" brand building (Pilla et al., 2019). Moreover, in case firsts eco-innovations are diffused in the market and well-accepted by customers, Spence (2011) proved the existence of a spillover effect that pushes the other firms to adopt the prevalent standard solutions, in a mimetic isomorphism process.

The fact of sustainability being a credence attribute makes very difficult even for ethic consumers to really understand what's in their dish and the real effects of their food choices on the environment. Eco-innovations can be in this sense a way for producers to signal to the customers (and to the whole market) their attention to the issue.

2.6.4 ORIGIN AND EU QUALITY SCHEMES: GEOGRAPHICAL INDICATIONS AND TRADITIONAL SPECIALITIES

The perceived importance of the origin of the fish has already been explained sooner in this deliverable. European fish consumers generally do prefer marine products originated as closer as possible to them. In this sense, the previously reported survey from Eurobarometer signals

5 Decision N° 1639/2006/EC establishing a Competitiveness and Innovation Framework Programme
6 https://ec.europa.eu/environment/ecoap/about-action-plan/objectives-methodology
7 Sustainable Manufacturing and Eco-Innovation, Synthesis Report. Framework, Practices and Measurement. OECD 2009. Pag.6

the presence of a strong preference for the fish coming from the consumer's own region, followed by their country and lastly by FAPs originated in the European Union.

In order to pander this consumers' preference, the European Union implemented a Quality Scheme for the seafood sector able to guarantee the product's quality and its perception, creating from guaranteed origin fish products a market niche in rapid development. Different indication labels are enclosed in this framework: Protected Designations of Origin (PDOs), Protected Geographical Indications (PGIs) and Traditional Specialities Guaranteed (TSGs, the only one referring to traditional aspects).

The main aspect of a Quality Scheme is to provide information about quality to the customers (Cei et al., 2018). From the producer perspective, reducing the information asymmetry allows to ask for a premium price if compared with standard products (computable as standard price plus the Willingness to Pay for guaranteed origin product). For the consumers, the presence of the Geographical Indication guarantees the consistency of attributes and characteristics' claims that cannot be assessed before (or even after) the consumption. In this way it's possible to address the customer perception of the product in the direction of the real actual properties. The number of products accepted within the framework notably increased in the last ten years, passing from the 21 in 2010 to 53 in 2020, a noticeable growth that signals an increasing interest from producers in the framework. Up to now, amid all the certified denominations, just over the half (58%) are referred to final products derived by wild catch, while the rest is from farmed products. The species most covered by the Quality Scheme, in decreasing number of denominations, are Carp (registered by Germany, Czech Republic and Poland), Mussel (France, Italy, Spain and UK), Salmon (four deposited products in UK and one in Ireland) and then Anchovy, Oyster, Cod and Tuna. In terms of economic relevance this niche accounted about the 4% of the total European seafood sector during 2017, with 246.709 tons of FAPs (worth 1,42 Billion €). Most of those products were destined to the internal market, in fact the 62% of the value has been consumed in the country of catch/production. Despite this, a relevant share was intended to be exported as the 28% has been exchanged in intra-European trades, while the 10% of the total has been exported outside the European Union (Eumofa, 2020).

In order to show the protected mark on their products, producers should undergo a process of conformity certification in collaboration with an authorized control body. If the process is passed, the product become protected from any direct or indirect commercial use of the name, any misuse, imitation or reminder, or any other practice that may mislead the consumers about the product[8].

8 Prizefish report 4.2.2. pag.8

3 AIMS AND SCOPE

The main objective of this deliverable is the exploration of the appreciation showed by customers regarding relevant attributes of seafood, such as *Quality, Sustainability* and *Local Production*. This is going to be investigated both for traditional and eco-innovative products, searching for discrepancies and peculiarities.

In order to successfully develop this primary aim, the following aspects will be assessed:

1. Understanding the general consumer attitude towards seafood, the main drivers dragging the consumer behavior and the main barriers to seafood consumption in social and psychological terms.
2. Understanding the reaction of consumers on the specific new proposed eco-products, in terms of willingness to buy (interest on the product) and willingness to pay (interest on the commercial proposal).
3. Understanding the perceived importance of ecologic/sustainable choices inside fishery supply chain by consumers (fishing techniques, certifications…)

This deliverable will consider two main consumer analyses:

a. After an exploratory analysis conducted on CROFISH fair visitors in Split (Croatia) in 2019, a **qualitative analysis of three online discussion rooms**, respectively in Croatia, Italy and Spain was carried out;
b. A quantitative analysis was conducted through Computer Assisted Web Interviews (CAWI) methodology on a panel of representative customers in Croatia, Italy and Spain.

The online discussion rooms and web-based survey's analysis provided useful feedback for the **development of three new eco-innovative products**. Those concepts have been built through a collaborative evaluation process within PRIZEFISH partners, including universities and producers.

All the product concepts share the need to deliver longer shelf-lives in order to add quality and value to the products, they involve species that have been declared or are considered suitable for sustainable exploiting and deliver ready-to-cook or ready-to-eat products with the intention of meeting the growing demand of this market niche.

After a first testing period on different ingredients composition, the **three final product concepts** have been defined as follows (Table 1):

Table 1 - Description of the 3 eco-innovative seafood products

Product Concept	Main specifications	Key innovative aspect
Product concept 1 **Sardine Fillets** 	Presented on trays with transparent film of 200g each (2-3 portions). Protected by an innovative Modified Atmosphere Packaging (MAP) which consists in the reduction of Oxigen level in the packaging and its consequent substitution with Argon or NO2. By reducing oxidation reactions and microbiological spoilage, it can be conserved 4 days more than the conventional packaging systems (up to 12 days) without any loss on organoleptic characteristics or food safety.	The key innovative element of the product is the long-lasting aspect, along with the convenience (no cooking skills needed for the cleaning operations).
Product concept 2 **Clams** 	Presented on trays with transparent film of 500g each (2-3 portions), this product concept is processed with a High Hydrostatic Pressure (HHP). If correctly conserved within 1° and 4°C, their shelf-life is extended from about 6 days of a conventional product, up to 2-3 weeks (at least +100%), with stable quality characteristics.	The key element of this product is the long-lasting aspect while still being a fresh product.
Product concept 3: **Fish burger** 	Presented on trays with transparent film of 500g each (2-3 portions), this product concept is processed with a High Hydrostatic Pressure (HHP). Thanks to the conservation technologies applied which keeps the temperature between 1 and 4 °C, the shelf-life is extended from about 5 days of a conventional product up to 30 days, with stable quality characteristics (i.e., microbiological aspects, color, etc.).	The key elements of this product are the product innovation (possible to eat it raw and mixed combinations of ingredients, e.g., mullet-crustaceans burger) and the long-lasting aspect.

4 QUALITATIVE CONSUMER ANALYSIS IN CROATIA, ITALY AND SPAIN

A qualitative analysis has been conducted to explore consumers' attitudes towards eco-innovative seafood products. The aim of this analysis is first to understand consumers' acceptance and initial appreciation concerning specific attributes (i.e., quality, freshness, sustainability) of traditional and eco-innovative seafood, and then to explore possible strategic marketing options for eco-labelled products.

4.1 DATA AND METHODS

Data collection has been carried out through three online discussion rooms addressed respectively to Italian and Spanish audiences, managed by the Toluna platform, and to Croatian audiences managed by Agrarno Savjetovanje Doo, an agricultural consultancy agency based in Zagreb.

The three discussion rooms have been animated in 7 different days on 16 specific topics.

Table 2 Topics of the discussion rooms

Topic number	Topic name	Day
1	Sea fish	1
2	It's time to cook	
3	"Sustainable" fish	
4	Certifications	
5	Certification MSC	
6	Certification ARFM	
7	Product 1 - first impressions	2
8	Product 1-additional questions	
9	Product 2 - first impressions	
10	Product 2- additional questions	3
11	Product 3 - first impressions	
12	Product 3 - additional questions	
13	Product 1 attributes scoring	5-7
14	Product 2 attributes scoring	
15	Product 3 attributes scoring	
16	Other suggestions, ideas, opinions	

Discussion of day 1 was focused on the concept of sea fish and participants' dietary habits, cooking habits, fish sustainability and related perceptions, and last but not least on the topic of certifications, in general, as well as on two specific certifications: Certification MSC, Marine Stewardhip Council and Certification ARFM, Adriatic Responsible Fisheries Management.

On days 2 and 3, participants discussed on three proposed eco-innovative products:

(i) **Product 1: Sardine fillets**, packaged in MAP protective atmosphere
(ii) **Product 2: Clams**, subjected to treatment with high hydrostatic pressures (HHP)
(iii) **Product 3: Fish Burgers**, with enhanced shelf life and quality and subjected to treatment with high hydrostatic pressures (HHP).

Day 4 was, instead, dedicated to the preliminary analysis of the first impressions on the topics discussed on the first three days.

Finally, on days 5-7, a questionnaire was submitted to the participants with the aim of evaluating attributes related to the products- such as origin, conservation, price, presentation etc.- on a scale of 9 (1 disagree - 9 completely agree).

We created three separated data collections for each country of interest, in Italy, Spain and Croatia. In Italy a total of 65 people has been registered in the discussion rooms, precisely 38 participants coming from the coast and 27 from the inland. In Spain, the rate of participation has been slightly higher with a final sample of 79 participants, divided between 28 respondents from the coast and 51 from the inland. Finally, in Croatia a total of 47 people participated in the discussion rooms, of which 21 were from the coast and 26 respondents were counted from the inland.

Table 3 Datasets of the discussion rooms in Italy, Spain and Croatia

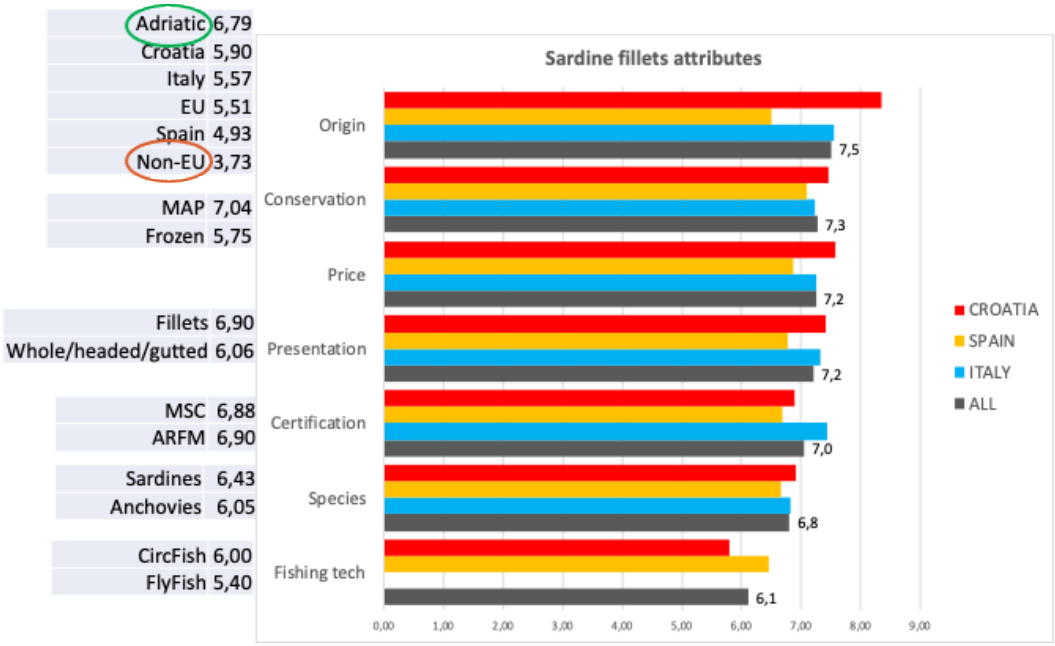
Dataset	Country	Total participants	Inland	On the coast
D1	Italy	65	27	38
D2	Spain	79	51	28
D3	Croatia	47	26	21

4.2 PRODUCT ATTRIBUTES SCORING RESULTS

As previously stated, the last days of discussion rooms were dedicated to collect information on attributes participants usually focus on when they choose a seafood product. Respondents had to evaluate a list of product attributes indicating how much they agree with a series of statements on a score from 1 (disagree) to 9 (completely agree). This scoring test has been repeated three times, once for sardines, once for clams and finally once for burgers.

Overall, based on Figure 6,7,8 below, it seems that in all three countries and for all the three products the attribute which received the highest score is **origin**. This means that all respondents (especially Croatian participants) agree that origin is the most relevant attribute when it comes to choose products like sardines, clams or burgers.

Figure 5 Sardine fillets scoring test results



However, some interesting differences based on the type of product have emerged. When it comes to sardines and burgers, participants seem to assign the second highest score to **conservation** while the attribute of **presentation** results to be particularly important when choosing clams.

Figure 6 Clams scoring test results

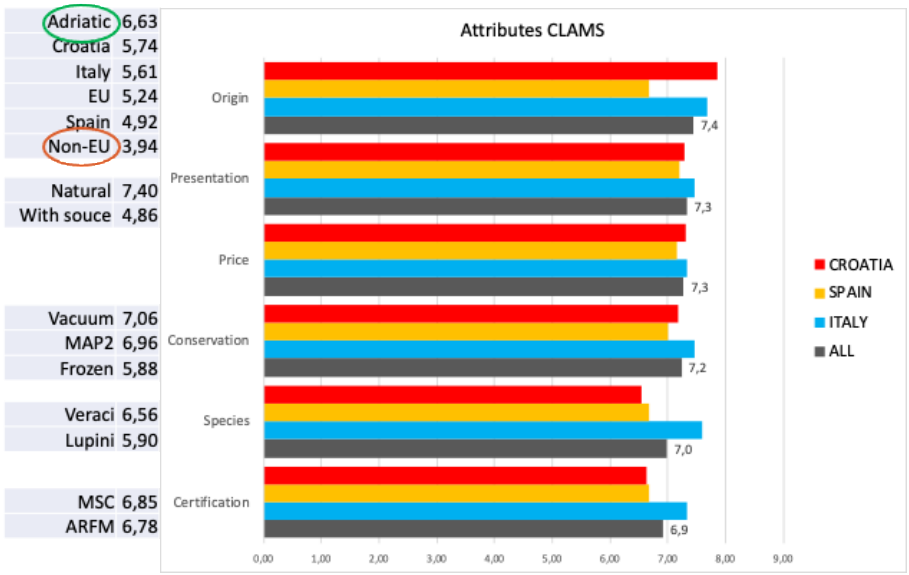
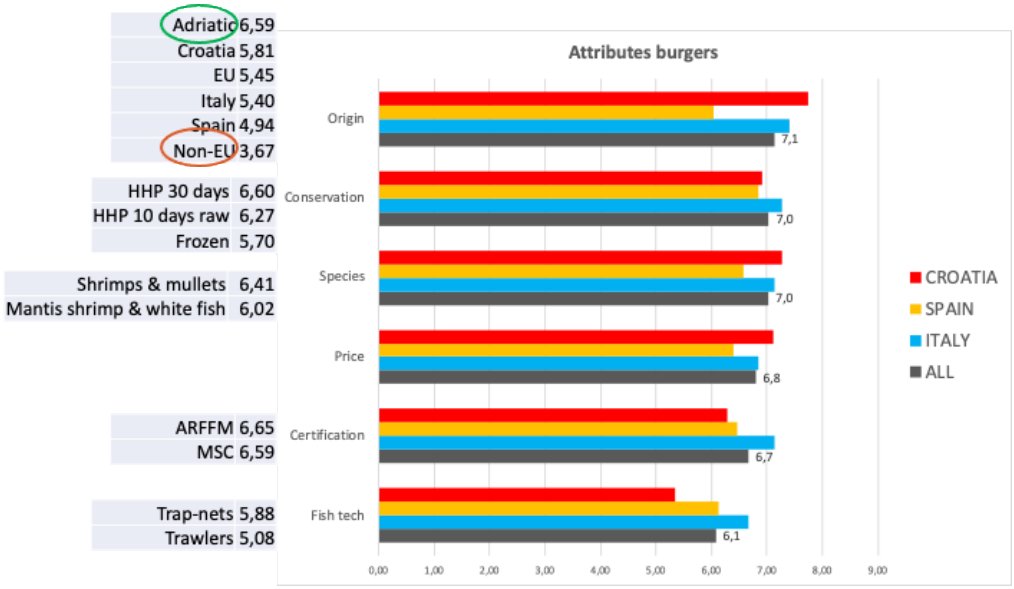


Figure 7 Burgers scoring test results



4.3 SENTIMENT ANALYSIS

Participants expressed their views and opinions on all the previously presented topics throughout the 5 days of Online discussion rooms. In the present research, sentiment analysis of participants' impressions and comments has been studied in context of Italy, Spain and Croatia, both inland and on the coast. Analysis has been done using R software and its associated library, the NRC Emotion Lexicon.

In the literature, sentiment analysis has been used to study people's sentiments, opinions, attitudes, and emotions towards services and products (D'Andrea, A. et al., 2015).

After collecting data from online discussion rooms, text preparation has been done. This consisted in cleaning the extracted data before analysis, specifically, contents that were irrelevant for the analysis were identified and eliminated. Then, sentiment detection could start and the extracted sentences of the opinions were examined and classified in positive, negative, or neutral according to a score range indicating how negative or positive the text analyzed is. In this study, the default values have been kept: anything below a score of -0.25 is tagged as negative and anything above +0.25 is tagged as positive, anything in between is neutral.

When the analysis is finished, the text results have been displayed on graphs with words count and sentiment averages in between countries comparisons as well as within country comparisons (inland vs coast) for the three eco-innovative products, certifications in general, certification MSC and certification ARFM.

In the last step of the analysis, an emotions analysis has been carried out.

The associated library on which the analysis is built on is a list of English words and their associations with two sentiments (negative and positive) and eight basic emotions (anger, fear, anticipation, trust, surprise, sadness, joy, and disgust) (D'Andrea, A. et al., 2015; Plutchik, 2001).

The output from the emotions analysis shows how many occurrences of words associated with that particular emotion exist in that line of the text. The text results have been again displayed on graphs for each country (inland vs coast) first for the three eco-innovative products, and then for certifications in general, certification MSC and certification ARFM.

4.4 CHAT OVERVIEW

In Table 4, we supply the first outcomes of the analysis— such as word count— for the main topics listed above.

Among the three products, the one which seems to have created more discussion around is Fish burgers with 56820 words counted in total. Specifically, discussion rooms in Spain seem to be the more animated ones for what concerns all the three products under investigations. This is probably due to the high level of fish consumption in this Mediterranean country. On the other hand, Croatia appears to be the country where discussion rooms about these concepts were less animated. For what concerns the products, clams are the ones which drew less attention with only 3789 counted words. An explanation could be found on the lower clams' market share registered in Croatia compared to the Italian and Spanish markets.

Finally, the concepts around certifications do not seem to have created a high level of discussion around participants. Specifically, Certification ARFM registered the lowest level of discussion in Spain. This is probably because by being a certification on Adriatic Responsible Fisheries Management (ARFM), it does not regard directly the Spanish fishery sector.

Table 4 Word count of main topics from sentiment analysis

Topic	**Countries**			
	ES	HR	IT	Total
Fish Burgers (Topics 11;12)	45803	5106	5911	56820
Sardines (Topics 7;8)	8229	5245	6607	20081
Clams (Topics 9;10)	7763	3789	6153	17705
Certification (Topic 4)	1886	2905	2339	7130
Certification - MSC (Topic 5)	2239	2217	2414	6870
Certification - ARFM (Topic 6)	1755	2082	2032	5869

4.5 PRODUCT CONCEPTS ANALYSIS

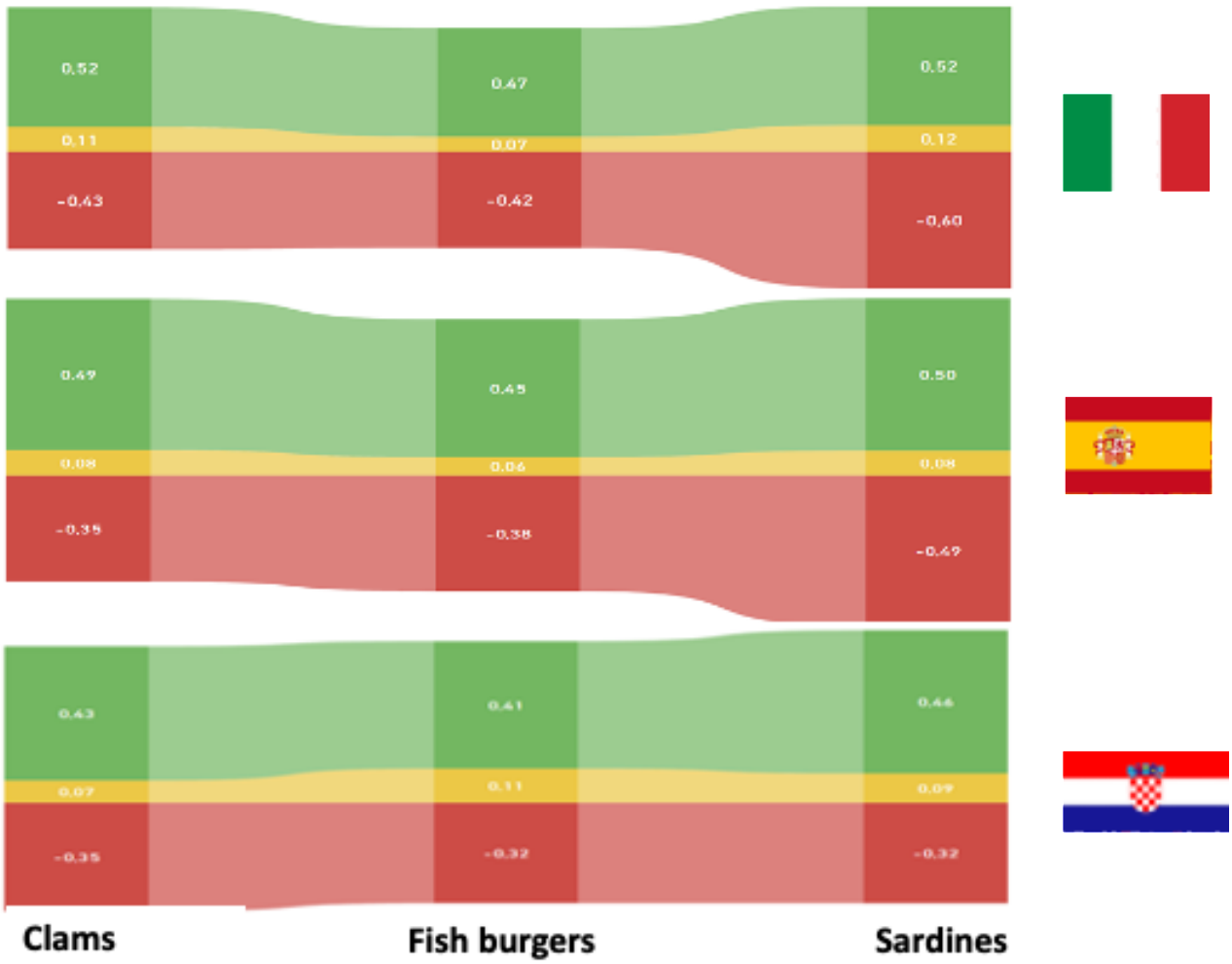
A sentiment analysis has been carried out for all the three eco-innovative products in all the countries under investigations, first at the country level and then separately for each country also at the inland and coast levels. Then, for the same selected topics an emotion analysis will follow for each country on the coast and inland.

Additional sentiment analysis results for the product concepts can be found in the Annex 1 of this report.

4.5.1 TOPICS #7/8, #9/10 AND #11/12 - PRODUCT CONCEPTS

Figure 9 illustrates the results for positive, negative or neutral sentiments on words associated with clams, fish burgers and sardines. Overall, across all the three countries, the predominant sentiment associated with these products seems to be positive. However, in Italy, sardines appear to have a more negative sentiment (-0.60) compared to the same product in Spain (-0.49) and Croatia (-0.32).

Figure 8 ITALY, SPAIN, CROATIA– PRODUCTS



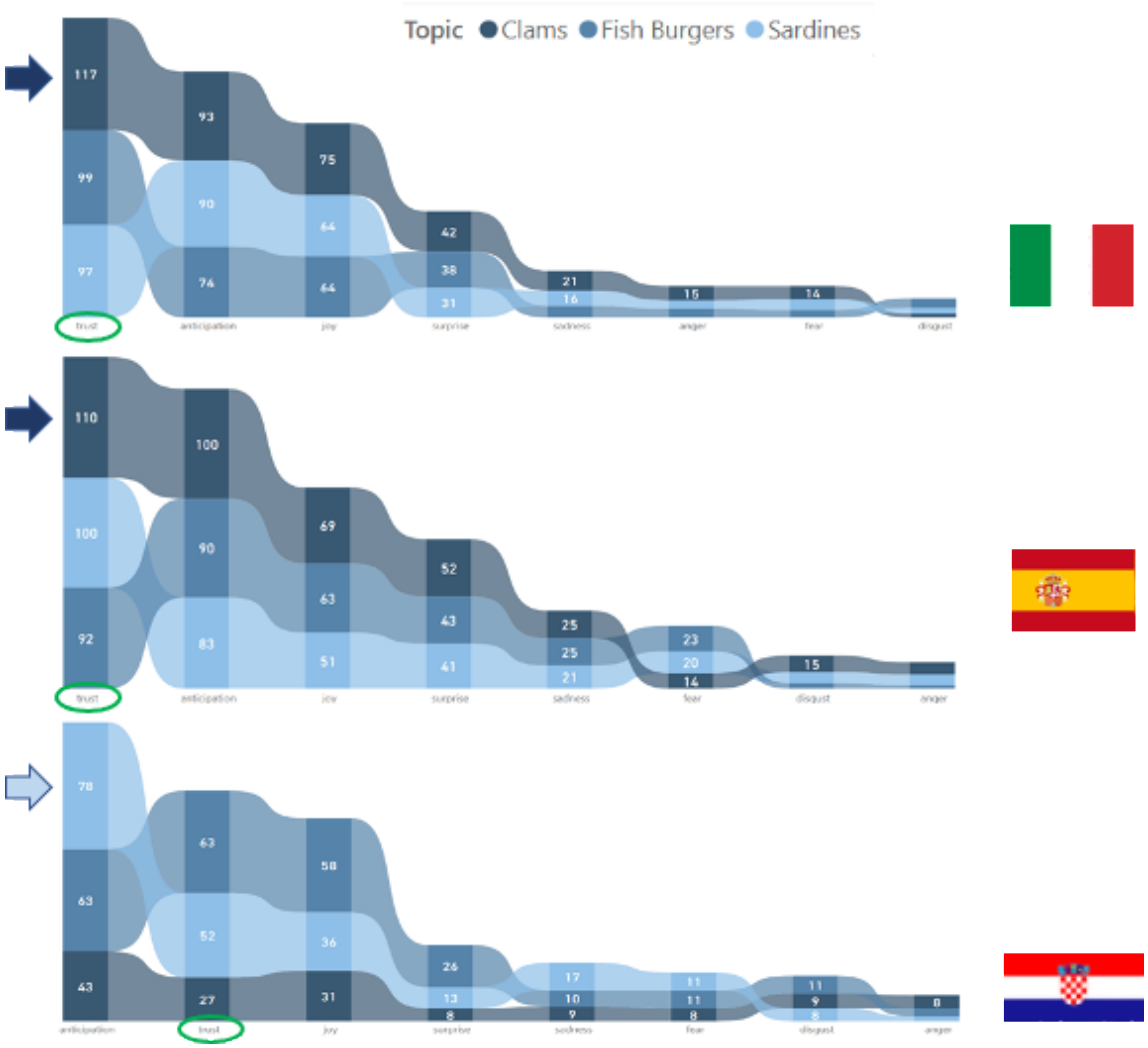
Positive, negative or neutral sentiments on the product concepts have also been investigated at the inland level. A positive sentiment result associated with clams has been registered in all three countries with no negative associations neither in Italy nor in Spain. However, in inland Italy a strong negative sentiment has been registered for both fish burgers (-0.65) and sardines (-0.60).

The same analysis has been conducted at the coast level too. Differently, on the coast, sardines seem the product with more positive connotations especially in Italy and Croatia while in Spain the sentiment score associated with this product seems to be simultaneously positive (0.50) and negative (-0.52).

4.5.2 TOPICS #7/8, #9/10 AND #11/12 PRODUCT CONCEPTS: EMOTION ANALYSIS

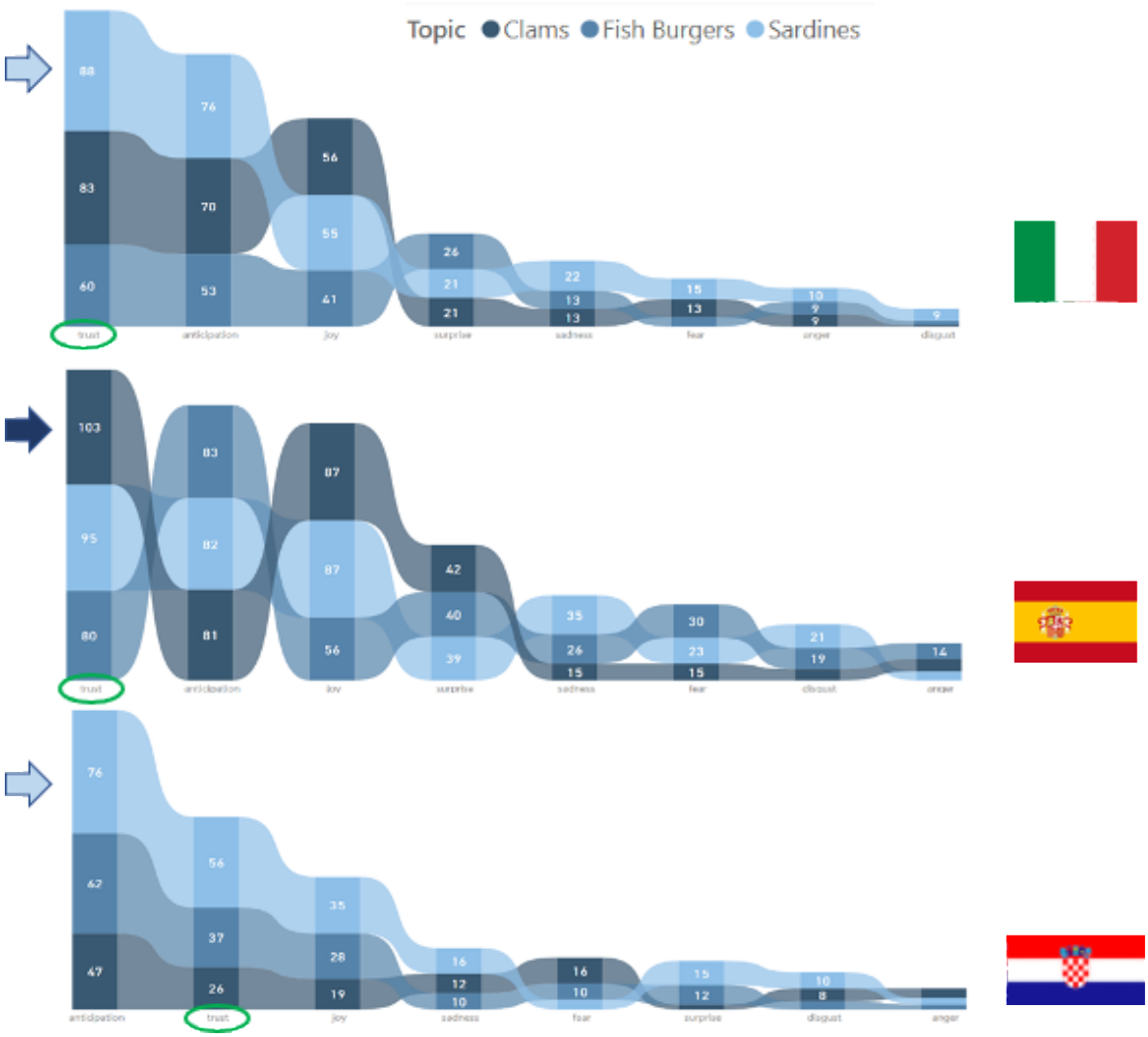
In the discussion rooms, people mainly expressed positive emotions. Specifically, trust, anticipation and joy seem to be the three most recurrent emotions for all three product concepts in all three countries at the coast level. Italian and Spanish respondents appear to trust clams more than people in Croatia who expressed little level of trust and joy related to this product (Figure 10). In Croatia, instead, the highest level of emotion has been found in anticipation with regards to sardines, similarly to Spain where people mostly expressed emotions of trust (110 counted words) and anticipation (100 words) in regards to this product.

Figure 9 ITALY, SPAIN, CROATIA, EMOTION COUNTS - COAST



Similarly, inland participants mainly expressed positive emotions. In all three countries, respondents tend to trust more the product of sardines, especially in Spain with 103 and in Italy with 88 counted words (compared to 56 in Croatia) associated with this emotion (Figure 11).

Figure 10 ITALY, SPAIN, CROATIA – EMOTION COUNTS - INLAND



27

KEY FINDINGS:
Overall, results from the sentiment analysis demonstrated that **positive** connotations are associated with almost all the three proposed eco-innovative products in all the three countries. This has been confirmed also by the emotion classification where the three most registered emotions were **trust, anticipation and joy** among all countries.
Specifically, **sardines** have been the most **positively accepted** product by **Italian and Spanish** respondents, with associated emotions like **trust** and anticipation both on the coast and inland.

4.6 CERTIFICATIONS ANALYSIS

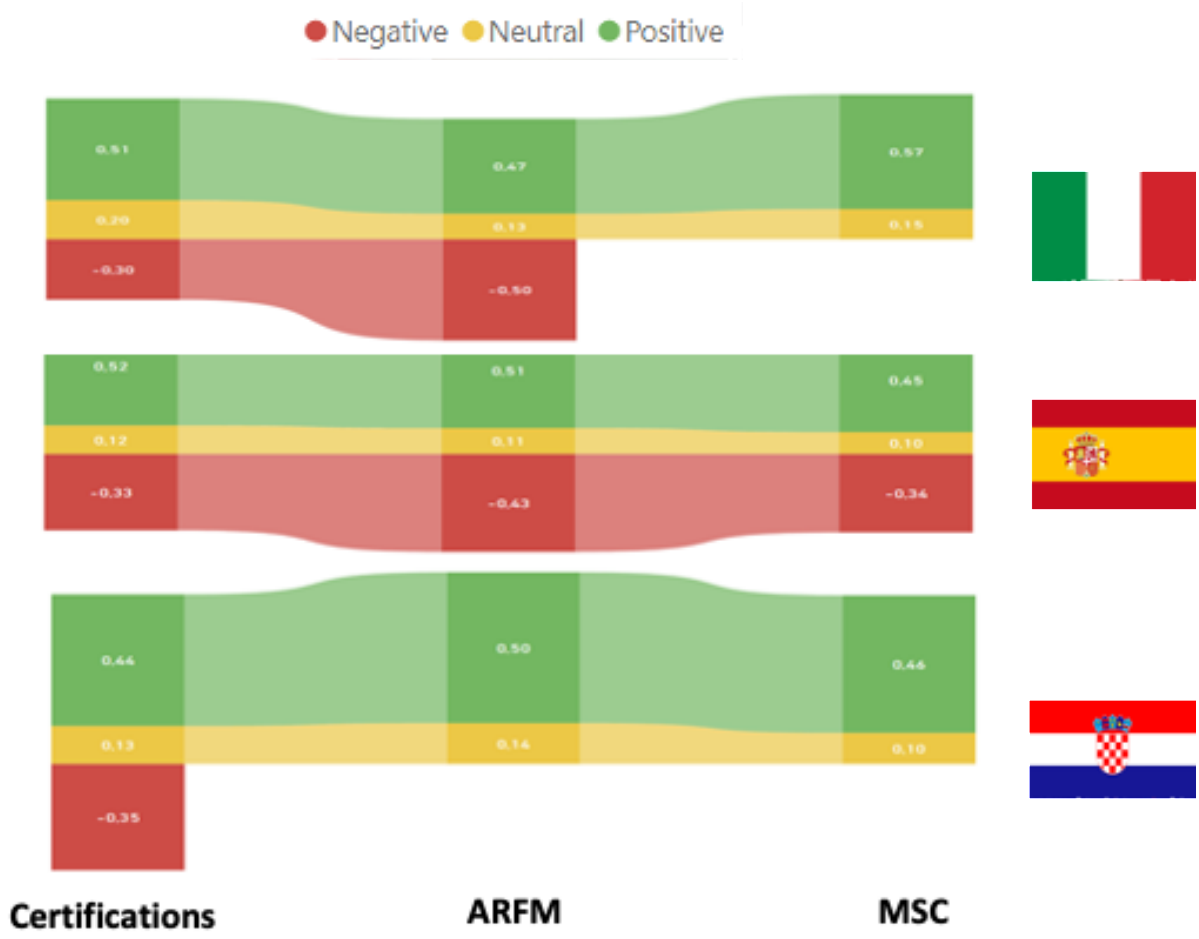
A sentiment analysis has also been carried out for the topics on certifications, certification MSC and certification ARFM in all the countries under investigations, first at the country level and then separately for each country also at the inland and coast levels. Then, for the same selected topics an emotion analysis will follow for each country on the coast and inland.

Additional sentiment analysis results for certifications can be found in the Annex 2 of this report.

4.6.1 TOPICS #4, #5 AND #6 – CERTIFICATIONS

Overall, respondents from all the three countries seem to have a positive sentiment towards the topic of certifications. However, in Italy it has been registered a negative sentiment (-0.50) in regards to certification ARFM while for certification MSC a positive score of +0.57 has been calculated (Figure 12). On the other hand, in Spain both types of certifications received a positive score as well as in Croatia where no negative score has been registered for neither of the two certifications.

Figure 11 ITALY, SPAIN, CROATIA - CERTIFICATIONS



At the inland level, the topic on certifications registered positive scores in all countries, especially in Croatia where no topic on certification received a negative sentiment.

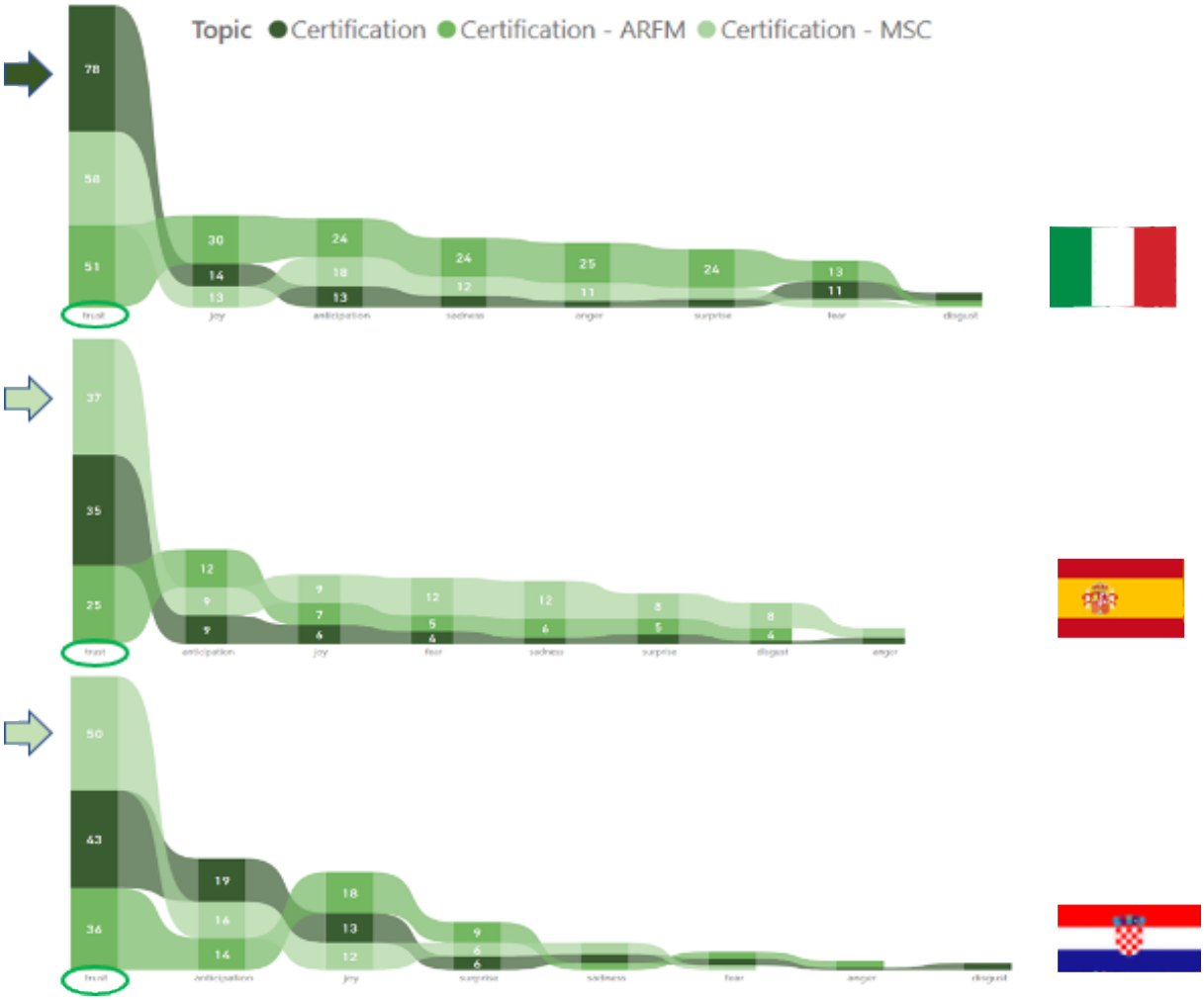
On the coast, only positive sentiment scores have been calculated for certification MSC in all the three countries (especially in Italy with +0.61). On the other hand, the highest positive score for certification ARFM has been found in Croatia, while for Italy and Spain the sentiment score associated with this certification seems to be simultaneously positive and negative.

4.6.2 TOPICS #4, #5 AND #6 – CERTIFICATIONS: EMOTION ANALYSIS

Results of the emotion analysis demonstrated that people mainly expressed positive emotions on all the three certification topics. Specifically, trust, anticipation and joy seem again to be the most recurrent emotions for all the certifications concepts in all three countries at the coast level.

Specifically, words related to the emotion of trust are the most counted in the text. Overall, people seem to trust fishery certifications, especially in Italy (78), followed by Croatia (43) and Spain (35). Among the two certifications, people seem to trust more certification MSC in all three countries of interest.

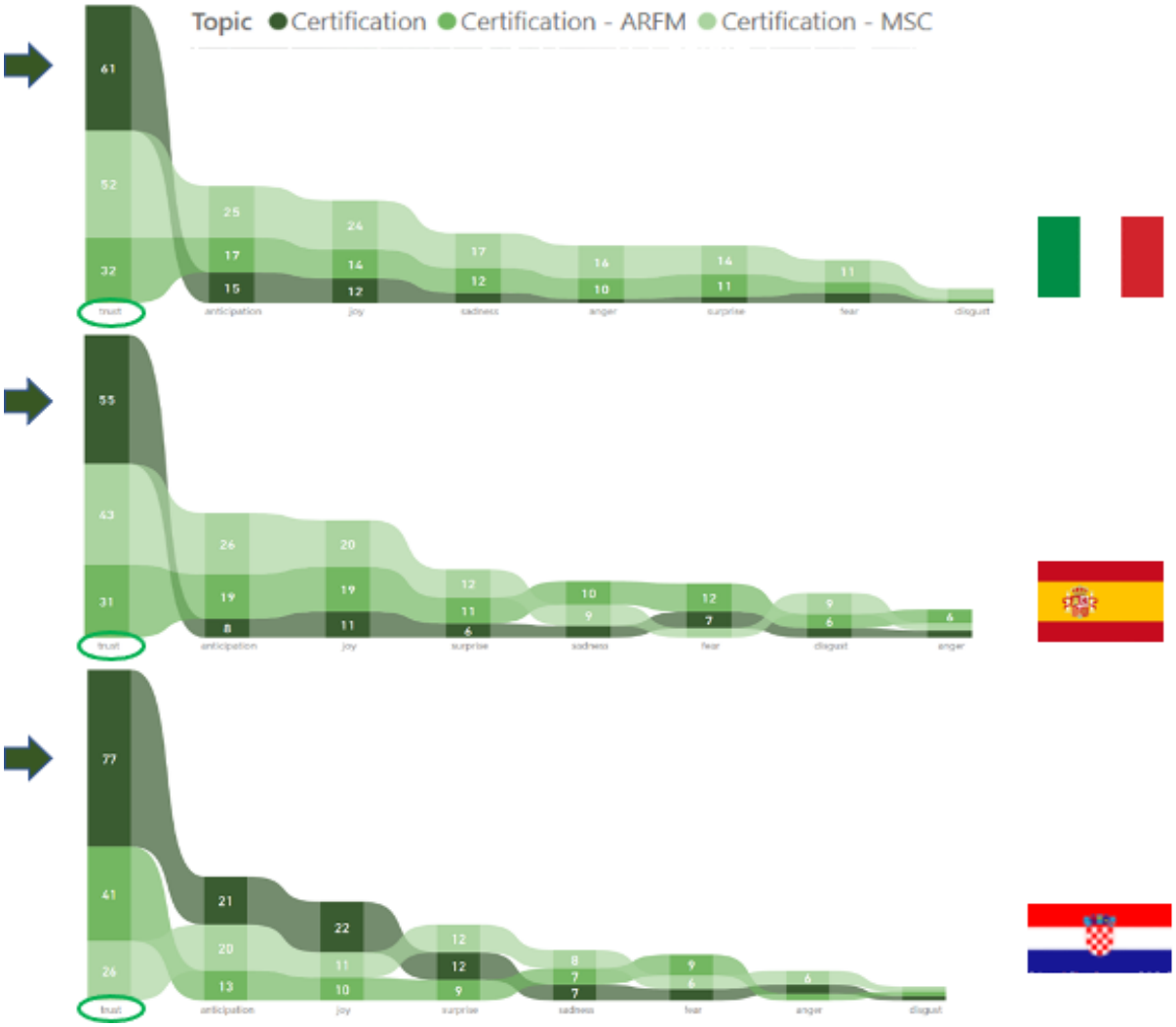
Figure 12 ITALY, SPAIN, CROATIA – EMOTION COUNTS – COAST



A similar trend can be seen for the emotion analysis at the inland level. Trust, anticipation and joy seem again to be the most recurrent emotions, specifically words related to trust are the most counted in the text. Differently from inland, on the coast the country with the highest number of counted words related to trust on certifications is Croatia (77), followed by Italy (66)

and Spain (55). Among the two certifications, people seem to trust more certification MSC in Italy and Spain while in Croatia respondents seem to have a higher level of trust for certification ARFM.

Figure 13 ITALY, SPAIN, CROATIA – EMOTION COUNTS – INLAND



KEY FINDINGS:

Overall, results from the sentiment analysis demonstrated that **positive** connotations are associated with almost all the three certification concepts in all the three countries. This has been confirmed also by the emotion analysis where the three most registered emotions were **trust, anticipation and joy.** Specifically, certification MSC has been associated with a more positive sentiment in all countries compared to the ARFM certification.

The most recurrent emotion related to the certifications topics was **trust** both on the coast and inland. Among the two certifications, people seem to trust more **certification MSC** in all three countries both at the coast and inland level with the exception of Croatia where respondents on the inland had a higher level of trust for certification ARFM.

5 QUANTITATIVE CONSUMER ANALYSIS (CAWI)

5.1 DATA AND METHODS

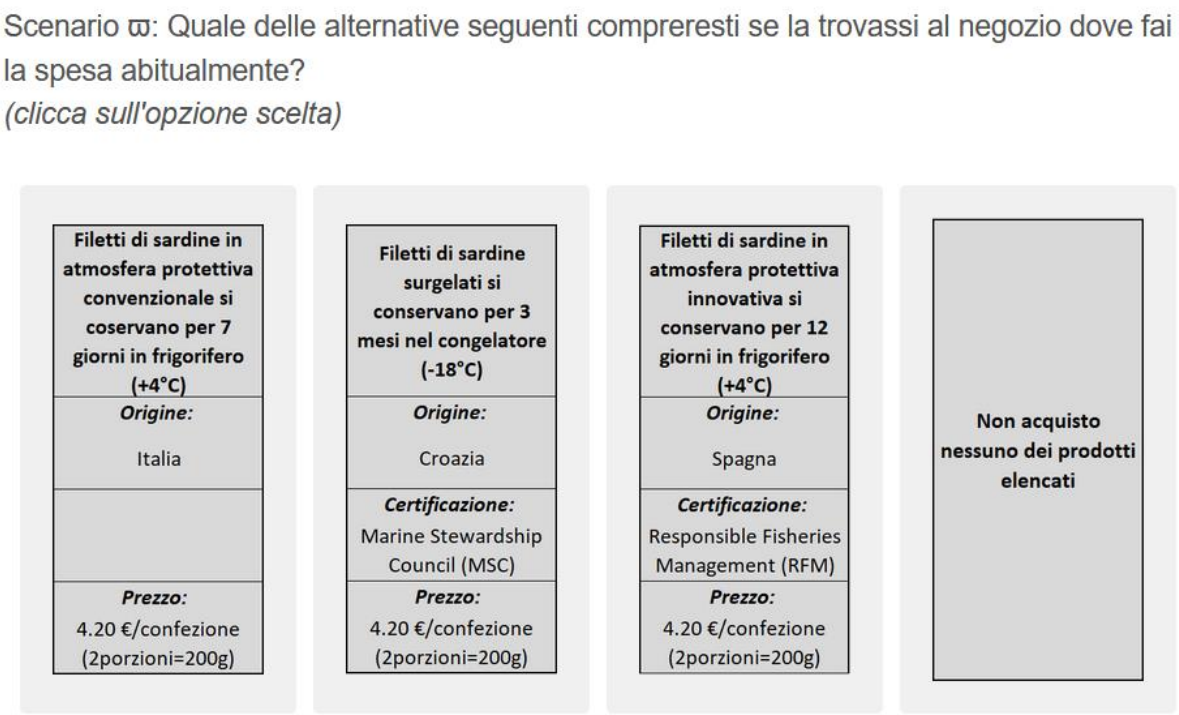
Data was collected online through Qualtrics. Participants were recruited in three countries, Croatia, Italy and Spain. We aimed to have a representative sample of the population in these countries. The questionnaires were translated in the official languages of the countries.

The questionnaire was organized in 3 parts. At first screening questions for fish products' consumption and purchase were presented and, in addition, another question asking participants if they were responsible for food purchase was included since the choice experiment foresees a purchase scenario. Moreover, if participants were consuming fish products less than once per month or never, they were excluded from the survey. Subsequently socio-demographic questions were presented in order to profile participants and to estimate the representativeness of the sample. The third part of the questionnaire was dedicated to the choice experiment task. Participants were presented with 9 choice scenarios where each of the scenario had 4 alternatives (an example is shown in the following Figure 15).

Prior to this, participants were explained the attributes and the levels of each attribute. They had to choose only one of the alternatives. It is important to highlight the fact that there were three products, sardines, clams and burgers and the levels of the attributes were different for each of them. Moreover, the price levels were different between the countries.

As seen before, one alternative is to choose a product with no certification, one with a product with the MSC certification, one with the RFM certification and the last alternative gives the possibility not to choose any of the aforementioned products (Figure 15).

Figure 14 Choice experiment- the four alternatives



Under this section, there is the need to explain why RFM certification has been chosen instead of ARFM certification, previously used in the qualitative analysis. This is because results of the discussion rooms proved that Spanish respondents were quite indifferent to ARFM certification, given that it refers specifically to the fishery areas of the Adriatic Sea. Thus, RFM enables to remove the geographic specificity of this certification.

The respondents were provided with the following information about the certifications proposed:

Table 5 Provided information on certifications

Type of certification	Description
Responsible Fisheries Management (RFM)	The RFM fishing standard is based on three key principles: • an efficient and adaptive management system, with clear sustainability objectives and which guarantees monitoring, control and surveillance of fishing activity; • availability of assessments of the status of the target resource and the ecosystem that hosts it, considering the specific impact of the fishing activity concerned; The fishing activity must be characterized by compliance with social and safety at work policies and with economic indicators that highlight profitable activities.
Marine Stewardship Council (MSC)	The MSC fishing standard is based on three key principles: • fishing must have a management system that leaves enough resources in the sea to ensure that the stock can reproduce and the fishing activity can thus continue over time; • fishing must be carried out with gear and in areas that minimize its impact, allowing habitats and marine animals to thrive; • fishing must be managed by administrations and companies responsibly and in compliance with applicable laws.
No certification	-

Subsequently, participants were asked about their purchase habits in order to understand the characteristics of the products they usually purchase. Finally, we applied three calibrated scales, convenience, green consumer value and innovativeness. The scales were utilized for creating a profile of the consumer and how it could affect their choices.

Data were analysed using R software. Descriptive analysis was conducted for understanding the data. Missing values and responses which were given too fast were excluded from the analysis. Multinomial logit model was applied for understanding consumers' preferences for sardines, clams and burgers.

5.2 SAMPLE DESCRIPTION AND MAIN PURCHASING HABITS

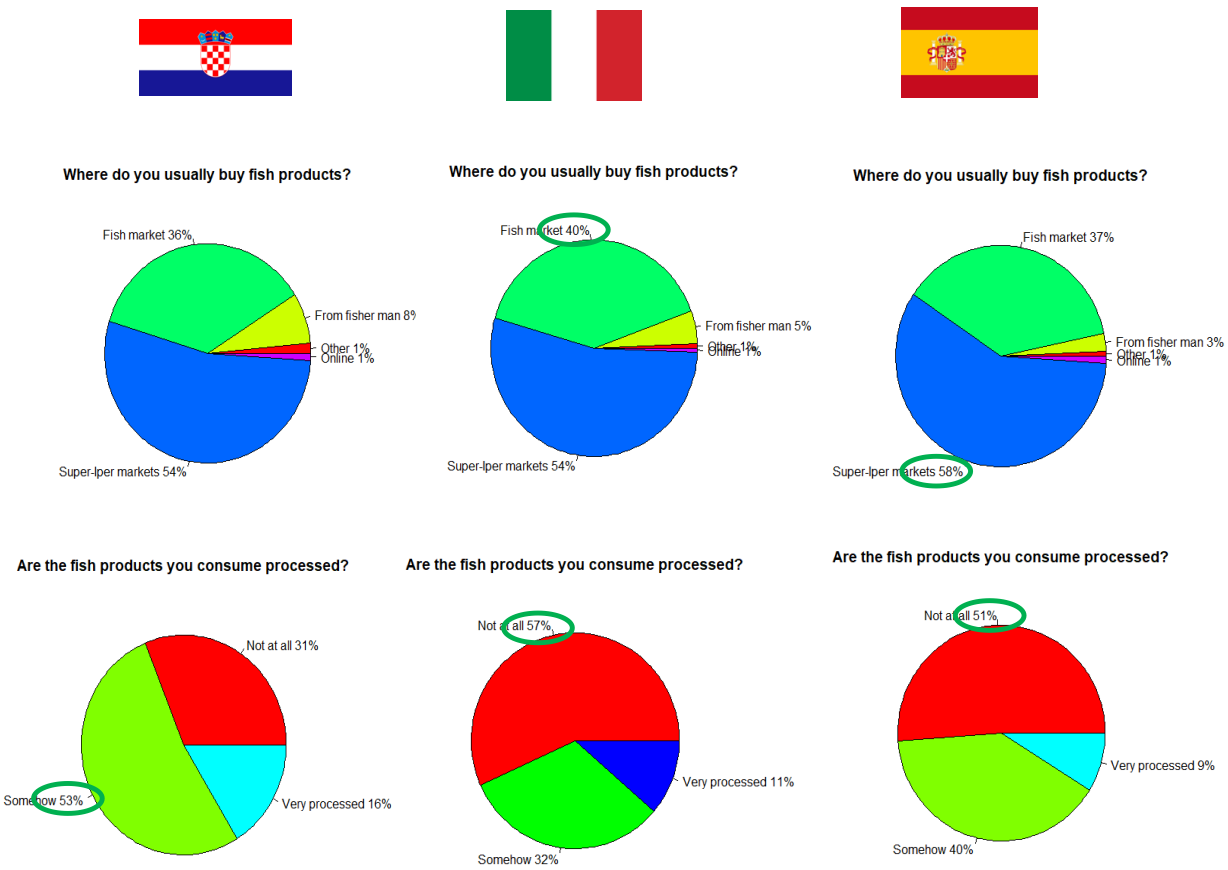
In Italy, a total of 1201 people participated in the survey, divided between 63 % of participants coming from the inland and 36% were from the coast. In Spain, a total of 1266 participants have been registered, divided between 54% of respondents coming from inland and 46% were from the coast. In Croatia, it has been registered the highest response rate, with 1293 people who participated in the survey. Most of the participants, 72% came from the inland while only 25% of the respondents were from the coast.

Table 6 Dataset composition

Dataset	Country	Total participants	Inland	On the coast
D1	Italy	1201	63%	36%
D2	Spain	1266	54%	46%
D3	Croatia	1293	72%	25%

For what concerns their purchasing habits, it seems the majority of respondents from all the three countries are used to buy fish products mostly from supermarkets (> 50%) and around 40% of them directly from fish markets. Specifically, in Italy and Spain there is the tendency to consume mainly not processed fish products (Italy 57%, Spain 51%) while in Croatia 53% of participants seem to mainly consume fish products that are somehow processed.

Figure 15 Participants' purchasing habits



5.3 RESULTS: SARDINE FILLETS

5.3.1 CONSUMERS' PREFERENCES FOR SARDINE FILLETS

The parameter estimates of the MNL models for main effect variables are listed in Table 7 below (please refer to Appendix 3 for the full results on the models). The null hypothesis is that all coefficients are zero. For sardines, as the table shows, Croatian consumers are interested in buying the frozen option However, in Italy and Spain they are not. Moreover, regarding the innovative product with higher shelf life, coefficients for Croatia and Italy are negative and for Spain is not significant, meaning that consumers do not prefer to buy it. The no buy option is significant and with negative coefficient, meaning that consumers are open to new options in the three countries. Also attribute price is negative for the three countries meaning that consumers do not like to pay additional prices for sardines. In addition, the coefficients of origin for the

country where the study was conducted is positive and for the other countries is negative. This means that consumers prefer to buy sardines from their country of origin.

Regarding certification, as it is observed, Croatian consumers, again, do not particularly rely on them while purchasing sardines, still, they have a very low preference for RFM certificate. Similarly, Italian consumers prefer RFM certificate compared to no certificate or MSC. On the other hand, Spanish consumers prefer MSC certificate compared to no certificate and they do not particularly prefer RFM.

Table 7 MNL model. Dependent variable is the choice and independent variables are the levels of the attributes

	Croatia	**Italy**	**Spain**
Alt 2/Frozen	0.13*	NS	-0.14*
Alt 3/Innovative	-0.13*	-0.19**	NS
Alt 4/no buy	-1.21***	-0.92***	-0.74***
Price	-0.04***	-0.22***	-0.27***
Origin Croatia[a]	0.81***	-0.48***	-0.58***
Origin Italy	-0.44***	0.89***	-0.41***
Origin Spain	-0.37***	-0.41***	0.99***
No certificate[a]	0.11*	-0.18***	-0.16***
RFM certificate	0.07*	0.13***	NS
MSC certificate	NS	NS	0.12***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

5.3.2 CONSUMERS' WILLINGNESS-TO-PAY FOR SARDINE FILLETS

Average willingness-to-pay (WTP) for each attribute level was calculated as follows:

$$WTP(Attribute) = -(\beta i - \beta level)/\beta 1$$

Where β_1 is the parameter of price, β_{level} is the parameter for reference level of the attribute, origin and certification and β_i is the parameter for attribute level. The WTP we are calculating here is the maximum premium price that consumers are willing to pay for certified burgers of stated origin. The following table shows the results for the WTP.

Regarding the WTP for the attributes, as it is observed Croatian consumers are not willing to pay any premium price for sardines originating from other countries compared to the Croatian sardines. However, Spanish and Italian consumers are willing to pay a higher premium price for

the sardines originating from their countries compared to the ones from Croatia. Italian consumers are willing to pay a premium price for certified sardines with RFM and the Spanish consumers are willing to pay a premium price of only 1.03 Euro for sardines certified with MSC.

Table 8 Willingness to pay for sardines. Evaluating premium price comparing to sardines from Croatia and with no label

Attribute	**Croatia (€)***	**Italy (€)**	**Spain (€)**
Italy	-4,2 [-31.25 kn]	6.22	0.63
Spain	-3.9 [-29.5 kn]	0.32	5.81
Certification RFM	-0.13 [-1 kn]	1.41	NS
Certification MSC	NS	NS	1.03

*2020 average euro/kuna exchange rate: 7.5 (source Eurostat Euro/ECU exchange rates - annual data)

Preferences of consumers when considering:

a) City location

As it is observed, when considering city location parameters are significant only for Croatia. The price's coefficient is negative but very small almost zero and not with the high significance level. This means that preferences for sardines regarding price are similar to the people living in the coast. In addition, they do not prefer sardines originating from Spain but they have a small preference for sardines from Italy compared to the Croatians living in the coast. Parameters for the certification were not significant.

b) City size:

When considering the size of the city, the parameters are not significant for Croatia and Italy which means that city size does not affect particularly preferences for sardines. However, for Spain the situation is slightly different. As it is seen the price and RFM certificate coefficients are positive meaning that people living in bigger cities associate higher prices of sardines with better quality, however, the coefficient are very small.

c) Income:

In Spain, incomes do not reflect any influence on the preferences of the consumers for sardines. However, in Croatia there is a small preference about sardines coming from Italy among people with higher incomes while sardines from Spain are highly not preferred. In Italy the coefficient of price is positive meaning that people with higher incomes associate higher prices to better qualities. Again, there is a preference for sardines originating from Italy.

5.4 RESULTS: CLAMS

5.4.1 CONSUMERS' PREFERENCES FOR CLAMS

The parameter estimates of the MNL models for main effect variables are listed in the Table 9 (please refer to Appendix 4 for the full results on the models). The null hypothesis is that all coefficients are zero.

For clams, as the table shows, Croatian consumers are interested in buying the frozen option However, in Italy and Spain they are not. Moreover, regarding the innovative product with higher shelf life, coefficients for Croatia and Italy are negative and for Spain is not significant, meaning that consumers do not prefer to buy it. The no buy option is significant and with negative coefficient, meaning that consumers are open to new options for the three countries. Also attribute price is negative for the three countries, in higher values for Italy, meaning that consumers will not buy additional quantities is the price for clams increases. Also, the coefficients of origin for the country where the study was conducted is positive and for the other countries is negative. This means that consumers prefer to buy clams from their country of origin.

Regarding certification, as it is observed, Croatian consumers do not particularly rely on them while purchasing clams. Contrary to Croatia, in Italy and Spain consumers prefer clams with certificate to the one that do not contain. Italian consumers prefer both types of certificates, however, given that the coefficient for RFM is higher, it means that they have a slightly higher preference for RFM certificate compared to the MSC. On the other hand, Spanish consumers prefer MSC certificate compared to no certificate and they do not particularly prefer RFM.

Table 9 MNL model. Dependent variable is the choice and independent variables are the levels of the attributes

Attribute	Croatia	Italy	Spain
Alt 2/Frozen	0.14*	-0.12*	NS
Alt 3/Innovative	-0.15*	-0.19**	-0.22***
Alt 4/no buy	-0.25**	-1.04***	-0.66***
Price	-0.02***	-0.12***	-0.02***
Origin Croatia[a]	0.88***	-0.44***	-0.24***
Origin Italy	-0.36***	0.82***	-0.16***
Origin Spain	-0.52***	-0.38***	0.40***
No certificate[a]	NS	-0.12***	-0.10***
RFM certificate	NS	0.11***	-0.17***
MSC certificate	NS	0.09**	0.07*

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

5.4.2 CONSUMERS' WILLINGNESS-TO-PAY FOR CLAMS

Average willingness-to-pay (WTP) for each attribute level was calculated as follows:

$$WTP(Attribute) = -(\beta i - \beta level)/\beta 1$$

Where β_1 is the parameter of price, β_{level} is the parameter for reference level of the attribute, origin and certification and β_i is the parameter for attribute level. The WTP we are calculating here is the maximum premium price that consumers are willing to pay for certified burger with stated origin. Following table shows the results for the WTP.

Regarding the WTP for the attributes, as it is observed Croatian consumers are not willing to pay any premium price for clams originating from other countries compared to the Croatian ones. However, Spanish and Italian consumers are willing to pay a higher premium price for the sardines originating from their countries compared to the ones from Croatia. In addition, consumers from Italy and Spain are willing to pay a premium price for clams originating from Spain and Italy respectively, meaning that there is a low preference for Croatian clams in these two countries. Italians appreciate both RFM and MSC certification but they are willing to pay a higher premium price for RFM. Not exactly the same it can be said for the Spanish consumers, who prefer both certificates but have a higher premium price for the MSC.

Table 10 Willingness to pay for sardines. Evaluating premium price comparing to sardines from Croatia and with no label

Attribute	Croatia (€)*	Italy (€)	Spain (€)
Italy	-8.3 [-62 kn]	10.5	4
Spain	-9.3 [70 kn]	0.5	32
Certification RFM	NS	1.92	3.5
Certification MSC	NS	1.75	8.5

*2020 average euro/kuna exchange rate: 7.5 (source Eurostat Euro/ECU exchange rates - annual data)

Preferences of consumers when considering:

City location

As it is observed, when considering city location parameters are not significant only for Spain. In Croatia the price's coefficient is negative but very small almost zero but high in significance. This means that preferences for clams regarding price are similar to the people living in the coast. The rest of parameters are not significant. Regarding Italy, similar to Croatia, the price is negative and small. There is a high preference for Italian clams for people living in inland of Italy.

City size:

Results show that when considering the city size, in none of the countries it affected preferences for clams.

Income:

For clams, preferences when incomes are considered is similar between the countries. As it is observed, only the price is significant and positive, meaning that people with higher incomes associate better quality to clams with higher prices.

5.5 RESULTS: BURGERS

5.5.1 CONSUMERS' PREFERENCES FOR BURGERS

The parameter estimates of the MNL models for main effect variables are listed in the Table 11 (please refer to Appendix 5 for the full results on the models). The null hypothesis is that all coefficients are zero.

For burger, as the table shows, consumers are not interested in buying the frozen option of burgers in the three countries. Another similarity is that the no buy option is significant and with negative coefficient, meaning that consumers are open to new options. Also attribute price is

negative for the three countries meaning that consumers do not like to pay additional prices for burgers. Also, the coefficients of origin for the country where the study was conducted is positive and for the other countries is negative. This means that consumers prefer to buy products from their country of origin.

Regarding certification, as it is observed, Croatian consumers do not particularly rely on them while purchasing burgers. However, Italian and Spanish consumers do not particularly appreciate burgers that do not have any certificate. Still in Italy they prefer mostly the new RFM certificate and in Spain the MSC.

Table 11 MNL model. Dependent variable is the choice and independent variables are the levels of the attributes

Attribute	**Croatia**	**Italy**	**Spain**
Alt 2/Frozen	NS	NS	NS
Alt 3/Innovative	-0.42***	-0.13*	NS
Alt 4/no buy	-0.74***	-0.54***	-0.91***
Price	-0.03***	-0.17***	-0.19***
Origin Croatia[a]	0.87***	-0.55***	-0.97***
Origin Italy	-0.40***	0.98***	-0.39***
Origin Spain	-0.47***	-0.43***	0.97***
No certificate[a]	NS	-0.16***	-0.12***
RFM certificate	NS	0.16***	NS
MSC certificate	NS	NS	0.11***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

5.5.2 CONSUMERS' WILLINGNESS-TO-PAY FOR BURGERS

Average willingness-to-pay (WTP) for each attribute level was calculated as follows:

$$WTP(Attribute) = -(\beta i - \beta level)/\beta 1$$

Where β_1 is the parameter of price, β_{level} is the parameter for each level of the attributes, origin and certification and β_i is the parameter for reference attribute level. The WTP we are calculating here is the maximum premium price that consumers are willing to pay for certified burger with stated origin. Following table shows the results for the WTP.

Regarding the WTP for the attributes, as it is observed Croatian consumers are not willing to pay any premium price for burgers originating from other countries compared to the Croatian burger. However, Spanish and Italian consumers are willing to pay a higher premium price for the burgers originating from their countries compared to the ones from Croatia. However, Italian consumers are not willing to pay a premium price for certified burgers and the Spanish consumers are willing to pay a premium price of only 1.24 Euro.

Table 12 Willingness to pay for sardines. Evaluating premium price comparing to sardines from Croatia and with no label

Attribute	**Croatia (€)***	**Italy (€)**	**Spain (€)**
Italy	-6.04 [-45.3 kn]	9	3.04
Spain	-6.3 [-47.6 kn]	0.70	10.2
Certification RFM	NS	0	NS
Certification MSC	NS	NS	1.24

*2020 average euro/kuna exchange rate: 7.5 (source Eurostat Euro/ECU exchange rates - annual data)

Preferences of consumers when considering:

City location

As it is observed, when considering city location parameters are significant only for Croatia. As it is observed the price's coefficient is positive, meaning that Croatian consumers that live in the inland associate a better quality to burgers with high prices compared to the people that live in the coast. In addition, they do not prefer burgers originating from Spain. Parameters for the certification were not significant.

City size:

When considering the size of the city, the parameters are not significant for Croatia which means that city size does not affect particularly preferences for burgers. However, for Italy and Spain

the situation is different. As it is seen the price coefficient is positive meaning that people living in bigger cities consider higher prices of burgers with better quality, however, the coefficient are very small. In addition, as it is observed, people living in bigger cities appreciate more burgers from two countries, Spain and Italy while certification is not significant.

Income:

For burger, In Italy, incomes do not reflect any influence on the preferences of the consumers. However, in Croatia and Spain the situation is different. The coefficient is again positive, meaning that people with higher incomes attach to higher prices a better quality for burgers, similar with products originating from Spain. However, the situation is a bit different in Spain, where consumers with higher incomes prefer burgers originating from Spain and with the RFM certificate.

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ANNEXES

Annex 1. Products concepts: detailed sentiment scores

Figure 16 Boxplot average sentiment score-Product concepts- Italy (inland vs coast)

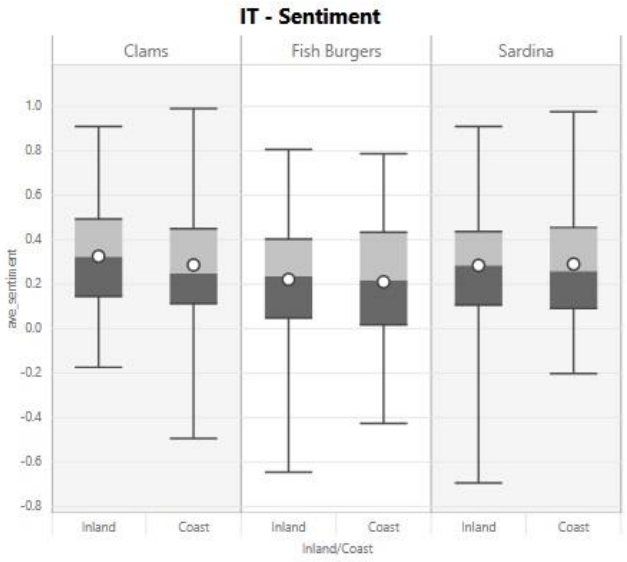


Figure 17 Boxplot average sentiment score-Product concepts- Spain (inland vs coast)

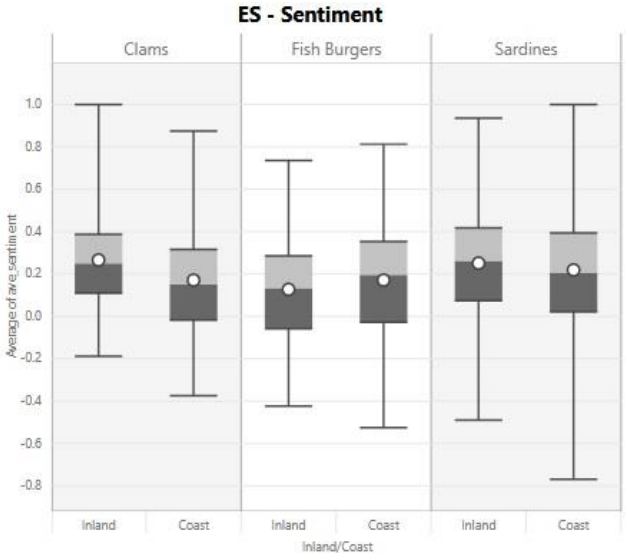
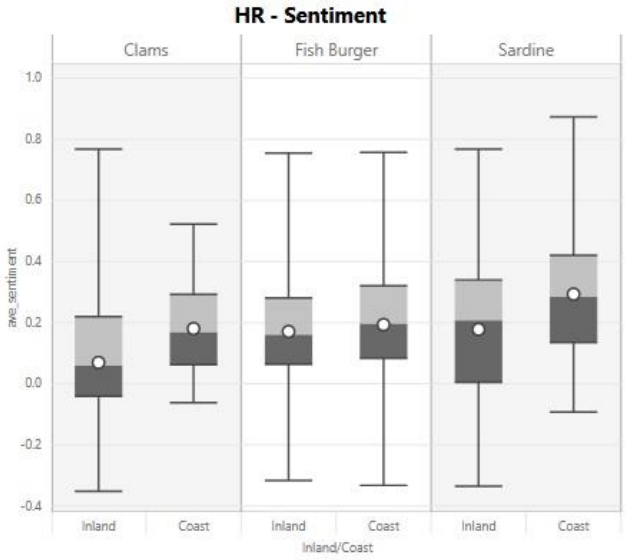


Figure 18 Boxplot average sentiment score-Product concepts- Croatia (inland vs coast)



Annex 2. Certifications: detailed sentiment scores

Figure 19 Boxplot average sentiment scores- Certifications-Italy (inland vs coast)

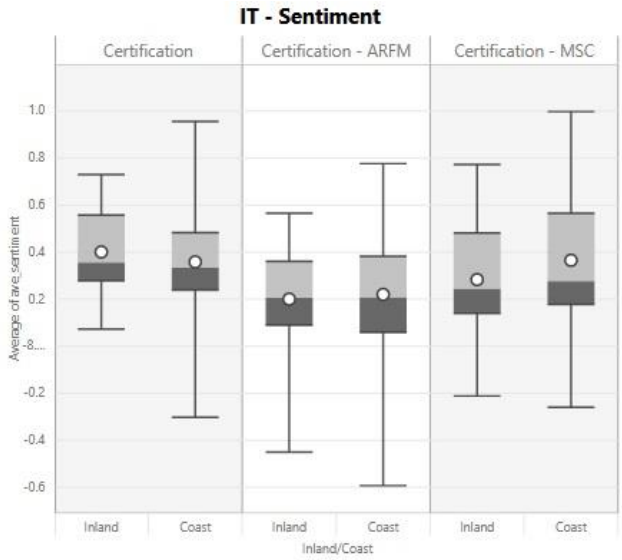


Figure 20 Boxplot average sentiment scores- Certifications- Spain (inland vs coast)

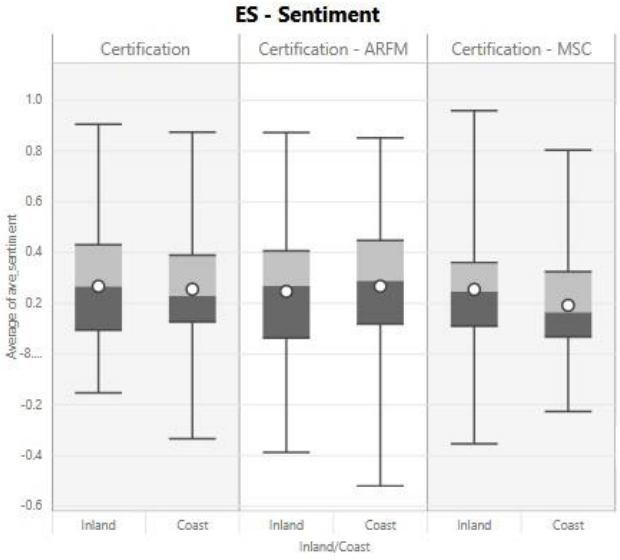


Figure 21 Boxplot average sentiment scores- Certifications- Croatia (inland vs coast)

Annex 3. Full results on the MNL models for Sardines

Screenshot 1 MNL model for SARDINE FILLETS in CROATIA

```
[1] "# MNL model with only the product attributes"

Call:
mlogit(formula = CHOICE ~ price + OriIta + OriSpa + CerRfm +
    CerMsc, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.27069 0.37290 0.18956 0.16685

nr method
4 iterations, 0h:0m:0s
g'(-H)^-1g = 7.41E-07
gradient close to zero

Coefficients :
               Estimate Std. Error  z-value Pr(>|z|)
(Intercept):2  0.1310324  0.0520789   2.5160  0.01187 *
(Intercept):3 -0.1310802  0.0582987  -2.2484  0.02455 *
(Intercept):4 -1.2110309  0.0911568 -13.2851  < 2e-16 ***
price         -0.0376047  0.0031248 -12.0344  < 2e-16 ***
OriIta        -0.4371708  0.0326082 -13.4068  < 2e-16 ***
OriSpa        -0.3726501  0.0319397 -11.6673  < 2e-16 ***
CerRfm         0.0726784  0.0285512   2.5455  0.01091 *
CerMsc         0.0404621  0.0281983   1.4349  0.15131
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4354.7
McFadden R^2:  0.11831
Likelihood ratio test : chisq = 1168.7 (p.value = < 2.22e-16)
```

Screenshot 2 MNL model for SARDINE FILLETS in CROATIA including CITY LOCATION

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_LOC + OriIta + OriIta:CITY_LOC +
    OriSpa + OriSpa:CITY_LOC + CerRfm + CerRfm:CITY_LOC + CerMsc +
    CerMsc:CITY_LOC, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.27069 0.37290 0.18956 0.16685

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 1.09E-06
successive function values within tolerance limits

Coefficients :
                     Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2       0.1290851  0.0522387   2.4711  0.013471 *
(Intercept):3      -0.1273684  0.0583786  -2.1818  0.029127 *
(Intercept):4      -1.2192195  0.0914463 -13.3326 < 2.2e-16 ***
price              -0.0316388  0.0040071  -7.8956 2.887e-15 ***
OriIta             -0.5541811  0.0637968  -8.6867 < 2.2e-16 ***
OriSpa             -0.1502610  0.0573585  -2.6197  0.008801 **
CerRfm              0.0658026  0.0537738   1.2237  0.221068
CerMsc              0.0462237  0.0532265   0.8684  0.385157
price:CITY_LOC2.0  -0.0088062  0.0035214  -2.5008  0.012393 *
OriIta:CITY_LOC2.0  0.1626896  0.0742005   2.1926  0.028339 *
OriSpa:CITY_LOC2.0 -0.3145046  0.0691597  -4.5475 5.428e-06 ***
CerRfm:CITY_LOC2.0  0.0091438  0.0632463   0.1446  0.885047
CerMsc:CITY_LOC2.0 -0.0066051  0.0626574  -0.1054  0.916045
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4342.1
McFadden R^2:  0.12086
Likelihood ratio test : chisq = 1193.8 (p.value = < 2.22e-16)
```

Screenshot 3 MNL model for SARDINE FILLETS in CROATIA including CITY SIZE

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_SIZE + OriIta +
    OriIta:CITY_SIZE + OriSpa + OriSpa:CITY_SIZE + CerRfm + CerRfm:CITY_SIZE +
    CerMsc + CerMsc:CITY_SIZE, data = RCEchoice.data, reflevel = "1",
    method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.27069 0.37290 0.18956 0.16685

nr method
4 iterations, 0h:0m:0s
g'(-H)^-1g = 7.85E-07
gradient close to zero

Coefficients :
                      Estimate Std. Error  z-value Pr(>|z|)
(Intercept):2        0.1290486  0.0521399   2.4750  0.01332 *
(Intercept):3       -0.1285680  0.0583521  -2.2033  0.02757 *
(Intercept):4       -1.2181392  0.0913317 -13.3375  < 2e-16 ***
price               -0.0359066  0.0038387  -9.3539  < 2e-16 ***
OriIta              -0.4870188  0.0577125  -8.4387  < 2e-16 ***
OriSpa              -0.3517947  0.0554298  -6.3467  2.2e-10 ***
CerRfm               0.0509481  0.0498540   1.0219  0.30681
CerMsc               0.0270789  0.0490480   0.5521  0.58089
price:CITY_SIZE2.0  -0.0010872  0.0037784  -0.2877  0.77355
price:CITY_SIZE3.0  -0.0051413  0.0038885  -1.3222  0.18610
OriIta:CITY_SIZE2.0  0.0726468  0.0788722   0.9211  0.35701
OriIta:CITY_SIZE3.0  0.0753732  0.0816945   0.9226  0.35620
OriSpa:CITY_SIZE2.0  0.0240204  0.0764380   0.3142  0.75333
OriSpa:CITY_SIZE3.0 -0.0960014  0.0804694  -1.1930  0.23286
CerRfm:CITY_SIZE2.0  0.0148997  0.0685958   0.2172  0.82804
CerRfm:CITY_SIZE3.0  0.0522878  0.0709017   0.7375  0.46084
CerMsc:CITY_SIZE2.0  0.0271330  0.0678376   0.4000  0.68918
CerMsc:CITY_SIZE3.0  0.0117886  0.0702038   0.1679  0.86665
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4350.7
McFadden R^2:  0.11912
```

Screenshot 4 MNL model for SARDINE FILLETS in CROATIA including INCOME

```
Call:
mlogit(formula = CHOICE ~ price + price:INC_02 + OriIta + OriIta:INC_02 +
    OriSpa + OriSpa:INC_02 + CerRfm + CerRfm:INC_02 + CerMsc +
    CerMsc:INC_02, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.27069 0.37290 0.18956 0.16685

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 2.86E-06
successive function values within tolerance limits

Coefficients :
                 Estimate  Std. Error  z-value  Pr(>|z|)
(Intercept):2  0.13068236  0.05256753   2.4860   0.01292 *
(Intercept):3 -0.12916152  0.05883959  -2.1951   0.02815 *
(Intercept):4 -1.21268234  0.09183495 -13.2050 < 2.2e-16 ***
price         -0.04073067  0.00615988  -6.6123 3.785e-11 ***
OriIta        -0.65393601  0.11690632  -5.5937 2.223e-08 ***
OriSpa         0.49538720  0.10852928   4.5645 5.006e-06 ***
CerRfm        -0.10421334  0.10183377  -1.0234   0.30613
CerMsc         0.06939992  0.10019727   0.6926   0.48854
price:INC_02   0.00082734  0.00192459   0.4299   0.66729
OriIta:INC_02  0.08335264  0.04047359   2.0594   0.03945 *
OriSpa:INC_02 -0.32078349  0.03940307  -8.1411 4.441e-16 ***
CerRfm:INC_02  0.06516118  0.03535634   1.8430   0.06533 .
CerMsc:INC_02 -0.01005404  0.03497165  -0.2875   0.77374
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4306.2
McFadden R^2:  0.12812
Likelihood ratio test : chisq = 1265.6 (p.value = < 2.22e-16)
```

Screenshot 5 MNL model for SARDINE FILLETS in ITALY

```
[1] "# MNL model with only the product attributes"

Call:
mlogit(formula = CHOICE ~ price + OriIta + OriSpa + CerRfm +
    CerMsc, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.27091 0.33363 0.18130 0.21416

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 4.1E-06
successive function values within tolerance limits

Coefficients :
              Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2 -0.048446   0.056848  -0.8522   0.39410
(Intercept):3 -0.186357   0.063279  -2.9450   0.00323 **
(Intercept):4 -0.921510   0.094046  -9.7985 < 2.2e-16 ***
price         -0.216710   0.019812 -10.9382 < 2.2e-16 ***
OriIta         0.892843   0.028633  31.1823 < 2.2e-16 ***
OriSpa        -0.411497   0.035844 -11.4803 < 2.2e-16 ***
CerRfm         0.134518   0.030207   4.4532 8.461e-06 ***
CerMsc         0.047695   0.031207   1.5283   0.12643
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -3970.3
McFadden R^2:  0.12781
Likelihood ratio test : chisq = 1163.6 (p.value = < 2.22e-16)
```

Screenshot 6 MNL model for SARDINE FILLETS in ITALY including CITY LOCATION

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_LOC + OriIta + OriIta:CITY_LOC +
    OriSpa + OriSpa:CITY_LOC + CerRfm + CerRfm:CITY_LOC + CerMsc +
    CerMsc:CITY_LOC, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.27091 0.33363 0.18130 0.21416

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 4.36E-06
successive function values within tolerance limits

Coefficients :
                     Estimate Std. Error z-value  Pr(>|z|)
(Intercept):2      -0.0484013  0.0568652 -0.8512  0.394681
(Intercept):3      -0.1862905  0.0633006 -2.9429  0.003251 **
(Intercept):4      -0.9215702  0.0940643 -9.7972 < 2.2e-16 ***
price              -0.2133176  0.0232869 -9.1604 < 2.2e-16 ***
OriIta              0.8395241  0.0473992 17.7118 < 2.2e-16 ***
OriSpa             -0.4020589  0.0591014 -6.8029 1.026e-11 ***
CerRfm              0.0880934  0.0502283  1.7539  0.079454 .
CerMsc              0.0863678  0.0513434  1.6822  0.092538 .
price:CITY_LOC2.0  -0.0056511  0.0192982 -0.2928  0.769651
OriIta:CITY_LOC2.0  0.0837431  0.0594822  1.4079  0.159170
OriSpa:CITY_LOC2.0 -0.0144487  0.0743266 -0.1944  0.845867
CerRfm:CITY_LOC2.0  0.0728414  0.0626453  1.1628  0.244927
CerMsc:CITY_LOC2.0 -0.0608238  0.0646212 -0.9412  0.346584
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -3968.5
McFadden R^2:  0.1282
Likelihood ratio test : chisq = 1167.2 (p.value = < 2.22e-16)
```

Screenshot 7 MNL model for SARDINE FILLETS in ITALY including CITY SIZE

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_SIZE + OriIta +
    OriIta:CITY_SIZE + OriSpa + OriSpa:CITY_SIZE + CerRfm + CerRfm:CITY_SIZE +
    CerMsc + CerMsc:CITY_SIZE, data = RCEchoice.data, reflevel = "1",
    method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.27091 0.33363 0.18130 0.21416

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 5.32E-06
successive function values within tolerance limits

Coefficients :
                      Estimate Std. Error z-value  Pr(>|z|)
(Intercept):2       -0.0483827  0.0569257 -0.8499  0.395366
(Intercept):3       -0.1868303  0.0633985 -2.9469  0.003210 **
(Intercept):4       -0.9209192  0.0941882 -9.7774 < 2.2e-16 ***
price               -0.2173745  0.0231460 -9.3914 < 2.2e-16 ***
OriIta               0.9481031  0.0465040 20.3876 < 2.2e-16 ***
OriSpa              -0.4427041  0.0587763 -7.5320 4.996e-14 ***
CerRfm               0.1961446  0.0485909  4.0367 5.422e-05 ***
CerMsc               0.0062871  0.0509486  0.1234  0.901790
price:CITY_SIZE2.0   0.0035481  0.0222622  0.1594  0.873371
price:CITY_SIZE3.0  -0.0037888  0.0227607 -0.1665  0.867794
OriIta:CITY_SIZE2.0 -0.0055036  0.0685823 -0.0802  0.936039
OriIta:CITY_SIZE3.0 -0.1821174  0.0704022 -2.5868  0.009687 **
OriSpa:CITY_SIZE2.0  0.0655515  0.0859815  0.7624  0.445827
OriSpa:CITY_SIZE3.0  0.0381133  0.0879910  0.4332  0.664906
CerRfm:CITY_SIZE2.0 -0.1227672  0.0720241 -1.7045  0.088282 .
CerRfm:CITY_SIZE3.0 -0.0748018  0.0736693 -1.0154  0.309928
CerMsc:CITY_SIZE2.0  0.0429467  0.0748023  0.5741  0.565876
CerMsc:CITY_SIZE3.0  0.0944371  0.0764553  1.2352  0.216758
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

Screenshot 8 MNL model for SARDINE FILLETS in ITALY including INCOME

```
Call:
mlogit(formula = CHOICE ~ price + price:INC_02 + OriIta + OriIta:INC_02 +
    OriSpa + OriSpa:INC_02 + CerRfm + CerRfm:INC_02 + CerMsc +
    CerMsc:INC_02, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.27091 0.33363 0.18130 0.21416

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 5.84E-06
successive function values within tolerance limits

Coefficients :
               Estimate Std. Error z-value  Pr(>|z|)
(Intercept):2 -0.049423   0.056933 -0.8681  0.385344
(Intercept):3 -0.188840   0.063451 -2.9761  0.002919 **
(Intercept):4 -0.927114   0.094231 -9.8388 < 2.2e-16 ***
price         -0.292448   0.033599 -8.7040 < 2.2e-16 ***
OriIta         0.647172   0.087350  7.4089 1.272e-13 ***
OriSpa        -0.225509   0.108026 -2.0875  0.036840 *
CerRfm         0.040158   0.092204  0.4355  0.663176
CerMsc         0.105580   0.094709  1.1148  0.264943
price:INC_02   0.039392   0.014087  2.7964  0.005168 **
OriIta:INC_02  0.128176   0.043231  2.9649  0.003028 **
OriSpa:INC_02 -0.097713   0.054301 -1.7995  0.071944 .
CerRfm:INC_02  0.049527   0.045604  1.0860  0.277467
CerMsc:INC_02 -0.030537   0.047069 -0.6488  0.516496
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -3956.4
McFadden R^2:  0.13086
Likelihood ratio test : chisq = 1191.4 (p.value = < 2.22e-16)
```

Screenshot 9 MNL model for SARDINE FILLETS in SPAIN

```
[1] "# MNL model with only the product attributes"

Call:
mlogit(formula = CHOICE ~ price + OriIta + OriSpa + CerRfm + 
    CerMsc, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4 
0.25796 0.29578 0.21730 0.22896 

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 4.31E-05
successive function values within tolerance limits

Coefficients :
               Estimate Std. Error  z-value  Pr(>|z|)    
(Intercept):2 -0.140590   0.056154  -2.5037   0.01229 *  
(Intercept):3  0.099482   0.059231   1.6796   0.09304 .  
(Intercept):4 -0.739283   0.086642  -8.5326 < 2.2e-16 ***
price         -0.267905   0.022230 -12.0514 < 2.2e-16 ***
OriIta        -0.405311   0.034674 -11.6893 < 2.2e-16 ***
OriSpa         0.994608   0.027289  36.4477 < 2.2e-16 ***
CerRfm         0.037875   0.029924   1.2657   0.20563    
CerMsc         0.117658   0.030164   3.9006 9.594e-05 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4482
McFadden R^2:  0.15825
Likelihood ratio test : chisq = 1685.2 (p.value = < 2.22e-16)
```

Screenshot 10 MNL model for SARDINE FILLETS in SPAIN including CITY LOCATION

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_LOC + OriIta + OriIta:CITY_LOC +
    OriSpa + OriSpa:CITY_LOC + CerRfm + CerRfm:CITY_LOC + CerMsc +
    CerMsc:CITY_LOC, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.25796 0.29578 0.21730 0.22896

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 4.23E-05
successive function values within tolerance limits

Coefficients :
                     Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2      -0.1402975  0.0561766  -2.4974 0.0125095 *
(Intercept):3       0.1001631  0.0592490   1.6905 0.0909238 .
(Intercept):4      -0.7400442  0.0866884  -8.5368 < 2.2e-16 ***
price              -0.2881284  0.0251712 -11.4468 < 2.2e-16 ***
OriIta             -0.4119660  0.0526274  -7.8280 4.885e-15 ***
OriSpa              1.0164699  0.0414199  24.5406 < 2.2e-16 ***
CerRfm             -0.0093811  0.0457822  -0.2049 0.8376447
CerMsc              0.1606151  0.0448975   3.5774 0.0003471 ***
price:CITY_LOC2.0   0.0357686  0.0206233   1.7344 0.0828503 .
OriIta:CITY_LOC2.0  0.0118101  0.0699577   0.1688 0.8659403
OriSpa:CITY_LOC2.0 -0.0390228  0.0549048  -0.7107 0.4772481
CerRfm:CITY_LOC2.0  0.0836946  0.0604654   1.3842 0.1663056
CerMsc:CITY_LOC2.0 -0.0764083  0.0596879  -1.2801 0.2004994
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4479.1
McFadden R^2:  0.15878
Likelihood ratio test : chisq = 1690.9 (p.value = < 2.22e-16)
```

Screenshot 11 MNL model for SARDINE FILLETS in SPAIN including CITY SIZE

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_SIZE + OriIta +
    OriIta:CITY_SIZE + OriSpa + OriSpa:CITY_SIZE + CerRfm + CerRfm:CITY_SIZE +
    CerMsc + CerMsc:CITY_SIZE, data = RCEchoice.data, reflevel = "1",
    method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.25796 0.29578 0.21730 0.22896

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 3.98E-05
successive function values within tolerance limits

Coefficients :
                  Estimate Std. Error z-value  Pr(>|z|)
(Intercept):2    -0.141015   0.056214 -2.5085  0.012123 *
(Intercept):3     0.100329   0.059276  1.6926  0.090535 .
(Intercept):4    -0.742848   0.086764 -8.5617 < 2.2e-16 ***
price            -0.364652   0.038435 -9.4876 < 2.2e-16 ***
OriIta           -0.506582   0.112013 -4.5225 6.111e-06 ***
OriSpa            1.026629   0.087550 11.7262 < 2.2e-16 ***
CerRfm           -0.160239   0.097467 -1.6440  0.100169
CerMsc            0.214162   0.094261  2.2720  0.023085 *
price:CITY_SIZE   0.041530   0.013318  3.1183  0.001819 **
OriIta:CITY_SIZE  0.043344   0.045507  0.9525  0.340856
OriSpa:CITY_SIZE -0.013529   0.035655 -0.3794  0.704363
CerRfm:CITY_SIZE  0.084682   0.039542  2.1416  0.032226 *
CerMsc:CITY_SIZE -0.040952   0.038545 -1.0625  0.288027
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4474
McFadden R^2:  0.15974
Likelihood ratio test : chisq = 1701.1 (p.value = < 2.22e-16)
```

Screenshot 12 MNL model for SARDINE FILLETS in SPAIN including INCOME

```
[1] "# MNL model with only the product attributes"

Call:
mlogit(formula = CHOICE ~ price + price:INC_02 + OriIta + OriIta:INC_02 +
    OriSpa + OriSpa:INC_02 + CerRfm + CerRfm:INC_02 + CerMsc +
    CerMsc:INC_02, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.25796 0.29578 0.21730 0.22896

nr method
5 iterations, 0h:0m:1s
g'(-H)^-1g = 4.37E-05
successive function values within tolerance limits

Coefficients :
                Estimate Std. Error z-value  Pr(>|z|)
(Intercept):2 -0.1404472  0.0561741 -2.5002 0.0124119 *
(Intercept):3  0.0991461  0.0592637  1.6730 0.0943343 .
(Intercept):4 -0.7393031  0.0866863 -8.5285 < 2.2e-16 ***
price         -0.2998707  0.0373426 -8.0303 8.882e-16 ***
OriIta        -0.3531316  0.1064923 -3.3160 0.0009131 ***
OriSpa         0.8965914  0.0839924 10.6747 < 2.2e-16 ***
CerRfm         0.0073758  0.0925917  0.0797 0.9365081
CerMsc         0.0269929  0.0917055  0.2943 0.7684955
price:INC_02   0.0160147  0.0150018  1.0675 0.2857372
OriIta:INC_02 -0.0264753  0.0507451 -0.5217 0.6018575
OriSpa:INC_02  0.0494009  0.0398984  1.2382 0.2156531
CerRfm:INC_02  0.0156596  0.0440142  0.3558 0.7220013
CerMsc:INC_02  0.0454903  0.0433861  1.0485 0.2944090
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4478.9
McFadden R^2:  0.15882
Likelihood ratio test : chisq = 1691.2 (p.value = < 2.22e-16)
```

Annex 4. Full results on the MNL models for Clams

Screenshot 13 MNL model for CLAMS in CROATIA

```
[1] "# MNL model with only the product attributes"

Call:
mlogit(formula = CHOICE ~ price + OriIta + OriSpa + CerRfm +
    CerMsc, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.21645 0.31106 0.14714 0.32536

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 2.09E-05
successive function values within tolerance limits

Coefficients :
                Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2  0.1407622  0.0578876   2.4316  0.015030 *
(Intercept):3 -0.1496968  0.0662732  -2.2588  0.023897 *
(Intercept):4 -0.2531979  0.0934494  -2.7095  0.006739 **
price         -0.0249411  0.0023549 -10.5910 < 2.2e-16 ***
OriIta        -0.3624277  0.0365036  -9.9285 < 2.2e-16 ***
OriSpa        -0.5216566  0.0380161 -13.7220 < 2.2e-16 ***
CerRfm         0.0098042  0.0322724   0.3038  0.761284
CerMsc         0.0162965  0.0316907   0.5142  0.607088
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4340.3
McFadden R^2:  0.11037
Likelihood ratio test : chisq = 1077 (p.value = < 2.22e-16)
```

Screenshot 14 MNL model for CLAMS in CROATIA including CITY LOCATION

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_LOC + OriIta + OriIta:CITY_LOC +
    OriSpa + OriSpa:CITY_LOC + CerRfm + CerRfm:CITY_LOC + CerMsc +
    CerMsc:CITY_LOC, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.21645 0.31106 0.14714 0.32536

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 3.14E-05
successive function values within tolerance limits

Coefficients :
                     Estimate Std. Error z-value  Pr(>|z|)
(Intercept):2       0.1395497  0.0579541  2.4079  0.016043 *
(Intercept):3      -0.1528426  0.0664368 -2.3006  0.021416 *
(Intercept):4      -0.2650128  0.0936685 -2.8293  0.004666 **
price              -0.0163417  0.0029341 -5.5696 2.553e-08 ***
OriIta             -0.3340674  0.0740583 -4.5109 6.456e-06 ***
OriSpa             -0.6254855  0.0801269 -7.8062 5.995e-15 ***
CerRfm              0.0362913  0.0649535  0.5587  0.576348
CerMsc             -0.0079193  0.0642133 -0.1233  0.901848
price:CITY_LOC2.0  -0.0114306  0.0023902 -4.7823 1.733e-06 ***
OriIta:CITY_LOC2.0 -0.0362838  0.0851212 -0.4263  0.669918
OriSpa:CITY_LOC2.0  0.1356404  0.0910307  1.4901  0.136211
CerRfm:CITY_LOC2.0 -0.0335614  0.0745209 -0.4504  0.652449
CerMsc:CITY_LOC2.0  0.0304360  0.0735355  0.4139  0.678951
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4322.1
McFadden R^2:  0.1141
Likelihood ratio test : chisq = 1113.3 (p.value = < 2.22e-16)
```

Screenshot 15 MNL model for CLAMS in CROATIA including CITY SIZE

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_SIZE + OriIta +
    OriIta:CITY_SIZE + OriSpa + OriSpa:CITY_SIZE + CerRfm + CerRfm:CITY_SIZE +
    CerMsc + CerMsc:CITY_SIZE, data = RCEchoice.data, reflevel = "1",
    method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.21645 0.31106 0.14714 0.32536

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 2.77E-05
successive function values within tolerance limits

Coefficients :
                     Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2       0.1400878  0.0579385   2.4179  0.015612 *
(Intercept):3      -0.1523425  0.0663843  -2.2949  0.021741 *
(Intercept):4      -0.2550083  0.0935839  -2.7249  0.006432 **
price              -0.0275150  0.0027423 -10.0336 < 2.2e-16 ***
OriIta             -0.3682180  0.0619152  -5.9471 2.729e-09 ***
OriSpa             -0.4688087  0.0633391  -7.4016 1.346e-13 ***
CerRfm             -0.0461762  0.0550443  -0.8389  0.401530
CerMsc              0.0114058  0.0536748   0.2125  0.831719
price:CITY_SIZE2.0  0.0021519  0.0025408   0.8470  0.397018
price:CITY_SIZE3.0  0.0051203  0.0023606   2.1691  0.030075 *
OriIta:CITY_SIZE2.0 -0.0569387  0.0937652  -0.6072  0.543687
OriIta:CITY_SIZE3.0  0.0610826  0.0856044   0.7135  0.475509
OriSpa:CITY_SIZE2.0  0.0407507  0.0946874   0.4304  0.666926
OriSpa:CITY_SIZE3.0 -0.1779755  0.0905745  -1.9650  0.049419 *
CerRfm:CITY_SIZE2.0  0.0786306  0.0817964   0.9613  0.336403
CerRfm:CITY_SIZE3.0  0.0924432  0.0754954   1.2245  0.220769
CerMsc:CITY_SIZE2.0  0.0212323  0.0801469   0.2649  0.791073
CerMsc:CITY_SIZE3.0 -0.0021819  0.0740518  -0.0295  0.976494
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4330.7
McFadden R^2:  0.11234
```

Screenshot 16 MNL model for CLAMS in CROATIA including INCOME

```
Call:
mlogit(formula = CHOICE ~ price + price:INC_02 + OriIta + OriIta:INC_02 +
    OriSpa + OriSpa:INC_02 + CerRfm + CerRfm:INC_02 + CerMsc +
    CerMsc:INC_02, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.21645 0.31106 0.14714 0.32536

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 3.6E-05
successive function values within tolerance limits

Coefficients :
                   Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2     0.1393881  0.0579941   2.4035 0.0162395 *
(Intercept):3    -0.1484762  0.0663781  -2.2368 0.0252977 *
(Intercept):4    -0.2612071  0.0936664  -2.7887 0.0052921 **
price            -0.0301282  0.0029076 -10.3620 < 2.2e-16 ***
OriIta           -0.3007960  0.0695328  -4.3260 1.519e-05 ***
OriSpa           -0.5285082  0.0736145  -7.1794 7.001e-13 ***
CerRfm           -0.0065378  0.0622803  -0.1050 0.9163960
CerMsc            0.0217884  0.0611581   0.3563 0.7216430
price:INC_022.0   0.0055589  0.0023407   2.3749 0.0175518 *
price:INC_023.0   0.0110307  0.0031261   3.5286 0.0004178 ***
OriIta:INC_022.0 -0.1474311  0.0856557  -1.7212 0.0852132 .
OriIta:INC_023.0  0.1032864  0.1093772   0.9443 0.3450092
OriSpa:INC_022.0  0.0451002  0.0891862   0.5057 0.6130767
OriSpa:INC_023.0 -0.0994422  0.1200425  -0.8284 0.4074487
CerRfm:INC_022.0  0.0197527  0.0754590   0.2618 0.7935007
CerRfm:INC_023.0  0.0299373  0.0987764   0.3031 0.7618274
CerMsc:INC_022.0 -0.0483866  0.0741538  -0.6525 0.5140678
CerMsc:INC_023.0  0.1255575  0.0964716   1.3015 0.1930884
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4324.8
McFadden R^2:  0.11354
Likelihood ratio test : chisq = 1107.8 (p.value = < 2.22e-16)
```

Screenshot 17 MNL model for CLAMS in ITALY

```
[1] "# MNL model with only the product attributes"

Call:
mlogit(formula = CHOICE ~ price + OriIta + OriSpa + CerRfm +
    CerMsc, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.30106 0.31848 0.21822 0.16224

nr method
4 iterations, 0h:0m:0s
g'(-H)^-1g = 6.57E-08
gradient close to zero

Coefficients :
              Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2 -0.128884   0.053852  -2.3933 0.0166967 *
(Intercept):3 -0.187838   0.057611  -3.2604 0.0011124 **
(Intercept):4 -1.042498   0.092658 -11.2511 < 2.2e-16 ***
price         -0.115877   0.015095  -7.6766 1.643e-14 ***
OriIta         0.822623   0.026179  31.4229 < 2.2e-16 ***
OriSpa        -0.379156   0.032883 -11.5303 < 2.2e-16 ***
CerRfm         0.106515   0.028342   3.7582 0.0001711 ***
CerMsc         0.085404   0.028689   2.9769 0.0029119 **
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4182
McFadden R^2:  0.11717
Likelihood ratio test : chisq = 1110 (p.value = < 2.22e-16)
```

Screenshot 18 MNL model for CLAMS in ITALY including CITY LOCATION

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_LOC + OriIta + OriIta:CITY_LOC +
    OriSpa + OriSpa:CITY_LOC + CerRfm + CerRfm:CITY_LOC + CerMsc +
    CerMsc:CITY_LOC, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.30106 0.31848 0.21822 0.16224

nr method
4 iterations, 0h:0m:0s
g'(-H)^-1g = 2.67E-07
gradient close to zero

Coefficients :
                      Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2      -0.1305658  0.0539348  -2.4208 0.0154860 *
(Intercept):3      -0.1874511  0.0576705  -3.2504 0.0011525 **
(Intercept):4      -1.0484259  0.0928376 -11.2931 < 2.2e-16 ***
price              -0.0946115  0.0176532  -5.3594 8.348e-08 ***
OriIta              0.6982492  0.0422917  16.5103 < 2.2e-16 ***
OriSpa             -0.3452050  0.0524391  -6.5830 4.612e-11 ***
CerRfm              0.1042804  0.0458510   2.2743 0.0229460 *
CerMsc              0.0548055  0.0465201   1.1781 0.2387552
price:CITY_LOC2.0  -0.0358502  0.0151766  -2.3622 0.0181669 *
OriIta:CITY_LOC2.0  0.1998539  0.0538894   3.7086 0.0002084 ***
OriSpa:CITY_LOC2.0 -0.0533764  0.0673502  -0.7925 0.4280574
CerRfm:CITY_LOC2.0  0.0047196  0.0581167   0.0812 0.9352756
CerMsc:CITY_LOC2.0  0.0499707  0.0591349   0.8450 0.3980948
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4173.7
McFadden R^2:  0.11893
Likelihood ratio test : chisq = 1126.8 (p.value = < 2.22e-16)
```

Screenshot 19 MNL model for CLAMS in ITALY including CITY SIZE

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_SIZE + OriIta +
    OriIta:CITY_SIZE + OriSpa + OriSpa:CITY_SIZE + CerRfm + CerRfm:CITY_SIZE +
    CerMsc + CerMsc:CITY_SIZE, data = RCEchoice.data, reflevel = "1",
    method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.30106 0.31848 0.21822 0.16224

nr method
4 iterations, 0h:0m:0s
g'(-H)^-1g = 5.49E-07
gradient close to zero

Coefficients :
                     Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2       -0.131228   0.053937  -2.4330 0.0149743 *
(Intercept):3       -0.190546   0.057710  -3.3018 0.0009607 ***
(Intercept):4       -1.064407   0.093052 -11.4389 < 2.2e-16 ***
price               -0.162317   0.018117  -8.9595 < 2.2e-16 ***
OriIta               0.842303   0.043746  19.2542 < 2.2e-16 ***
OriSpa              -0.335061   0.053948  -6.2108 5.273e-10 ***
CerRfm               0.095593   0.046693   2.0472 0.0406339 *
CerMsc               0.088108   0.047585   1.8516 0.0640826 .
price:CITY_SIZE2.0   0.040702   0.017150   2.3732 0.0176324 *
price:CITY_SIZE3.0   0.113792   0.018817   6.0475 1.472e-09 ***
OriIta:CITY_SIZE2.0 -0.040042   0.062170  -0.6441 0.5195269
OriIta:CITY_SIZE3.0 -0.010044   0.065393  -0.1536 0.8779364
OriSpa:CITY_SIZE2.0 -0.048851   0.077337  -0.6317 0.5276097
OriSpa:CITY_SIZE3.0 -0.098441   0.082870  -1.1879 0.2348714
CerRfm:CITY_SIZE2.0  0.046509   0.066349   0.7010 0.4833197
CerRfm:CITY_SIZE3.0 -0.017686   0.071216  -0.2483 0.8038707
CerMsc:CITY_SIZE2.0 -0.027861   0.068013  -0.4096 0.6820665
CerMsc:CITY_SIZE3.0  0.022678   0.071793   0.3159 0.7520960
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4160.2
McFadden R^2:  0.12177
```

Screenshot 20 MNL model for CLAMS in ITALY including INCOME

```
Call:
mlogit(formula = CHOICE ~ price + price:INC_02 + OriIta + OriIta:INC_02 +
    OriSpa + OriSpa:INC_02 + CerRfm + CerRfm:INC_02 + CerMsc +
    CerMsc:INC_02, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.30106 0.31848 0.21822 0.16224

nr method
5 iterations, 0h:0m:1s
g'(-H)^-1g = 3.35E-06
successive function values within tolerance limits

Coefficients :
                   Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2    -0.1319622  0.0539726  -2.4450 0.0144858 *
(Intercept):3    -0.1915657  0.0577980  -3.3144 0.0009184 ***
(Intercept):4    -1.0719877  0.0931839 -11.5040 < 2.2e-16 ***
price            -0.1782023  0.0204600  -8.7098 < 2.2e-16 ***
OriIta            0.8430176  0.0560460  15.0415 < 2.2e-16 ***
OriSpa           -0.3962861  0.0703431  -5.6336 1.765e-08 ***
CerRfm            0.1460526  0.0594802   2.4555 0.0140695 *
CerMsc           -0.0231436  0.0622391  -0.3719 0.7100045
price:INC_022.0   0.0531192  0.0178931   2.9687 0.0029907 **
price:INC_023.0   0.1627887  0.0237490   6.8545 7.154e-12 ***
OriIta:INC_022.0 -0.0404487  0.0656943  -0.6157 0.5380846
OriIta:INC_023.0  0.0324742  0.0815075   0.3984 0.6903209
OriSpa:INC_022.0  0.0326443  0.0823209   0.3965 0.6916997
OriSpa:INC_023.0 -0.0081152  0.1036792  -0.0783 0.9376114
CerRfm:INC_022.0 -0.0573831  0.0699092  -0.8208 0.4117475
CerRfm:INC_023.0 -0.0259997  0.0886556  -0.2933 0.7693191
CerMsc:INC_022.0  0.1306891  0.0725848   1.8005 0.0717815 .
CerMsc:INC_023.0  0.1646476  0.0904149   1.8210 0.0686034 .
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4150.7
McFadden R^2:  0.12378
Likelihood ratio test : chisq = 1172.7 (p.value = < 2.22e-16)
```

Screenshot 21 MNL model for CLAMS in SPAIN

```
[1] "# MNL model with only the product attributes"

Call:
mlogit(formula = CHOICE ~ price + OriIta + OriSpa + CerRfm +
    CerMsc, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.25796 0.29578 0.21730 0.22896

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 4.31E-05
successive function values within tolerance limits

Coefficients :
               Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2 -0.140590   0.056154  -2.5037   0.01229 *
(Intercept):3  0.099482   0.059231   1.6796   0.09304 .
(Intercept):4 -0.739283   0.086642  -8.5326 < 2.2e-16 ***
price         -0.267905   0.022230 -12.0514 < 2.2e-16 ***
OriIta        -0.405311   0.034674 -11.6893 < 2.2e-16 ***
OriSpa         0.994608   0.027289  36.4477 < 2.2e-16 ***
CerRfm         0.037875   0.029924   1.2657   0.20563
CerMsc         0.117658   0.030164   3.9006 9.594e-05 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4482
McFadden R^2:  0.15825
Likelihood ratio test : chisq = 1685.2 (p.value = < 2.22e-16)
```

Screenshot 22 MNL model for CLAMS in SPAIN including CITY LOCATION

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_LOC + OriIta + OriIta:CITY_LOC +
    OriSpa + OriSpa:CITY_LOC + CerRfm + CerRfm:CITY_LOC + CerMsc +
    CerMsc:CITY_LOC, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.25796 0.29578 0.21730 0.22896

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 4.23E-05
successive function values within tolerance limits

Coefficients :
                     Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2      -0.1402975  0.0561766  -2.4974 0.0125095 *
(Intercept):3       0.1001631  0.0592490   1.6905 0.0909238 .
(Intercept):4      -0.7400442  0.0866884  -8.5368 < 2.2e-16 ***
price              -0.2881284  0.0251712 -11.4468 < 2.2e-16 ***
OriIta             -0.4119660  0.0526274  -7.8280 4.885e-15 ***
OriSpa              1.0164699  0.0414199  24.5406 < 2.2e-16 ***
CerRfm             -0.0093811  0.0457822  -0.2049 0.8376447
CerMsc              0.1606151  0.0448975   3.5774 0.0003471 ***
price:CITY_LOC2.0   0.0357686  0.0206233   1.7344 0.0828503 .
OriIta:CITY_LOC2.0  0.0118101  0.0699577   0.1688 0.8659403
OriSpa:CITY_LOC2.0 -0.0390228  0.0549048  -0.7107 0.4772481
CerRfm:CITY_LOC2.0  0.0836946  0.0604654   1.3842 0.1663056
CerMsc:CITY_LOC2.0 -0.0764083  0.0596879  -1.2801 0.2004994
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4479.1
McFadden R^2:  0.15878
Likelihood ratio test : chisq = 1690.9 (p.value = < 2.22e-16)
```

Screenshot 23 MNL model for CLAMS in SPAIN including CITY SIZE

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_SIZE + OriIta +
    OriIta:CITY_SIZE + OriSpa + OriSpa:CITY_SIZE + CerRfm + CerRfm:CITY_SIZE +
    CerMsc + CerMsc:CITY_SIZE, data = RCEchoice.data, reflevel = "1",
    method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.25796 0.29578 0.21730 0.22896

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 4.32E-05
successive function values within tolerance limits

Coefficients :
                    Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2     -0.1417233  0.0562438  -2.5198  0.011742 *
(Intercept):3      0.1004579  0.0593291   1.6932  0.090411 .
(Intercept):4     -0.7458403  0.0868468  -8.5880 < 2.2e-16 ***
price             -0.3324977  0.0310209 -10.7185 < 2.2e-16 ***
OriIta            -0.4136649  0.0802360  -5.1556 2.528e-07 ***
OriSpa             0.9578729  0.0638896  14.9926 < 2.2e-16 ***
CerRfm            -0.0147034  0.0708387  -0.2076  0.835571
CerMsc             0.1733966  0.0681726   2.5435  0.010975 *
price:CITY_SIZE2   0.0604875  0.0299402   2.0203  0.043355 *
price:CITY_SIZE3   0.0876954  0.0274827   3.1909  0.001418 **
OriIta:CITY_SIZE2 -0.0674108  0.1033407  -0.6523  0.514197
OriIta:CITY_SIZE3  0.0533901  0.0933713   0.5718  0.567454
OriSpa:CITY_SIZE2  0.1147206  0.0809795   1.4167  0.156582
OriSpa:CITY_SIZE3  0.0081893  0.0742974   0.1102  0.912233
CerRfm:CITY_SIZE2 -0.0561205  0.0898795  -0.6244  0.532366
CerRfm:CITY_SIZE3  0.1302005  0.0820128   1.5876  0.112385
CerMsc:CITY_SIZE2 -0.0383864  0.0869643  -0.4414  0.658921
CerMsc:CITY_SIZE3 -0.0812868  0.0796834  -1.0201  0.307670
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4469.2
McFadden R^2:  0.16065
```

Screenshot 24 MNL model for CLAMS in SPAIN including INCOME

```
Call:
mlogit(formula = CHOICE ~ price + price:INC_02 + OriIta + OriIta:INC_02 +
    OriSpa + OriSpa:INC_02 + CerRfm + CerRfm:INC_02 + CerMsc +
    CerMsc:INC_02, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.25796 0.29578 0.21730 0.22896

nr method
5 iterations, 0h:0m:1s
g'(-H)^-1g = 4.37E-05
successive function values within tolerance limits

Coefficients :
                Estimate Std. Error z-value  Pr(>|z|)
(Intercept):2 -0.1404472  0.0561741 -2.5002 0.0124119 *
(Intercept):3  0.0991461  0.0592637  1.6730 0.0943343 .
(Intercept):4 -0.7393031  0.0866863 -8.5285 < 2.2e-16 ***
price         -0.2998707  0.0373426 -8.0303 8.882e-16 ***
OriIta        -0.3531316  0.1064923 -3.3160 0.0009131 ***
OriSpa         0.8965914  0.0839924 10.6747 < 2.2e-16 ***
CerRfm         0.0073758  0.0925917  0.0797 0.9365081
CerMsc         0.0269929  0.0917055  0.2943 0.7684955
price:INC_02   0.0160147  0.0150018  1.0675 0.2857372
OriIta:INC_02 -0.0264753  0.0507451 -0.5217 0.6018575
OriSpa:INC_02  0.0494009  0.0398984  1.2382 0.2156531
CerRfm:INC_02  0.0156596  0.0440142  0.3558 0.7220013
CerMsc:INC_02  0.0454903  0.0433861  1.0485 0.2944090
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4478.9
McFadden R^2:  0.15882
Likelihood ratio test : chisq = 1691.2 (p.value = < 2.22e-16)
```

Annex 5. Full results on the MNL models for Burgers

Screenshot 25 MNL model for BURGERS in CROATIA

```
[1] "# MNL model with only the product attributes"

Call:
mlogit(formula = CHOICE ~ price + OriIta + OriSpa + CerRfm +
    CerMsc, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.26435 0.34097 0.14560 0.24908

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 3.7E-06
successive function values within tolerance limits

Coefficients :
                Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2  0.0366243  0.0552250   0.6632    0.5072
(Intercept):3 -0.4236059  0.0648624  -6.5308 6.540e-11 ***
(Intercept):4 -0.7370264  0.0954224  -7.7238 1.132e-14 ***
price         -0.0280996  0.0027271 -10.3040 < 2.2e-16 ***
OriIta        -0.4026796  0.0352642 -11.4189 < 2.2e-16 ***
OriSpa        -0.4680563  0.0357433 -13.0950 < 2.2e-16 ***
CerRfm         0.0434327  0.0311512   1.3943    0.1632
CerMsc         0.0235153  0.0306238   0.7679    0.4426
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4204.4
McFadden R^2:  0.11646
Likelihood ratio test : chisq = 1108.4 (p.value = < 2.22e-16)
```

Screenshot 26 MNL model for BURGERS in CROATIA including CITY LOCATION

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_LOC + OriIta + OriIta:CITY_LOC +
    OriSpa + OriSpa:CITY_LOC + CerRfm + CerRfm:CITY_LOC + CerMsc +
    CerMsc:CITY_LOC, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.26435 0.34097 0.14560 0.24908

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 5.97E-06
successive function values within tolerance limits

Coefficients :
                     Estimate Std. Error z-value  Pr(>|z|)
(Intercept):2       0.0378271  0.0553450  0.6835  0.494305
(Intercept):3      -0.4290889  0.0650845 -6.5928 4.316e-11 ***
(Intercept):4      -0.7362965  0.0956671 -7.6964 1.399e-14 ***
price              -0.0337368  0.0033814 -9.9772 < 2.2e-16 ***
OriIta             -0.4088860  0.0669484 -6.1075 1.012e-09 ***
OriSpa             -0.3146180  0.0651295 -4.8307 1.361e-06 ***
CerRfm              0.0240685  0.0594712  0.4047  0.685691
CerMsc             -0.0063994  0.0584573 -0.1095  0.912828
price:CITY_LOC2.0   0.0079152  0.0026802  2.9532  0.003145 **
OriIta:CITY_LOC2.0  0.0115148  0.0787614  0.1462  0.883765
OriSpa:CITY_LOC2.0 -0.2138110  0.0779952 -2.7413  0.006119 **
CerRfm:CITY_LOC2.0  0.0240353  0.0695487  0.3456  0.729652
CerMsc:CITY_LOC2.0  0.0409934  0.0684741  0.5987  0.549393
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4188.9
McFadden R^2:  0.11971
Likelihood ratio test : chisq = 1139.3 (p.value = < 2.22e-16)
```

Screenshot 27 MNL model for BURGERS in CROATIA including CITY SIZE

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_SIZE + OriIta +
    OriIta:CITY_SIZE + OriSpa + OriSpa:CITY_SIZE + CerRfm + CerRfm:CITY_SIZE +
    CerMsc + CerMsc:CITY_SIZE, data = RCEchoice.data, reflevel = "1",
    method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.26435 0.34097 0.14560 0.24908

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 4.72E-06
successive function values within tolerance limits

Coefficients :
                      Estimate Std. Error z-value  Pr(>|z|)
(Intercept):2        0.0353299  0.0553035  0.6388  0.522930
(Intercept):3       -0.4233557  0.0649271 -6.5205 7.008e-11 ***
(Intercept):4       -0.7402272  0.0955726 -7.7452 9.548e-15 ***
price               -0.0271334  0.0032418 -8.3699 < 2.2e-16 ***
OriIta              -0.3185835  0.0609292 -5.2288 1.707e-07 ***
OriSpa              -0.5941775  0.0654775 -9.0745 < 2.2e-16 ***
CerRfm               0.0621556  0.0541844  1.1471  0.251335
CerMsc               0.0560369  0.0535371  1.0467  0.295241
price:CITY_SIZE2.0   0.0011085  0.0031151  0.3558  0.721957
price:CITY_SIZE3.0  -0.0037359  0.0028853 -1.2948  0.195391
OriIta:CITY_SIZE2.0 -0.1600609  0.0903505 -1.7716  0.076469 .
OriIta:CITY_SIZE3.0 -0.0966356  0.0833340 -1.1596  0.246204
OriSpa:CITY_SIZE2.0  0.2423699  0.0916371  2.6449  0.008172 **
OriSpa:CITY_SIZE3.0  0.1346514  0.0871625  1.5448  0.122387
CerRfm:CITY_SIZE2.0 -0.0898738  0.0793060 -1.1333  0.257108
CerRfm:CITY_SIZE3.0  0.0185920  0.0733804  0.2534  0.799987
CerMsc:CITY_SIZE2.0 -0.0720401  0.0780435 -0.9231  0.355968
CerMsc:CITY_SIZE3.0 -0.0274604  0.0724284 -0.3791  0.704585
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4196.6
McFadden R^2:  0.11809
```

Screenshot 28 MNL model for BURGERS in CROATIA including INCOME

```
Call:
mlogit(formula = CHOICE ~ price + price:INC_02 + OriIta + OriIta:INC_02 +
    OriSpa + OriSpa:INC_02 + CerRfm + CerRfm:INC_02 + CerMsc +
    CerMsc:INC_02, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.26435 0.34097 0.14560 0.24908

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 3.02E-05
successive function values within tolerance limits

Coefficients :
                Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2  0.0335619  0.0554536   0.6052 0.5450292
(Intercept):3 -0.4239187  0.0649596  -6.5259 6.760e-11 ***
(Intercept):4 -0.7728977  0.0960661  -8.0455 8.882e-16 ***
price         -0.0579165  0.0047809 -12.1141 < 2.2e-16 ***
OriIta        -0.4977033  0.1157026  -4.3016 1.696e-05 ***
OriSpa        -0.8776613  0.1193543  -7.3534 1.932e-13 ***
CerRfm         0.1399968  0.1004709   1.3934 0.1634967
CerMsc         0.1273992  0.0987506   1.2901 0.1970121
price:INC_02   0.0146918  0.0018850   7.7940 6.439e-15 ***
OriIta:INC_02  0.0495691  0.0542209   0.9142 0.3606079
OriSpa:INC_02  0.2006654  0.0550936   3.6423 0.0002703 ***
CerRfm:INC_02 -0.0477424  0.0475352  -1.0044 0.3152062
CerMsc:INC_02 -0.0503979  0.0469677  -1.0730 0.2832558
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -4165.8
McFadden R^2:  0.12456
Likelihood ratio test : chisq = 1185.5 (p.value = < 2.22e-16)
```

Screenshot 29 MNL model for BURGERS in ITALY

```
[1] "# MNL model with only the product attributes"

Call:
mlogit(formula = CHOICE ~ price + OriIta + OriSpa + CerRfm +
    CerMsc, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.24406 0.32982 0.18327 0.24285

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 8.88E-06
successive function values within tolerance limits

Coefficients :
              Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2  0.059850   0.059860   0.9998   0.31739
(Intercept):3 -0.123356   0.065256  -1.8903   0.05871 .
(Intercept):4 -0.594440   0.097368  -6.1051 1.027e-09 ***
price         -0.175305   0.017947  -9.7681 < 2.2e-16 ***
OriIta         0.983273   0.029864  32.9249 < 2.2e-16 ***
OriSpa        -0.433814   0.037769 -11.4860 < 2.2e-16 ***
CerRfm         0.162265   0.031120   5.2143 1.846e-07 ***
CerMsc        -0.010864   0.032724  -0.3320   0.73990
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -3887.7
McFadden R^2:  0.14272
Likelihood ratio test : chisq = 1294.5 (p.value = < 2.22e-16)
```

Screenshot 30 MNL model for BURGERS in ITALY including CITY LOCATION

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_LOC + OriIta + OriIta:CITY_LOC +
    OriSpa + OriSpa:CITY_LOC + CerRfm + CerRfm:CITY_LOC + CerMsc +
    CerMsc:CITY_LOC, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.24406 0.32982 0.18327 0.24285

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 1.12E-05
successive function values within tolerance limits

Coefficients :
                      Estimate  Std. Error z-value  Pr(>|z|)
(Intercept):2       0.05977396  0.05989610  0.9980   0.31830
(Intercept):3      -0.12452012  0.06532329 -1.9062   0.05662 .
(Intercept):4      -0.59635904  0.09745833 -6.1191 9.409e-10 ***
price              -0.19775489  0.02089375 -9.4648 < 2.2e-16 ***
OriIta              0.93395217  0.04895562 19.0775 < 2.2e-16 ***
OriSpa             -0.39405272  0.06077447 -6.4839 8.941e-11 ***
CerRfm              0.20641416  0.05027304  4.1059 4.028e-05 ***
CerMsc              0.00027466  0.05345884  0.0051   0.99590
price:CITY_LOC2.0   0.03589574  0.01669072  2.1506   0.03150 *
OriIta:CITY_LOC2.0  0.07930401  0.06179367  1.2834   0.19936
OriSpa:CITY_LOC2.0 -0.06452575  0.07757377 -0.8318   0.40552
CerRfm:CITY_LOC2.0 -0.07092262  0.06375720 -1.1124   0.26597
CerMsc:CITY_LOC2.0 -0.01772745  0.06761039 -0.2622   0.79317
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -3881.9
McFadden R^2:  0.14402
Likelihood ratio test : chisq = 1306.2 (p.value = < 2.22e-16)
```

Screenshot 31 MNL model for BURGERS in ITALY including CITY SIZE

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_SIZE + OriIta +
    OriIta:CITY_SIZE + OriSpa + OriSpa:CITY_SIZE + CerRfm + CerRfm:CITY_SIZE +
    CerMsc + CerMsc:CITY_SIZE, data = RCEchoice.data, reflevel = "1",
    method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.24406 0.32982 0.18327 0.24285

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 1.22E-05
successive function values within tolerance limits

Coefficients :
                     Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2        0.059815   0.059950   0.9978   0.31840
(Intercept):3       -0.125238   0.065370  -1.9158   0.05539 .
(Intercept):4       -0.603852   0.097684  -6.1817 6.342e-10 ***
price               -0.219651   0.021386 -10.2710 < 2.2e-16 ***
OriIta               1.073727   0.051772  20.7394 < 2.2e-16 ***
OriSpa              -0.543676   0.066716  -8.1491 4.441e-16 ***
CerRfm               0.113190   0.053127   2.1305   0.03313 *
CerMsc               0.084314   0.055107   1.5300   0.12602
price:CITY_SIZE2.0   0.090238   0.019398   4.6519 3.289e-06 ***
price:CITY_SIZE3.0   0.039640   0.020299   1.9528   0.05084 .
OriIta:CITY_SIZE2.0 -0.122995   0.071356  -1.7237   0.08477 .
OriIta:CITY_SIZE3.0 -0.145412   0.075854  -1.9170   0.05524 .
OriSpa:CITY_SIZE2.0  0.117251   0.091387   1.2830   0.19949
OriSpa:CITY_SIZE3.0  0.212139   0.095192   2.2285   0.02585 *
CerRfm:CITY_SIZE2.0  0.072640   0.074022   0.9813   0.32643
CerRfm:CITY_SIZE3.0  0.080890   0.077611   1.0422   0.29730
CerMsc:CITY_SIZE2.0 -0.200893   0.078050  -2.5739   0.01006 *
CerMsc:CITY_SIZE3.0 -0.082258   0.082072  -1.0023   0.31622
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -3870.8
McFadden R^2:  0.14646
```

Screenshot 32 MNL model for BURGERS in ITALY including INCOME

```
Call:
mlogit(formula = CHOICE ~ price + price:INC_02 + OriIta + OriIta:INC_02 +
    OriSpa + OriSpa:INC_02 + CerRfm + CerRfm:INC_02 + CerMsc +
    CerMsc:INC_02, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.24406 0.32982 0.18327 0.24285

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 9.84E-06
successive function values within tolerance limits

Coefficients :
                Estimate Std. Error z-value  Pr(>|z|)
(Intercept):2  0.0600400  0.0599194  1.0020   0.31634
(Intercept):3 -0.1244756  0.0653427 -1.9050   0.05678 .
(Intercept):4 -0.5928234  0.0974571 -6.0829 1.180e-09 ***
price         -0.1872431  0.0300066 -6.2401 4.374e-10 ***
OriIta         0.8196169  0.0937797  8.7398 < 2.2e-16 ***
OriSpa        -0.5169634  0.1187941 -4.3518 1.350e-05 ***
CerRfm        -0.0050708  0.0976910 -0.0519   0.95860
CerMsc        -0.0604444  0.1030111 -0.5868   0.55735
price:INC_02   0.0059931  0.0123645  0.4847   0.62789
OriIta:INC_02  0.0847722  0.0456551  1.8568   0.06334 .
OriSpa:INC_02  0.0425219  0.0575957  0.7383   0.46034
CerRfm:INC_02  0.0852538  0.0472331  1.8050   0.07108 .
CerMsc:INC_02  0.0264509  0.0499992  0.5290   0.59679
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -3881.2
McFadden R^2:  0.14415
Likelihood ratio test : chisq = 1307.5 (p.value = < 2.22e-16)
```

Screenshot 33 MNL model for BURGERS in SPAIN

```
[1] "# MNL model with only the product attributes"

Call:
mlogit(formula = CHOICE ~ price + OriIta + OriSpa + CerRfm +
    CerMsc, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.27928 0.31590 0.21331 0.19151

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 3.5E-05
successive function values within tolerance limits

Coefficients :
               Estimate Std. Error  z-value  Pr(>|z|)
(Intercept):2 -0.084177   0.057497  -1.4640 0.1431926
(Intercept):3 -0.081612   0.061204  -1.3334 0.1823856
(Intercept):4 -0.913305   0.095122  -9.6014 < 2.2e-16 ***
price         -0.191249   0.019516  -9.7997 < 2.2e-16 ***
OriIta        -0.389270   0.035318 -11.0218 < 2.2e-16 ***
OriSpa         0.971641   0.028112  34.5637 < 2.2e-16 ***
CerRfm         0.011675   0.030945   0.3773 0.7059610
CerMsc         0.112809   0.031023   3.6363 0.0002766 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -3967.4
McFadden R^2:  0.15615
Likelihood ratio test : chisq = 1468.3 (p.value = < 2.22e-16)
```

Screenshot 34 MNL model for BURGERS in SPAIN including CITY LOCATION

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_LOC + OriIta + OriIta:CITY_LOC +
    OriSpa + OriSpa:CITY_LOC + CerRfm + CerRfm:CITY_LOC + CerMsc +
    CerMsc:CITY_LOC, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.27928 0.31590 0.21331 0.19151

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 4.08E-05
successive function values within tolerance limits

Coefficients :
                     Estimate Std. Error z-value  Pr(>|z|)
(Intercept):2      -0.0841371  0.0575316 -1.4625  0.143618
(Intercept):3      -0.0817447  0.0612580 -1.3344  0.182062
(Intercept):4      -0.9127704  0.0951926 -9.5887 < 2.2e-16 ***
price              -0.1904667  0.0217609 -8.7527 < 2.2e-16 ***
OriIta             -0.3252830  0.0506081 -6.4275 1.297e-10 ***
OriSpa              0.9099438  0.0410525 22.1653 < 2.2e-16 ***
CerRfm              0.0085077  0.0450825  0.1887  0.850317
CerMsc              0.1373883  0.0447229  3.0720  0.002126 **
price:CITY_LOC2.0  -0.0018412  0.0183894 -0.1001  0.920246
OriIta:CITY_LOC2.0 -0.1210105  0.0707034 -1.7115  0.086984 .
OriSpa:CITY_LOC2.0  0.1155703  0.0563399  2.0513  0.040237 *
CerRfm:CITY_LOC2.0  0.0086169  0.0619697  0.1391  0.889410
CerMsc:CITY_LOC2.0 -0.0464675  0.0611639 -0.7597  0.447421
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -3964.2
McFadden R^2:  0.15685
Likelihood ratio test : chisq = 1474.9 (p.value = < 2.22e-16)
```

Screenshot 35 MNL model for BURGERS in SPAIN including CITY SIZE

```
Call:
mlogit(formula = CHOICE ~ price + price:CITY_SIZE + OriIta +
    OriIta:CITY_SIZE + OriSpa + OriSpa:CITY_SIZE + CerRfm + CerRfm:CITY_SIZE +
    CerMsc + CerMsc:CITY_SIZE, data = RCEchoice.data, reflevel = "1",
    method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.27928 0.31590 0.21331 0.19151

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 4E-05
successive function values within tolerance limits

Coefficients :
                  Estimate Std. Error z-value  Pr(>|z|)
(Intercept):2    -0.083864   0.057542 -1.4574 0.1449963
(Intercept):3    -0.081425   0.061235 -1.3297 0.1836167
(Intercept):4    -0.914519   0.095217 -9.6045 < 2.2e-16 ***
price            -0.251792   0.034070 -7.3904 1.463e-13 ***
OriIta           -0.426461   0.113826 -3.7466 0.0001792 ***
OriSpa            1.219381   0.090700 13.4441 < 2.2e-16 ***
CerRfm            0.062082   0.098496  0.6303 0.5284963
CerMsc            0.100853   0.098045  1.0286 0.3036489
price:CITY_SIZE   0.025751   0.011792  2.1837 0.0289879 *
OriIta:CITY_SIZE  0.016362   0.045799  0.3573 0.7208996
OriSpa:CITY_SIZE -0.105772   0.036492 -2.8985 0.0037500 **
CerRfm:CITY_SIZE -0.021739   0.039860 -0.5454 0.5854849
CerMsc:CITY_SIZE  0.005207   0.039436  0.1320 0.8949539
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -3962.1
McFadden R^2:  0.15728
Likelihood ratio test : chisq = 1478.9 (p.value = < 2.22e-16)
```

Screenshot 36 MNL model for BURGERS in SPAIN including INCOME

```
Call:
mlogit(formula = CHOICE ~ price + price:INC_02 + OriIta + OriIta:INC_02 +
    OriSpa + OriSpa:INC_02 + CerRfm + CerRfm:INC_02 + CerMsc +
    CerMsc:INC_02, data = RCEchoice.data, reflevel = "1", method = "nr")

Frequencies of alternatives:choice
      1       2       3       4
0.27928 0.31590 0.21331 0.19151

nr method
5 iterations, 0h:0m:0s
g'(-H)^-1g = 3.75E-05
successive function values within tolerance limits

Coefficients :
               Estimate Std. Error z-value  Pr(>|z|)
(Intercept):2 -0.083053   0.057612 -1.4416 0.1494201
(Intercept):3 -0.084676   0.061355 -1.3801 0.1675526
(Intercept):4 -0.910355   0.095420 -9.5405 < 2.2e-16 ***
price         -0.223082   0.032436 -6.8777 6.083e-12 ***
OriIta        -0.370447   0.105544 -3.5099 0.0004483 ***
OriSpa         0.794886   0.084287  9.4308 < 2.2e-16 ***
CerRfm        -0.202520   0.093497 -2.1661 0.0303069 *
CerMsc         0.069192   0.091624  0.7552 0.4501440
price:INC_02   0.016333   0.013237  1.2338 0.2172607
OriIta:INC_02 -0.011059   0.050808 -0.2177 0.8276940
OriSpa:INC_02  0.091719   0.040559  2.2614 0.0237375 *
CerRfm:INC_02  0.110750   0.044767  2.4739 0.0133645 *
CerMsc:INC_02  0.022081   0.043895  0.5031 0.6149257
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Log-Likelihood: -3957.8
McFadden R^2:  0.15821
Likelihood ratio test : chisq = 1487.7 (p.value = < 2.22e-16)
```

Annex 6. CROFISH consumer survey

This section contains the results of the surveys collected at *Crofish 2019*, the only Croatian international fish related fair, during the edition that took place in between the 22nd and the 24th of November 2019.

Crofish's objective is to create an environment where all the economic subjects active in the field of fishing, aquaculture and sport fishing in Croatia or neighbour countries can meet and talk to each other. The final scope is to improve the consumption and strengthen the fishing infrastructure through a collaborative approach.

DATA COLLECTION

Two different surveys have been there collected, with two radically different audiences and objects.

The first questionnaire (from now on, Consumers Survey) has been submitted to a sample of 32 consumers (families and single consumers, even not related to the fish supply chain by passion or job) gathered during a food exhibition show inside Crofish 19. Along with the survey, the respondents were asked to taste an innovative fish product and share the feedback. During the whole period, 7 portions of Clams where tried, along with 12 Shrimp Burgers, 11 Shrimp Paté and 1 Salad of Musky Octopus.

The survey has been divided into two parts. The introduction is aimed at the construction of the consumer archetype, including questions on *Age*, *Gender*, *Country of origin* and if the person *does live within 10 Km from the sea*. The second part is directly aimed at receiving feedbacks on the proposed product. Questions of this section are whether the respondent likes the proposed dish (in general terms and specifically regarding the taste and the consistence), if he/she would be interested on buying this product at the supermarket/shop and last (if the previous question was answered positively) if he/she would prefer to find it in a ready-to-cook, raw or semi-processed version.

The second questionnaire (from now on, General Survey) has been submitted to a largest base, composed by 61 people. The sample of this survey includes only fishing-related professionals (from all the stages of the supply chain), and it thereby responds to a more professionalized public. Its aim, mainly fulfilled in the second section, was to inquiry and understand the fish-products related habits and the consumers generic attitude towards seafood and fishery products. Further questions were assessed in the third section with the scope to define the perceived importance of some key-concepts, particularly appreciated by the market lately.

The first part of the survey is supposed to define habits and preferences. It contains questions on the FAPs purchases, asking how often the respondent use to buy fishery products, where do they buy them and which are the most bought/consumed species. It also investigates which are the preferred state of preservation (fresh, chilled, frozen, smoked, preserved/canned) and presentation (whole, fillet, gutted or others).

A second part is committed to sound out the perceived importance of the sustainable fisheries, the geographic origin of the product, the recognizability of the private brands/labels and the public certifications of quality origin, sustainability or similar aspects. Also, an evaluation is asked to the respondents regarding innovative fishery products such as burgers, carpaccio, fish balls and others.

The last part shared the same answers of the Consumers Survey, asking for *Gender*, *Age*, *Country of origin* and if the person *does live within 10 Km from the sea*.

RESULTS

The Consumers Survey included a statistical universe of 32 people. Between them, 15 answered to be women and 17 to be men. The majority of the respondents (23) are Croatian citizens, while the other 9 are Italians. A strong majority of 25 persons also declared to live within 10 Kilometers from the seacoast, while the remaining 7 do live in the inland.

Speaking about age groups, a clear preponderance is identified with 22 respondents within the 26-50 years old range. A consistent share of 9 persons also lies in the 50-65 years-old range, while only one respondent is between 18 and 25 years old.

The following results have been obtained dividing by proposed specific dish. The Musky Octopus salad has not been considered due to the sample only including one person.

Clams

From the universe of 32 people a sample of 7 people was provided with a Clam dish. All of them were Italians, 4 were men and 3 women. Four of them live on the sea cost while 3 in the inland. About age-ranges, one of the respondents was between 18 and 25 years old, 3 were between 26 and 50 and 3 between 50 and 65.

On a scale from 1 to 5 points (where 1 means *don't like* and 5 means *really like*), the question "*Do you like how the dish you tried has been prepared?"* realized an average value of 3,43 and a Standard Deviation of 0,975. The following table shows the answer distribution.

1 (don't like)	2	3	4	5 (really like)
0	1	3	2	1

On the same scale, the question *"Do you like the taste?"* presents an average value of 3,14 and a Standard Deviation of 1,07.

1 (don't like)	2	3	4	5 (really like)
0	2	3	1	1

The last organoleptic question on the product, "*Do you like the consistence?"* scored an average of 3,43 and the lowest Standard Deviation of 0,79.

1 (don't like)	2	3	4	5 (really like)
0	1	2	4	0

A confrontation from the previous three answers makes clear that the product has been liked in its general characteristics, with a higher score for its consistence than for its taste.

The whole sample of 7 respondents answered that would *Probably buy this product in a shop*. It's worth noting that no one chose negative (but open) answers, or positive answers conditioned by price or availability.

The last question was intended to explore feedbacks on this product being in a different shape/version, such as Raw, semi-processed or Ready-to-Eat. The 75,1% (5 respondents) expressed preference for a raw version of the product while an equal share of 14,3% (1 respondent each) declared to prefer a Ready-to-eat or a semi-processed version.

Shrimp Burger

From the total population of the survey, 13 persons (2 Italians and 11 Croatians) were proposed to try a Shrimp burger. More in detail, all the Italians came from Italian inland while all the 11 Croatians do live within 10 Kilometers from the coast.

The major part of the respondents (10 people) is within 25 and 50 years old, while the rest of them is between 50 and 65.

This product concept obtained a very high appreciation score. The 92,3% (12/13) of the respondents promoted how the dish has been prepared with a full score (5/5) while the last voted 4 out of 5, so that the average vote is 4.92/5.

1 (don't like)	2	3	4	5 (really like)
0	0	0	1	12

The average value for the dish' taste scored 4,76/5. No vote under the 4 has been submitted.

1 (don't like)	2	3	4	5 (really like)
0	0	0	3	10

The question about the product's consistence registers an average value of 4,54/5. Even for this point no vote under the 4 has been submitted.

1 (don't like)	2	3	4	5 (really like)
0	0	0	6	7

General feedback on Shrimp Burger evidence that this dish as a whole has been highly appreciated in its general characteristics. More in detail, its taste has been evaluated more positively than its consistence.

The answer about the willingness to buy evidenced how the 54% of the sample would buy this product in a shop. The 30,1% declared that would buy this product but considers the price a major constraint, while the 7,7% (one respondent) considers it to be the availability. Nobody answered that would not buy this product in any case, and one last respondent anchored his/her willingness to buy to the product being fresh.

The last question divided the sample in a more symmetric way. The same share of respondents (46,1%, 6 people), declared to like more the possibility to encounter in the shops this product in a raw version and in the Ready-to-eat one.

Shrimp Paté

From the universe of 32 people a sample of 11 people was selected to taste a Shrimp Paté. They are 5 women and 6 men, all coming from Croatia. Nine of them live within 10 kilometers from the seacoast, while the remaining two do live in the inland. All but three of them (who are 50-65 years old), are in the 26-50 years old range.

The general appreciation for this dish scored an average 4.45/5. Despite "5" being the answer chosen by the great majority, the average value is lowered by one "2".

1 (don't like)	2	3	4	5 (really like)
0	1	0	3	7

The average value for the Shrimp paté's taste scored 4,36/5. 6 out of 11 responders answered with an enthusiastic 5 while all the others but one answered 4.

1 (don’t like)	2	3	4	5 (really like)
0	1	0	4	6

The consistence of the paté has the same exact distribution of votes as of taste, except for one respondent who switched from 4 to 3. The average value is 4,27/5.

1 (don’t like)	2	3	4	5 (really like)
0	1	1	3	6

This product has been thereby clearly appreciated by the audience in its general characteristics. The taste recorded a slightly higher score than consistence.

On the whole sample, 8 people answered that would probably buy this product in a shop if they had the occasion and 2 declared to be interested depending on the price. The last interviewed explicated his/her not willingness to buy this product because “*it doesn’t taste like shrimp, more like some kind of fish, unsalted*”.

The consistent majority of the sample (72%) expressed its preference for a Ready-to-eat version of the Patè, opposed to the 18% who prefers a raw adaptation and the 9% who would rather endorse a semi-processed version.

GLOSSARY AND ACRONYMS

FAP's = Fishery and aquaculture products

Apparent Consumption = Stock (at t=0) + Catches + Import – Export – Leftovers

LSRT = Large-Scale Retail Trade

MS = Member State (of the European Union)

CAGR = Compound Annual Growth Rate

WTP = Willingness to pay

WTB = Willingness to buy