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INNOVATIVE BLOCKCHAIN TRACEABILITY TECHNOLOGY AND STAKEHOLDERS' ENGAGEMENT STRATEGY FOR BOOSTING SUSTAINABLE SEAFOOD VISIBILITY, SOCIAL ACCEPTANCE AND CONSUMPTION IN EUROPE

DELIVERABLE 6.3 – Exploitation plan and IPR management strategy

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5	14/03/23	Matthieu Hug Enrique Amaré	Changes to exploitation

Document Approval

Name	Role	Action	Date
Carlos Mazorra	Project Coordinator	*Approved*	23-Mar-23

Nature of the deliverable

R	Document, report (excluding the periodic and final reports)	☒
DEM	Demonstrator, pilot, prototype, plan designs	☐
DEC	Websites, patents filing, press & media actions, videos, etc.	☐
DATA	Data sets, microdata, etc.	☐
DMP	Data management plan	☐
Ethics	Deliverables related to ethics issues.	☐
SECURITY	Deliverables related to security issues	☐
Other	Software, technical diagram, algorithms, models, etc.	☐

Dissemination level

PU	Public — fully open (automatically posted online on the Project Results platforms)	☒
SEN	Sensitive — limited under the conditions of the Grant Agreement	☐

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Current seafood traceability tools and services have the potential to take advantage of novel blockchain technologies to obtain a wide range of data making sustainable seafood practices more visible to consumers. Sea2See project will fill in existing seafood traceability gaps through development and demonstration of an innovative end-to-end blockchain traceability model throughout the seafood value chain and professional and consumer applications to increase trust and social acceptance of sustainably fished and farmed seafood.

The project will provide technological solutions to answer the need of a valuable source of data collected throughout the whole seafood value chain, verified, and covering inputs from diverse stakeholders. For that purpose, a specific focus will be put on active commitment of stakeholders and real empowerment of consumers through the implementation of societal and sectoral strategies for co-creation, communication and awareness raising.

The project runs from July 2022 to June 2026. It involves 14 partners from 6 EU countries, and is coordinated by SMARTWATER PLANET SL, Spain.

More information about the project can be found at: http://www.sea2see.eu/

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EXECUTIVE SUMMARY

The exploitation plan and IPR management strategy of each partner is defined regarding the following main points:

- How to use and receive commercial benefits by the final Sea2See working product, defining who can sell and use it.
- How to manage the IPR generated in the project, addressing the ownership of the IPR, and the management of access rights to such IPR by the project partners.

ACRONYMS AND ABBREVIATIONS

ACRONYM	DEFINITION
SWOT	Strength, Weakness, Opportunity, Threat
USD	United States Dollar
CAGR	Compound annual growth rate
SALT	Seafood Alliance for Legality and Traceability
GDST	Global Dialogue on Seafood Traceability
IPR	Intellectual Property Rights
KER	Key Exploitable Results
SDK	Software Development Kit
RFID	Radio-frequency identification
IOT	Internet of Things
EU	European Union
USA	United States of America
IUU	Illegal, Unreported, And Unregulated
MSC	Marine Stewardship Council
ASC	Aquaculture Stewardship Council

PROJECT PARTNERS

#	Partners full name	Short	Country	Website
1	SMARTWATER PLANET SL	SmartWater	ES	www.smartwaterplanet.com
2	TILKAL	Tilkal	FR	www.Tilkal.com
3	PAGE UP	PAGE UP	FR	www.pageup.fr
4	SUBMON	SUBMON	ES	www.submon.org

5	CENTRO DE CIENCIAS DO MAR DO ALGARVE	CCMAR	PT	www.ccmar.ualg.pt
6	ASOCIACION NACIONAL DE FABRICANTES DE CONSERVAS DE PESCADOS Y MARISCOS-CENTRO TECNICO NACIONAL DE CONSERVACION DE PRODUCTOS DE LA PESCA	ANFACO	ES	www.anfaco.es
7	IOANNA N.ARGYROU SIMBOULOI EPICHEIR ISIAKIS ANAPTYXIS ETAIREIA PERIORISMENIS EYTHYNIS	NAYS	EL	www.nays.gr
8	SEAENTIA-FOOD, LDA	SEAentia	PT	www.seaentia.com
9	LANDLNG AQUACULTURE BV	LA	NL	www.landingaquaculture.com
10	UNIVERSIDADE DE AVEIRO	UAVR	PT	www.ua.pt
11	VITAGORA POLE	VITAGORA	FR	www.vitagora.com
12	ETHIC OCEAN	Ethic Ocean	FR	www.ethic-ocean.org
13	EVROPROJECT OOD	EP	BG	www.europroject.bg
14	ANP - ASSOCIACAO NATUREZA PORTUGAL	ANP	PT	www.natureza-portugal.org

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1. IDENTIFICATION OF THE INNOVATIVE EXPLOITABLE ASSETS

Starting from the ideas in the Description of Action for Sea2Sea and through consultation with the project partners, we have obtained an identification of the innovative exploitable assets, whether these are technological components or added value services, that the project will deliver. Key Exploitable Results (KERs) and related exploitation strategies have been preliminarily identified by the consortium members. We consider a broad definition of exploitation, which considers the KERs of the project as any asset that can be used for:

1. Further research activities
2. Developing and/or commercialising products or processes
3. Creating and providing services
4. Standardisation activities
5. Improving policies
6. Addressing various environmental, societal, and economic issues.

In the original proposal, we already identified the main KERs of the project. That has been the starting point of our current analysis. However, we have validated all the assets in our final lists through direct interviews with the project partners. Therefore, we consider the following assets, which have been considered exploitable assets at least by one project partner:

1. The blockchain-based Sea2See traceability solution for the fishery and aquaculture industries is clearly the main exploitable asset and its development is the main objective of the project. This asset is comprised of three main components:
    a. **Blockchain-based traceability solution**, (by Tilkal) which is a general-purpose traceability solution that will be adapted to the fishery and aquaculture industries during the Sea2See project. The partner Tilkal will adapt their existing technology, already in the commercialization stage in other industries such as textiles, cosmetics, and others. The platform is the same for all applications to different industries although customized for each of them by adding specific features. During the Sea2See project, new features need to be developed to adapt the platform to the needs of the fish and seafood industry from farm to fork.
    b. **Two SDK sets with documentation**. (by Tilkal) Full documentation of the Sea2See Data Collection SDK along with implementation samples, to allow as simple as possible interactions with the Sea2See information system:

i. One SDK for RFID data collection: provide a library that handles communication and data collection from defined RFID readers.
ii. One SDK for data transmission to the blockchain-based traceability platform: provide a library that handles communication with the Sea2See platform.

The SDK for Sea2See is an inseparable part of the blockchain-based platform that is the main asset of the project. The RFID SDK is optional and depends on the end user's needs. Therefore, they will be commercialized as part of the whole platform, as components that potential users will need to interact with the platform.

c. **IoT traceability solution for fish farms** (by Smartwater) to produce inputs related to sustainable practices. It has been developed by Smartwater and will be adapted to provide data on sustainable practices automatically to the traceability platform. The system integrates a software suite that combines a plug-and-play IoT, multifunctional, autonomous, and rechargeable device to provide online real-time measurements from advanced water quality sensing technology (MEDUSA™), with a production management suite (SmartWater Cloud) to optimize production at fish farms, business potential and sustainability improved with autonomous learning capabilities. The system includes the traceability records of all the processes involved in aquaculture production.

2. Further exploitation assets are mostly related to specific knowledge and know-how acquired during the Sea2See project, which can be further applied to the fish industry or other food industries:
   a. **Sea2See Stakeholders' Engagement strategy and methodology**, (see D1.1) which has provided an in-depth knowledge of the fishing and fish farming industry regarding stakeholders that goes beyond the literature, including much more stakeholders than any other study in several European countries. This strategy focuses on identifying each stakeholder group of Sea2See with the aim of implementing appropriate and targeted actions for their active involvement and contribution to seafood sustainability. Upon their identification, a framework of their perspectives and approach was created to be used as a basis for developing strategies to promote shared understandings, increase knowledge and influence the behaviour of each group. Sea2See Methodology on stakeholders' engagement aims at three main results: 1) Methodological framework for analysis of the barriers to value chain actors related to blockchain traceability deployment in the seafood sector in the EU; 2) Identifying and engaging key end-to-end value chain actors to contribute to the blockchain technology demonstration 3) A strategy for multistakeholder engagement that is developed taking into account the comparability across demonstration sites, seafood products and countries. This methodology is suitable to be applied to other industries.

b. **Report on the main impediments and potential incentives for the introduction of blockchain in the Seafood industry to solve the problem of full-chain traceability**. The goal is to produce a comparative cross-country analysis including legal barriers, price, unacceptance from producers/other stakeholders to introduce a technology leading to potential full traceability of seafood in the EU. The role of blockchain technology (as part of the traceability of seafood) for raising the share of sustainable production in the sector (e.g., increased transparency of production practices) will be examined. This knowledge has also applications in other industries with share similar challenges regarding full-chain traceability, and can help other industries to apply a similar solution based on blockchain.

c. **Knowledge about the fish farming industry in other countries**, could lead some Sea2See's partners to internationalize their business services and import fish farming good practices well-developed in other countries particularly related to the differentiation of exploitations to new fish species. Differentiation is a significant trend in the industry and a key part of the efforts to make fish farming more sustainable. This knowledge may have significant value in consulting services.

d. **Barriers that consumers demand to overcome to buy more seafood.** The goal is to identify and categorize the main barriers to sustainable seafood consumption in Europe together with key stakeholders through a participatory process. The review covers innovative formats of seafood consumption, promoting new product acceptance, increasing consumer awareness of sustainable fisheries, and increasing willingness to pay for a product fished sustainability. Insights into consumer´s perceptions and trends are also likely to be gained. The use of Collective Intelligence and knowledge to identify barriers to sustainable seafood consumption and product acceptance includes the engagement of different stakeholders at different levels of the supply chain of aquaculture and fishery (producers, packaging, supermarkets and restaurants, final buyers, consumers, policymakers, journalists, and influencers).

e. Highly related to the previous asset, the Sea2See project will develop **a Sea2See consumer feedback collection tool** intended to maximize the impact on the seafood sector in Europe resulting from change in the consumption patterns towards higher consumption of sustainable seafood products. This asset is similarly applicable to other food industries.

f. **Know-how about Life cycle assessments in the context of the elaboration of environmental impact assessment study** as LCA is increasingly demanded in the many markets by producers and public organizations. Also, know-how to carry out studies on the social, financial, and economic impact of the fishing and fish farming industries.

g. **Report on Lessons learned and datasets from case studies/Pilot sites "logBooks"**, which includes the Dos and don'ts of the application of traceability technologies to the fishing industry (and potentially also other food industries) to improve the transparency and sustainability of the sector to enhance consumer trust and support

for those producers that prioritize high sustainability standards. This knowledge may have significant value to develop management good practices and policy-making recommendations in a wide range of food industries.

h. **Database with the outcomes of emergent contaminants in addition to the legislated parameters**: the Sea2See project will evaluate the presence of certain contaminants susceptible to be present in shellfish or fish applied to all Sea2See use cases. These analyses will be carried out every 3 months, taking into account the highest probability of occurrence in the sampled areas. Once the analyses have been carried out and the results have been compiled, a database will be created allowing a risk assessment for each contaminant. The new digital technologies developed and implemented on the project, and the non-frequent contaminants evaluated, altogether will contribute to enhance food safety and the trust and confidence of the consumer. This database has potential use in further research and for consulting services in the seafood industry for instance the Improrisk model or other EC platforms. Eventually data coul feed EFSA´s calls for contaminants concentration which are asked from time to time.

2. OWNERSHIP RIGHTS OF THE EXPLOITABLE ASSETS

The general rules for the attribution of Intellectual Property Rights (IPRs) over the identified assets of the project are defined in the Description of Action of the project and compliant with Horizon Europe rules:

1. The background brought into the project by each partner will be listed in the Consortium Agreement whenever relevant. When planned in the tasks, access to the background is given royalty-free to other partners for the implementation of the tasks, only during the project duration.
2. Results shall be owned by the partner who generated them. Each partner is responsible for ensuring the fulfillment of its obligations under the Grant Agreement regarding results, by deciding with any third parties that could claim rights to them.
3. Whenever results have been produced jointly between two or more partners, the ownership of the results is to be shared among the partners who have carried out the work. The terms of the joint ownership, protection and share of ownership are to be agreed in writing in a joint ownership agreement.
4. Each partner is responsible for examining the possibility to protect any results, which can be expected to be commercially or industrially exploited (Patent & Utility model, Industrial design, Copyright, Trademark, or Confidential information). When deciding on protection, the partner must consider its legitimate interests and the interests of the other partners.

5. Exploitation rights will be discussed among the partners to define the level of royalties for an external organization willing to exploit the results of the project. Access rights to results for research purposes only are granted on a royalty-free basis on fair and reasonable conditions excluding commercialization strategies.

According to these principles, we establish the ownership of the identified assets as follows:

1. **The blockchain-based traceability platform for the fishery and aquaculture industries** is the main exploitable asset of the project. The main contributors to the platform are the technology partners:
    - **Tilkal** is the owner of a blockchain-based traceability platform that during the Sea2See project is being adapted to the fish and seafood industry. The adaptation of Tilkal's blockchain-based traceability technology to the seafood sector value chain will follow a similar model to the one already applied to the textile industry. Tilkal is, therefore, the sole owner of this blockchain-based traceability solution. The Tilkal system is, for the most part, a previously existing background. Tilkal is also developing algorithms to analyze data from the platform. This model involves a partnership between Tilkal, Smartwater and Page Up who provide specialized technology and knowledge of the seafood industry.
    - **Page Up**, which provides the apps intended to facilitate the interactions of several stakeholders with the platform.
    - **Smartwater** provides the IoT traceability solution for the aquaculture industry, and is adapting it for fish farms to produce inputs related to sustainable practices in the system. Smartwater is, therefore, the sole owner of this IoT traceability solution. The Smartwater system is, for the most part, a previously existing background adapted to be able to communicate with the Sea2See platform and provide the key inputs from producers. Smartwater is also developing a certification module to enable third-party certification bodies to access information from the platform.

2. Regarding the additional assets of the project, the ownership will be distributed according to the previous principles. The percentage of ownership rights of each partner over every asset depends on its participation effort on the development calculated in persons months. Nevertheless, a proposal of the distribution of ownership rights of each asset among the Sea2See partners will be submitted to the partners as part of the task to develop the exploitation plan and after approval, it will be included in the final version of the exploitation plan.

3. SPECIFIC INDIVIDUAL EXPLOITATION INTERESTS

Several Sea2See's partners have shown interest in the exploitation of the identified assets:

- Tilkal is interested in the exploitation of the blockchain-based traceability solution for the seafood sector value chain.
- Page up is interested in the exploitation of the blockchain-based traceability solution for the seafood sector value chain, and in the exploitation of the two SDK sets with documentation.
- Smartwater is interested in the exploitation of the blockchain-based traceability solution for the seafood sector value chain, and in the exploitation of the IoT traceability solution for the fish farming industries.
- NAYS is interested in exploiting the knowledge and know-how acquired during the project:
    - As part of its current service portfolio (Sea2See Stakeholders' Engagement methodology, lessons learnt and datasets from case studies/Pilot sites "logBooks", and impediments and potential incentives for seafood blockchain deployment)
    - Knowledge about the fish farming industry in other countries, which could lead NAYS to internationalize their business services and import to the Greek fish farming industry good practices well-developed in other countries particularly related to the differentiation of exploitations to new fish species. Differentiation is a significant trend in the industry and a key part of the efforts to make fish farming more sustainable.
    - Know-how about Life cycle assessments in the context of elaboration of environmental impact assessment study as LCA is increasingly demanded in the Greek market by producers and public organizations. Also, know-how to carry out studies on the social, financial, and economic impact of the fishing and fish farming industries.
    - Using these assets to develop new knowledge through further application to new grants.
- Vitagora is an agri-food cluster involved in European projects who is considering to use the methodology for stakeholder engagement for other supply chains in the food industry, e.g., the meat industry.
- For ANP, the Sea2See project is part of its ongoing interest in sustainable consumption and marine conservation and restauration. They typically work with fisheries for the adoption of good practices and with public authorities for policy-making recommendations. Several of the exploitable assets of this project will enable ANP to continue their activities in this area, particularly, Sea2See Stakeholders' Engagement methodology, lessons learnt and datasets from case studies/Pilot sites "logBooks", and sustainable seafood consumption.

- ANFACO, is interested in exploiting the obtained results concerning seafood safety and quality through papers to disseminate the project with collaboration of all partners.
- The Centro de Ciencias do Mar do Algarve and also Universidade de Aveiro are both interested in the exploitation of the new data obtained through the Sea2See platform. The implementation of the Sea2See platform in the fishery and fish farming industries, initially to the octopus fishery and afterward to other fish species, opens an opportunity to develop new research on sustainability practices and policies for the fishery and fish farming industry. These organizations are interested in researching the data generated through the Sea2See platform with two objectives:
    - Generate policy advice to promote better sustainability practices
    - Disseminate research papers on the topic in national and international publications about:
        i. Better and more sustainable management practices in the fishery and fish farming industry.
        ii. Gain visibility of practices intended to add value to fish products by increasing transparency and traceability.

4. PRELIMINARY EXPLOITATION PLAN OF SEA2SEE'S MAIN ASSET

There are two preliminary and complementary exploitation options for the Sea2See blockchain-based traceability platform:

1. Commercialization of the platform in the seafood sector value chain through collaboration between the three technology partners of the project: Tilkal, Smartwater, and Page Up.
2. The European Commission might adopt the Sea2See traceability platform to create a universal traceability tool as a white-label project.

However, to be valuable the platform has a critical need for data, which enables to have end-to-end traceability and feeds the analytical capabilities of the platform. This data is provided by data suppliers:

- During the Sea2See project, the project partners and the demonstrators;
- During the exploitation stage, a variety of stakeholders from the seafood industry such as fisheries, fish farms, cooperatives, etc.

Data suppliers are key partners in the project because data is the main inventory asset. Without data, the platform fails to provide value.

The business model of the blockchain-based traceability solution for the seafood sector

It is expected that the Sea2See platform will replicate some of the main characteristics of the platform that Tilkal operates in other industries:

This business model has two main roles: data suppliers (free users) and data consumers (paying customers)

1. **Data suppliers**: they are free of charge, and they provide data that feeds the system and makes it valuable for potential customers by providing:
    a. End-to-end traceability
    b. Data to feed the analytical system
2. **Paying customers**, typically through a subscription model on an annual basis. The price of the subscription depends on a variety of factors that vary in different industries. It will be part of the detailed Sea2See exploitation plan to carry out an assessment of these factors for the seafood industry. This effort will be an essential part of Sea2See's pricing strategy. The following factors will be included in this assessment: volume of the market to aim to track, number of products, etc. Paying customers can be primary stakeholders that need/want to provide transparent and reliable sustainability information to consumers or need to comply with regulations and sustainability commitments:
    a. Distributors
    b. Industrial companies of processed seafood products
    c. Retailers, restaurants, hotels, etc.

The results coming from WP1 and WP2 on Stakeholder identification and Consumer barriers will contribute to the construction of the market definition and constitute a first step on market research for the exploitation of the Ses2See Platform and the rest of the prospective products of the project.

Revenue model

There are several potential revenue streams generated by commercializing the Sea2See project assets:

1. Subscriptions to obtain access to the data of the Sea2See blockchain-based traceability platform. Typically, they are stakeholders that have detected consumers' demand for increased transparency of seafood products, or which need to comply with regulations.
2. Fees for project management and set-up for stakeholders that demand customized integration with the Sea2See platform. These projects may last 6 months on average.
3. For selling the two SDK of the platform, there are several options and it is not clear yet which one would be the most suitable to market these assets:
    - Sell development time dedicated to developing applications to communicate with the Sea2See platform

- Selling licenses for the two SDK or the apps.
- Fees for support and maintenance, since the system will require to be updated periodically to work with evolving technology.
- Customers could ask to develop customized apps to interact with the platform.

There is probably no single model since many options may be available depending on customers' needs. Several of these options may work simultaneously. Selling licenses and fees are the main revenue model, but the stakeholders' integration with the platform, whether they are data suppliers or paying customers may require also some customized developments.

4. Smartwater will sell its IoT production management and traceability products associated to the platform for the aquaculture industry through a revenue model that combines asset sale for hardware and a subscription model for access to Smartwater Cloud.

In the final exploitation plan, we will define how the Sea2See partners will articulate and coordinate their exploitation efforts. See the section below "Partnership strategy" for a preliminary assessment.

Go-to-market strategy

Preconditions:

Attending to previous experiences, the go-to-market strategy of the Sea2See platform will depend primarily on two main contexts of facts:

- **Demand for transparency** from consumers creates competition between companies to develop new tools capable of providing enhanced transparency. Ultimately, when consumers demand transparency to ensure sustainable practices, it creates an opportunity for differentiation that some retailers are starting to seize. Retailer companies such as Albertson´s Companies, Hannaford, Foodlion, Annova (US), Ahold Delhaize Group's (The Netherlands), as well as private seafood companies like Thai Union group and High Liner Foods, and Chicken of the Sea, are already betting on traceability for their supply chains.
- **Regulatory context**: particularly in Europe and North America, it is expected that regulations regarding sustainability are going to be upgraded in the following years. It is expected that governments will demand from companies to be much more proactive regarding their sustainability. Stakeholders across the supply chain may be compelled to prove their sustainability practices.

These two contexts create the conditions to introduce Sea2See's traceability platform in the fish and seafood industry. Both conditions are likely already operating within these sectors, and this

trend is expected to accelerate in the following years. Therefore, the fish and seafood sector has become a good business opportunity to introduce an end-to-end traceability platform.

Communication strategy

These two factors just mentioned already operating in the target industry create the conditions for highly efficient and effective communication and marketing campaigns intended to raise awareness among the stakeholders. The main goal of our early communication efforts is to get visible and create awareness about the limitations of current traceability solutions (classic traceability), which fail to provide end-to-end traceability. They provide only traceability for one specific moment-stakeholder but fail to show the whole picture.

The main channels to disseminate this message are:

- Communications through newsletters, press releases, blogs, social media, etc.
- Speaking appointments in the main forums of the Seafood industry.
- Partnerships with stakeholders with interests in improving the traceability of sustainable practices in the Seafood industry: The EU, governments, non-profits, sectoral organizations, companies already betting on increasing transparency in the sector, etc.

Key success factors:

- The message must be simple, easy to understand
- The technology must be not too difficult to apply (optimum usability)
- Simple + specific + quick results
- The message must reach a sufficient number of stakeholders in the value chain

The main goal of our communication strategy at this stage is to capture early adopters in the industry.

Multiplying effect of the Sea2See's communication efforts: Early adopters will play a critical role in Sea2See's road to market since they will demonstrate the technology and also multiply our communications efforts. It is an inherent part of any stakeholder's investment in raising its transparency and sustainability efforts to make the public aware of these efforts, because these investments are a response to consumers' concerns and priorities. These investments are not meant to be kept secret but to be widely disseminated as they are an integral part of stakeholders' brand and positioning strategies. Therefore, the Sea2See project will benefit from a multiplication of the communication efforts of all the stakeholders betting on our traceability platform.

Partnering strategy

The three technological companies of the Sea2See project are already working together and collaborating by providing each other with free access to data and applications. However, the exploitation of the Sea2See platform will call for closer collaboration and a clearer definition of the roles, responsibilities, and expectations between the three companies.

An initial agreement between the technological companies has been outlined, as presented in figure 1). The participation follows the different expertise and contribution of the three partners.

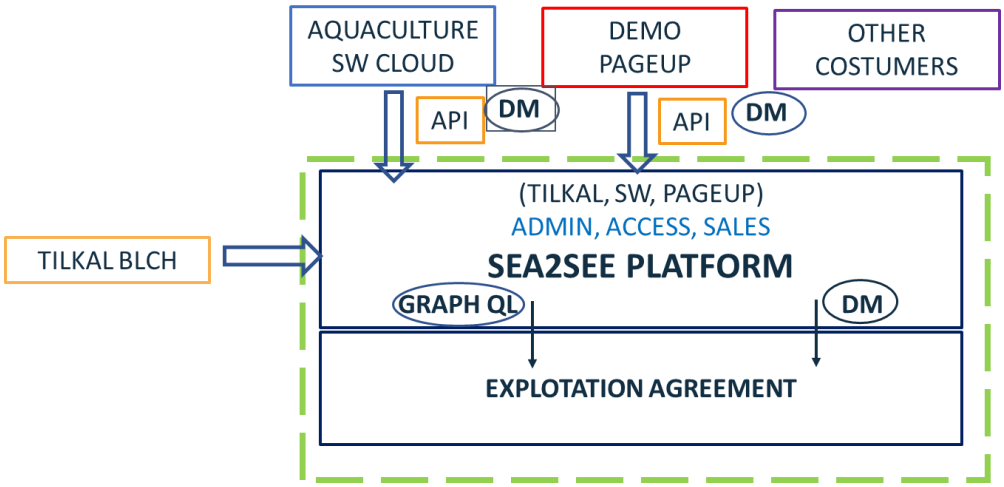

Figure 1: Sea2See Platform exploitation. The technology partners (Tilkal, Smartwater, and PageUp) contribute with their respective solutions (blockchain based traceability, application developments and dedicated traceability and management solutions). The running costs of the Sea2See Platform in terms of administration, access and sales are carried out by them, through an exploitation agreement. (DM: Data Management; BLCH: Blockchain; SW: Smartwater)

The formula being explored involves the joint exploitation of the Platform, with a maintenance agreement and revenues distributed among the three companies, Tilkal, PageUp and Smartwater Planet.

As part of the partnership agreement, the partners will assess the financial needs required for operating, expanding, and commercializing the Sea2See platform, particularly:

- New investments in developing new features and capabilities.
- Operating costs related to managing and maintaining the platform.
- Sales and marketing costs

Also, the partners will develop a financial strategy to raise the necessary financial resources and ensure the financial feasibility and sustainability of the Platform beyond the end of the project.

5. PRELIMINARY MARKET STUDY

The fish and seafood industry are turning to full-chain traceability to meet its main problem nowadays, the three primary forms of malpractice: overfishing, illegal, unreported, and unregulated (IUU) fishing. In this context, emerging blockchain-based food traceability platforms are considered a potential solution to prevent fraudulent and harmful practices. Seafood traceability is the ability to fully trace a product from its source to the point of sale. It is achieved through documentation, record-keeping, and proper handling protocols during processing, shipping, and receiving.

5.1. TARGET MARKET

The Sea2See project targets initially the European market. Europe is the world's second-largest seafood importer. In 2020, Europe imported $19.8 billion from outside Europe, only behind the US. Also, Europe is the largest importer from developing countries, which typically entails higher challenges to verify sustainability practices. Also, there is a clear trend toward consuming fish that have received sustainability certifications such as the Marine Stewardship Council (MSC) and the Aquaculture Stewardship Council (ASC). For some time, the demand for sustainable seafood has been limited to North-western Europe, but in recent years sustainable seafood is also increasing in Southern and Eastern Europe. Many European countries have seen two-digit growths in the demand for sustainable seafood recently[1].

5.2. MARKET SIZE ESTIMATION

The Global Food Traceability Software Market size was valued at USD 245.23 Million in 2021 and is projected to reach USD 512.34 Million by 2030, growing at a CAGR of 10.24% from 2023 to 2030[2]. In the Seafood industry, there are indications of similar growth although we have not found publicly available data.

[1] What is the demand for fish and seafood on the European market? CBI 2021

[2] Food Traceability Software Market Size and Forecast

5.3. SWOT ANALYSIS

- **Strengths**:
  - The Sea2See consortium includes three technological partners that can provide a whole solution which covers the entire use cycle of data, from automatic collection of information in fish farms (through Smartwater technology) and artisanal producers to processing and analysis (Tilkal blockchain & associated technology) to its utilization by interested stakeholders downstream the supply chain (Page up).
  - The participation of other consortium members representing the interests and views of a representative sample of the seafood industry's stakeholders involves a great opportunity to adapt the Sea2See platform to the market real needs and challenges.
  - The demonstration of the Sea2See platform in real conditions during the project entails a great opportunity to obtain invaluable data, validate Sea2See platform's ability to meet the market needs, and obtain visibility.
  - The communication and dissemination actions during the project will serve the purpose of engaging a large number of prospective users of the Sea2See Platform
- **Weaknesses**:
  - Lack of financial resources could hinder the partners' ability to launch and grow the platform in the market.
  - The partners interested in the exploitation of the Sea2See platform need to articulate their exploitation efforts through a business agreement adequate for the exploitation of an ambitious project while also meeting the expectations of all the participating partners.
  - The possible reluctance of some stakeholders to adopt measures towards transparency.
- **Opportunities**:
  - Today, the nongovernmental organization (NGO) community, national governments, and the seafood sector recognize a need for greater adoption of full-chain digital traceability to ensure safe, legal, sustainable and accurately labeled seafood products. There is an increasing awareness about the problem of traceability of the Seafood industry, and the main markets are introducing new regulations intended to foster traceability in the industry: the EU, the USA, China, India, etc.
  - The growing incidence of customers increasingly concerned about the sustainability practices of fisheries and aquatic farms. Customers' attention to sustainability labels in fishery and fish farm products has increased in the last decades, and the industry has responded to this interest by adopting ecolabels.
  - Alliances across these and other industry players have emerged to collaborate on improving social, economic, and environmental responsibility throughout the

seafood supply chain: The Marine Stewardship Council, The Seafood Alliance for Legality and Traceability (SALT), The Global Dialogue on Seafood Traceability (GDST).
    - There is an increasing adoption of traceability solutions to trace and track food products together with the supply chain and increasing need to recognize necessary documentation and tracking details for every stage of food processing.
- **Threats**:
    - The application of the blockchain technology to facilitate the development of traceability solutions for a wide range of supply chains is attracting many players to the Seafood industry. Because of the challenges and critical needs of this specific industry, several players have already identified this sector as clear business opportunity for a blockchain traceability platform.

5.4. COMPETITIVE LANDSCAPE

- Fishcoin: Blockchain based traceability for the seafood industry. To address the fragmentation of most seafood supply chains Fishcoin has been designed as a peer-to-peer network that allows independent industry stakeholders to take advantage of blockchain using a shared protocol so that data can be trusted, transparent, and secure. They have system of tokens intended to incentivize data sharing through the platform. The paying customers are downstream actors such as hotels, restaurants and retailers who benefit most from traceability.
- Wholechain is a blockchain based traceability solution built by Envisible to enable trust, coordination, and transparency in fragmented supply chains. Wholechain works across commodities, allowing businesses to manage risks and increase efficiencies while enabling consumers to make more responsible decisions. Wholechain is a former winner of the Fish 2.0 Competition at Stanford for Supply Chain Innovation.
- TraceSeaFood provides blockchain-based trusted, transparent and secure Supply chain management for seafood traceability and tracking while providing authentic goods to the consumers.
- Vericatch (Canada) is a technology solutions provider whose mission is to empower fisheries with data-driven decision making. They develop solutions for fisheries catch reporting, management, and seafood traceability. By adopting end-to-end seafood traceability, suppliers can work to increase trust, accuracy and value along the supply chain. Vericatch's FisheriesApp enables data collection platform that can help fisheries begin collecting data.
- Trace Register provides full-chain seafood traceability, with clients in more than 50 countries. It serves processors, fishers, farmers, retailers, importers, retailers, and more in the seafood ecosystem.

- CAI Software LLC (United States), Fish Trax Systems, Inc. (United States), FishWise (United States), Legit Fish Inc. (United States), Maritech (Canada), RFXCEL CORP.(Frequentz) (United States), Sedna Technologies (Canada), ThisFish Inc. (Canada), WiseFish (Iceland)

5.5. MARKET BARRIERS

- Knowledge gaps about the technologies that can provide traceability across large supply chain networks, particularly blockchain.
- Also, lack of standardization are the major factors hindering a widespread adoption of full-chain traceability platforms.
- Poor incentives for implementing full-chain digital traceability solutions by producers and distributors because retailers are not channeling the demands of consumers regarding sustainability. If retailers do not start demanding more information about the origin and sustainability practices of fisheries and fish farms, it is unlikely a widespread adoption of traceability solutions.
- Lack of resources, including funding and capacity issues.
- Logistical hurdles in the operation of traceability systems, particularly related to automating the process of collecting information, since manual data collection is costly and not reliable.
- Scaling issues in promoting and achieving broader adoption, which require participation of a broad range of stakeholders.
- Many producers and distributors benefit from obscure and downright illegal practices and reject the use of traceability technology, which would hinder practices currently widespread in the Seafood industry.

2. METHODOLOGY TO DEFINE THE FINAL EXPLOITATION PLAN

The implementation of these four stages methodology will benefit also from the progress of mainly WP1 Task 1.1, Task 1.3 and WP2 Task 2.1 and Task 2.3.

1. **Design stage (M1-M10)**

In this document, we have defined the preliminary exploitation plan of the Sea2See project. However, the definition process of our final exploitation plan will require the validation of all the business hypotheses that are part of this preliminary exploitation plan. Our goal is to test these

hypotheses through interactions with a wide range of key stakeholders to develop an exploitation plan that can minimize the risks of the project while increasing the effectiveness and efficiency of our exploitation efforts. The exploitation plan for the Sea2See traceability platform will require two main inputs:

- D1.1 Sea2See Stakeholders' Engagement Strategy, already mentioned.
- A study on the viability and sustainability of the preliminary exploitation plan in the seafood sector. There are still several questions that must be clarified regarding our preliminary exploitation plan. This plan will be widely discussed internally by the Sea2See's partners and also some initial consultation with stakeholders will be carried out to provide a further definition of the exploitation plan.

Both these inputs will enable us to fully develop the main business hypotheses of Sea2See's exploitation plan: potential customers, paying customers, business model, revenue model, market size, etc.

2. Validation stage (M11-M13)

- In this second stage, we will present our exploitation business hypotheses to the main stakeholders to validate or otherwise refute them. The interactions with stakeholders will be conducted through direct interviews and focus groups. This process may have at least two iterations with different actors to refine our conclusions. Since data is the key inventory asset of the Sea2See platform, we will critically to validate the potential engagement in the platform of the data suppliers, I.e., fish farms, fisheries, etc. Without these data suppliers' willingness to adopt new traceability solutions, the platform will fail to attract other players downstream of the supply chain. Therefore, the validation of the Sea2See platform's ability to incentivize data suppliers across the supply chain is the main risk and business hypothesis of the project.
- Secondly, our goal is to validate the existence of potential customers that are willing to pay for the platform under the conditions defined in our revenue model. These are data consumers willing to differentiate by providing transparency on sustainable practices in response to consumers' demands. It will involve also a validation of Sea2See's pricing strategy. This hypothesis is critical to validate Sea2See's market prospects and financial sustainability.
- What information do these data consumers need and would like to have from the platform and what information are they willing to pay for?
- Also, we will attempt to achieve a preliminary validation of Sea2See's business model and go-to-market strategies as defined in the previous Section 4 of this document. This will provide a validation of our communication and marketing, and our go-to-market strategies.

In this validation stage, we will benefit from the Sea2See partners' networking to connect to a representative sample of reference stakeholders. We plan to have direct interviews with these

stakeholders to have in-depth discussions about these topics. The structure of these interviews will follow the following structure:

- Validate the need/problem
- Validate the solution
- Validate the business model.

This validation process will require us to contact a representative sample of the seafood industry's stakeholders, who are expected to play different roles in the platform: data suppliers (producers), data consumers (retailers, manufacturers, etc.), public institutions, etc.

3. **Definition of the final exploitation plan (M14)**

After we have validated or refuted our main business hypotheses, the final step will be to make a final definition of Sea2See's exploitation plan.

4. **Review and update of the exploitation plan (M15-M45)**

The exploitation plan will be reviewed until the end of the project to identify new opportunities and update with results from WP1 and WP2 activities.