

MACKEREL GENDER ASSESMENT

AZTI

17. 10. 2019



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Project acronym: Smart Food Supply Chains

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Template for good practice cases

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WP leader: CBHU

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Dissemination Level		
PU	Public	
PP	Restricted to other program participants	
RE	Restricted to a group specified by the consortium	
CO	Confidential, only for members of the consortium	CO

1. Title of the case description

MACKEREL GENDER ASSESMENT

2. Indicate your role in the Smart Food Supply Chain (AZTI, project partner):

- individual member of the chain:
- chain operator:
- network operator:
- association:
- technical, scientific, or management expert:
- advisor:
- policy maker:
- other:

3. Indicate the region (if applicable): world-wide supplier network

4. WP2 Cross-reference table

Please indicate with an X in the relevant box of the matrix for which needs and the steps / functions of the supply chain the described innovative solution is applicable

		Individual steps of the SFSC							Short food supply chain as whole						
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Needs of the consumers (citizens)	food safety	X	X		X	X		X	X	X	X				
	food quality	X	X		X	X		X	X	X	X				X
	trust	X	X					X	X	X	X				
	ethical aspects														
	accessibility														
Needs of the chain actors	fair price	X	X		X				X	X					
	increased negotiating power	X	X		X				X	X					
	shared use of available resources	X	X												
	product development support		X		X										
	access to markets and consumers	X	X		X										X
	access to infrastructure														

1: Farming

2: Primary production

3: Transport

4: Processing and packaging

5: Storage

6: Logistics

7: Sale

8: Product integrity, authenticity, transparency

9: Marketing concepts

10: Food chain management and networking for enhancing cooperation among chain actors

11: Business modelling

12: Policy environment

13: Legal requirements

14: Labelling

5. Short description of the innovative solution

- **Describe the specific need or problem being addressed by the case and please explain what is the novelty of this innovative solution**

In temporary fish products as Mackerel, there are tons of fish in a short period of time (days), that is why because of the demand/offer the price of this fish goes down extremely. The differentiation of mackerel`s sex without opening it is a solution to give added value to this fish species as the price for both sexes are different. The interest in this separation is that in Europe the females are most appreciated because of the presence of gonads/caviar inside them and in the Japanese market the males are highly appreciated because of the leton (male gonad). In the past, this classification was done manually by pressing the anus of the fish and observing the colour of the effluent liquid. Here, we propose a technological innovation by the use an automatic classification process. This method is composed by colorimetric sensor and a robot that separates the classified fish by the sensor.

- **Describe the enabling function(s) and the practical benefit(s) - (e.g. for which types of problems and opportunities is used and can it be used, and how)**

The solution proposed is able to classify the sex of a mackerel in milliseconds (less than 200), the accuracy of the colorimetric sensor is the 100% and the success of the whole solution (including artificial vision, classification and movements of the robot) is more than 95%. The speed of the automated classification process is 2 fish (350—500grams) per second. Comparing with the traditional classification process the productivity has been increased in a 50% (from 4800fish/h to 6300fish/h) with only the need of 2-3 people instead of 20. The manipulation of the fish has been reduced at maximum taking into account that the gripper that has the sensor installed does not catch the fish, it is only positioned over the fish. Moreover, this makes possible to access to new markets (exports) because the fish can be frozen once been classified.

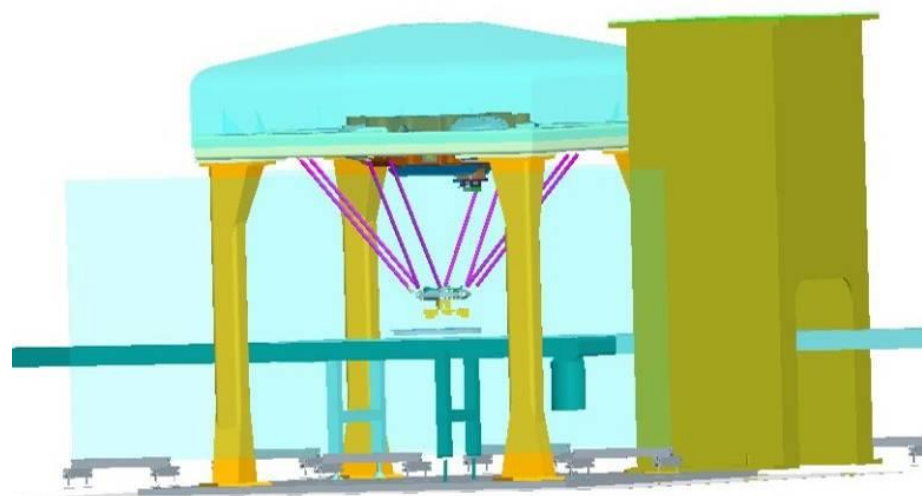
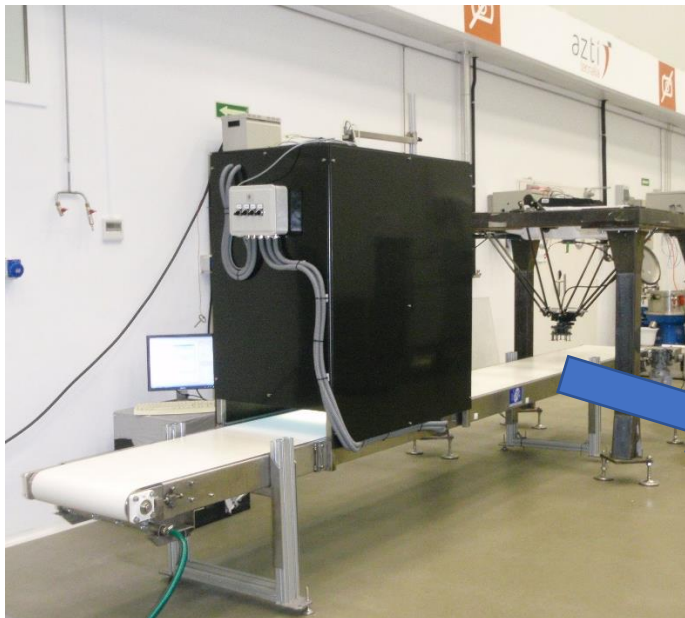
- **Describe the method/procedure/technology/solution implemented. (Please explain, whether the innovative method is a product / service / process / marketing or organizational / management innovation) After completing the description, please indicate, whether this innovation is a technological or non-technological one.**

The technological solution proposed is a process to classify mackerel according to it sex.

The procedure to classify the mackerel attending to the sex consists of four principal steps; 1. Detecting the fish over the conveyor belt (artificial vision), 2. Positioning the gripper in a concrete location over the gonad of the fish depending of the size of the sample, 3. Puncture of the sample with the probe (1,5mm) and determine the sex of the fish with the colorimetric sensor and 4. Move the fish to the correspondent bin attending to the sex determined by the sensor. At the completion of the process, the classified products will have retained its form, volume and original structure (the small hole produced during the process does not affect to the quality of the gonads) as well as all its physical, chemical and biological properties.

technological

non-technological



1. Figure: Mackerel gender classification

- **Describe the business, which implemented the innovated solution (size, country, region, location, type of food)**

This innovation can be used for a small/medium sized business or a multinational company, it is independent of the size of the business to be applied. The size and the capacity of the required classification machine depends on the volume of the production.

The innovation proposed can be applied as a collaborative investment.

- **Describe the distribution channels of the product(s)**

After being classified the mackerel, there are many solutions in terms of distribution of the different products:

- The whole fresh fish, can be sold fresh to a local companies/consumers to consume them as a whole, the female mackerel has more fat in the muscle so their fillets are more juicy
- The whole fresh fish, can be sold fresh to a local companies to extract the gonads and sell different products (gonads and fillets)
- The fillets and gonads can be frozen and exported
- The whole frozen fish can be exported

- **Describe what makes the innovation work.**

- This is a classification process that enable to give added value to mackerel
- Enable to obtain different products
- existing different sizes of machine according to the capacity required
- high efficacy of classification
- high productivity
- preserve quality and taste
- save on operational costs (labour) comparing to traditional process
- not many workers required to control de process

- **Describe the specific prerequisites for the business related to the implementation of the method and/or related to the location, method, procedure, solution**

a: List the relevant necessary resources (including the estimated cost) for the specific innovation.

Please list the relevant ones only (list is annexed)

MATERIALS:

- Fresh or frozen fish, ...
- local perishable

HUMAN:

- human resource for operation (1-2 persons per production line, depend on automation/inversion). The skill for these persons is production because the provider of the know-how (technological center) will develop the procedure/process

TECHNOLOGY:

- Capacity required, because the capacity is related with the size of the machine
- Patent: There are 2 patents involved, so there is necessary to do an agreement to do the industrial exploitation

FINANCIAL

- estimated cost: depends on the volume of the production, but for each line cost can be between 200.000-300.000€ (1-2 fish/second, 350-500g/fish)

b: List the relevant necessary capabilities for the specific innovation.

Please list the relevant ones only (list is annexed)

FOOD SAFETY:

- basic skills to comply with the EU food safety regulations
- food safety culture (motivation, responsibility for food safety) and basic skills for the implementation of HACCP

FOOD QUALITY:

- ability to define the target segments of consumers for SFSCs
- ability to define the product characteristics which are (tacit) basic requirements for the target segment(s) of consumers;

- ability to define which product attributes/levels and augmented services represent an added value for the target segments of consumers;
- food quality culture (motivation, responsibility for food quality);
- ability to provide distinguishable quality which meets the needs of the targeted consumer segment;
- ability to access the consumer willingness to pay for specific products of SFSCs.

INPUT FOR R+D:

- ability to develop new products, **processes**, packaging, preservation techniques, systems and access to new markets, including in other categories;
- access to innovative technologies
- access to local input for R+D covered by other aspects

ACCESS TO MARKETS: AND MARKET SUCCESS:

- effective promotion, customer service, efficient and innovative sales methods;
- ability to understand consumer's needs;
- ability to organise logistics efficiently and to exploit innovative solutions and distribution channels,
- ability to develop and implement new business models for ensuring access of consumers to products and augmented services, develop the market accessibility for the suppliers.
- stock control;

- **The method/technology was established by**

NAME: INSEAR ROBÓTICA,S.A

ADDRESS: Derio Bidea 55. C.P.: 48100. Mungia, Bizkaia, España.

DEALER AND SERVICE POINTS: Spain

APPLICATION AREAS:

The innovation is applicable to fresh or frozen Mackerel

6. Describe the results, achievements and typical failures

- New products development
- Better structure, less bacteria growth, longer shelf life.
- Saving labour cost compared to the traditional process
- Availability of the products the whole year
- Stability in the prices of the products due to the stability in the supply
- Increase the market, access to far markets

7. Summarize what makes the case to a good practice for the members of the SFSCs (e.g. lessons learned)

The innovation proposed make possible to increase the added value of mackerel by facilitating the sex determination processing a quick way. This make it possible to obtain more products from the same fish (whole product classified, male/female gonads fresh or frozen). So, this means that the companies incorporating it could reach new markets (farther markets as well as new customers due to the development a different products) and increase the sales of perishable fresh food or seasonal products. Moreover, this technology offers a high-quality final products.

8. Aspects, methods for transfer of methods for other SFSC members

This technology is applicable to various SFSC members, it is mainly recommended for fishermen associations and first transformation industries, so an aspect that could be taken into account could be to construct a shared platform in which some member could access to the technology in order to share cost of the inversions (e.g. agro-food cooperatives).

9. Recommendations for members of other SFSCs for further applications

Mackerel gender assessment can be used for small businesses where it is necessary to give added value to the products.

The capacity of the gender assessment line maybe is not probably 100 % used for one company (depend of the necessities of each one) but they can associate to share the technology in order to increase the profit obtained, even if one of them alone find the business profitable. Collective financing, scheduled operation can be effective for the small businesses. Small and high capacity equipment are available.

10. More information is available at (web), if it is relevant

<https://www.inser-robotica.com/contacto/>

Annex

1. Checklist for necessary resources (tangible and non-tangible):

- materials (access to: raw materials/ ingredients - including volume, land – including size, packaging materials)
- human: labour force: size, knowledge & skills (production, technical, marketing, managerial, ICT, financial, etc.)
- technology: patents, know-how, trademarks, copyrights, trade secrets
- infrastructure, equipment, facilities, - size, minimum volume of production/sales, IT infrastructure
- information, reputation, brand, trust
- financial*

*: estimated cost:

0 - 10 000 Eur
10 001 - 50 000 Eur
50 001 - 100 000 Eur
100 001 - 300 000 Eur
300 001 – 1 000 000 Eur
1 000 000 Eur above –

- other specific necessary resources for the application of the specific innovation

2. Checklist for the necessary capabilities

- **food safety:**
 - basic skills to comply with the EU food safety regulations
 - ability to understand what makes the product safe (the key controls, which ensure the safety of the product – biological, chemical and physical hazards, providing the safety shelf life of perishable products)
 - food safety culture (motivation, responsibility for food safety) and basic skills for the implementation of HACCP

- **food quality:**
 - ability to define the target segments of consumers for SFSCs
 - ability to define the product characteristics which are (tacit) basic requirements for the target segment(s) of consumers;
 - ability to define which product attributes/levels and augmented services represent an added value for the target segments of consumers;
 - food quality culture (motivation, responsibility for food quality);
 - production experiences which help to provide the expected quality reliably, uniformly;
 - ability to provide distinguishable quality which meets the needs of the targeted consumer segment;
 - meeting (local) legal requirements, application of the labelling rules;
 - ability to access the consumer willingness to pay for specific products of SFSCs.

- **trust:**
 - ability to ensure product integrity, authenticity and transparent information for the consumers (including systems, tools);
 - ability to access external trust enhancers (third party certification, internal certification system, participatory guarantee systems);
 - application of the labelling rules and branding (mandatory and voluntary);
 - ability to meet third party certification requirements

- **ethical aspects**
 - ability to understand consumer needs for ethical behaviour related to the specific product(s) of the SFSCs;
 - culture for ethical food production and supply;
 - ability to implement necessary measures to ensure ethical food production and supply;
 - ability to access the consumer willingness to pay for products meeting ethical aspects

- **accessibility to consumers:**
 - ability to organize logistics efficiently and to exploit innovative solutions and distribution channels;
 - efficient, innovative sales methods;

- ability to develop and implement new business models for ensuring access of consumers to products and augmented services;
- **fair price:**
 - collecting marketing information;
 - ability to enhance and maintain cooperation among chain actors including the combined use of available complementary resources, capabilities, competences of SFSCs actors, networking, understanding the principles of food value chain management;
 - ability to define, develop or maintain unique quality of products and augmented services;
 - ability to develop and implement new business models;
 - ability to access the consumer willingness to pay for fair price
- **increased negotiation power:**
 - collecting marketing information;
 - ability to enhance and maintain cooperation among chain actors including the combined use of available complementary resources, capabilities, competences of SFSCs actors, networking, understanding the principles of food value chain management, cooperation culture;
 - ability to define, develop or maintain unique quality of products and augmented services;
 - ability to develop and implement new business models;
- **shared use of available resources:**
 - ability to enhance and maintain cooperation among chain actors including the shared and combined use of available complementary resources, capabilities, competences of SFSCs actors, networking, understanding the principles of food value chain management, cooperation culture;
 - the level of value chain management culture;
 - ability to access the consumer willingness to pay for food with reduced environmental impacts

- **input for R+D:**
 - ability to monitor, research, evaluate, and understand the needs and wants of customers and consumers;
 - ability to develop new products, processes, packaging, preservation techniques, systems and access to new markets, including in other categories;
 - access to innovative technologies; distribution and marketing solutions and methods. management systems;
 - access to local input for R+D covered by other aspects

- **access to markets: and market success**
 - effective promotion, customer service, efficient and innovative sales methods;
 - ability to understand consumer's needs;
 - ability to organise logistics efficiently and to exploit innovative solutions and distribution channels,
 - unique value propositions;
 - ability to develop and implement new business models for ensuring access of consumers to products and augmented services, develop the market accessibility for the suppliers.
 - stock control;
 - ability to access to required raw materials within a restricted geographical area

- **access to infrastructure:**
 - ability to use existing own infrastructure in a focused way to serve consumer needs or to combine it with complementary infrastructures of other SFSC actors, cooperation culture;

- **management:**
 - to implement management systems for vision, planning, implementing), coordinating, controlling, monitoring, continuously;
 - improving; ability to motivate, authorize staff;

- **production, processing:**
 - management system, production experience, specific controlling, monitoring, continuously;
 - willingness to consider and ability to evaluate the adoption of TECI and NTI in the current production processes;
 - any additional specific resources necessary for the application of the specific innovation.