COMPLETED PROJECT CASE STUDY

AQUACULTURE INSIGHTS: OPEN DATA PLATFORM FOR SALMON AQUACULTURE

PARTNERS

Uhuru United Ltd | SBTelecom Europe | Signify | Optoscale | Loch Duart | Sustainable Aquaculture Innovation Centre (SAIC)

FUNDERS

European Institute of Innovation and Technology (EIT) and SAIC

IMPACT

The main goal of the Aquaculture Insights project was to create a digital solution in the form of an open data platform to not only amalgamate the important data generated from numerous sources surrounding salmon production, but to provide a single access point for the visualisation and interpretation of data, allowing improved management efficiency. This open data platform will bring cutting-edge technology closer to fish farmers and allow the aquaculture sector to improve its competitiveness and growth potential.

> *This was an ambitious project for the aquaculture sector, bringing in expertise from software development and data visualisation with a pedigree in the financial sector. A lot was learned and proven across the project.*

BACKGROUND

As the Scottish salmon industry continues to grow and evolve, so too does the development of the technological innovations required to support and promote sustainability across the sector. Technology such as fish health diagnostic tools, remotely operated underwater vehicles (ROVs), feeding sensors and more have significantly improved production efficiency. However, many of these systems work in isolation, limiting the potential value of the collected data and increasing the amount of time required to monitor operations.

To tackle this challenge, an international consortium was established with the goal to develop an open data platform to combine multiple data sources allowing access, visualisation, and transfer of data from connected devices and systems, all accessible from a user-friendly dashboard. This software platform will provide a single point for fish farmers to interact with and understand the data produced by the variety of technologies on their sites and, moreover, to inform and promote best practices for aquaculture production management.

The project consortium, led by Uhuru United – specialists in IoT consulting, engineering, and data analytics – has brought together aquaculture experts, Optoscale – a market leader in salmon biomass sensor development; Signify – underwater LED lighting providers; and SAIC – aquaculture consulting, funding, knowledge transfer and networking partners; along with marketing strategy and business model developers, SBTelecom Europe; and finally Scottish salmon farmer Loch Duart. Supported by the European Institute of Innovation and Technology (EIT) and SAIC, this £1.1 million pilot project will seek to accelerate the aquaculture sector's digital transformation and support the drive towards enhanced sustainability, productivity, and operational efficiency on fish farms.

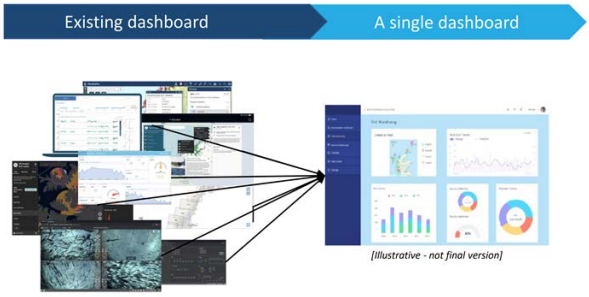
Fish feed accounts for up to 75% of overall salmon production costs; therefore, initial project phases focussed on providing economic value by improving resource efficiency in the fish growth process, with a goal to help farms make significant savings by making more efficient use of feed. The open data platform will be integrated with an end-to-end sensor-to-cloud IoT solution to facilitate visualisation and transfer of critical measurement parameter data, beginning with fish biomass data generated by Signify's underwater LED lighting system and Optoscale's AI-enabled biomass camera.

This technology will enable companies to access data seamlessly, offering insights that cannot be provided by existing systems. It will serve to digitalise the global aquaculture industry by providing new opportunities for data-driven decision making, and will help support the future growth and sustainability of the aquaculture sector.

AIMS

The overall goal of the Aquaculture Insights project is to build a customisable software platform for salmon farmers that will incorporate data generated

across multiple sources, accessible from a single dashboard for centralised analysis and more efficient data management. To achieve this, the project was broken down into focus areas surrounding product development, design and testing; integration of biomass and LED lighting sensors; and business planning and market development.



PRODUCT DEVELOPMENT: DESIGN, REQUIREMENTS, AND TESTING

The project lead, Uhuru United, was responsible for the technical design requirements for creating the open data platform and management dashboard by integrating various physical inputs from sensors, such as camera data, environmental data, financial/accounting data, and business management data. The Loch Duart team was invaluable in helping this learning and defining the priorities. From this, a 'mock-up dashboard' was created to visualise and interact with data based on the understanding of end user requirements.

The dashboard mock-up was used to show potential customers, such as Loch Duart, the value of having data from various unconnected systems brought together in a single access point. End user feedback was gathered to further develop and optimise the dashboard, and to understand opportunities for integration with other services.

INTEGRATION OF BIOMASS AND LED LIGHTING SENSORS

As part of the open data platform development, it was important to identify options to optimise underwater lighting conditions for salmon farming by using underwater sensors alongside data already available from other systems on site. Project partner Signify built and tested the prototype LED lighting system and its components to demonstrate its integration with the data platform. Furthermore, OptoScale's biomass sensors were deployed to gain insight from data generated by AI cameras, offering the ability to test and integrate with their proprietary hardware.

To validate the open data platform and test the functionality of the lighting system, the project team deployed biomass camera and lighting system components on a pilot net pen site at one of Loch Duart's marine farms. Other variables and site-specific sources of data were considered, such as weather stations, feeding barges, delousing treatment equipment etc, along with input from staff and management regarding what data is used, how it is displayed, and the shortcomings of existing solutions.

BUSINESS PLAN, MARKETING AND PRODUCT LAUNCH

SUSTAINABLE AQUACULTURE INSIGHTS AND DASHBOARD (SAID): SUSTAIN AND SUPPORT AQUACULTURE WITH DATA-DRIVEN INITIATIVE.

The resulting data platform and dashboard product, 'SAID', was developed to structure, store, analyse and visualise input data derived from sensors, people, devices, and gateways. This platform also has the ability to compare the differences between set key performance indicators (KPIs) and live input data, e.g. water quality parameters, video images, or budgets, and to suggest potential remediation actions based on predetermined data relationships.

SBTelecom Europe completed an initial review among interest groups including potential partners, service providers and customers to understand and inform on the marketing channels and potential opportunities therein. They also supported the establishment of a business model and Go-to-Market strategy. Furthermore, documents including user training manuals, licence agreements, sales contract, website formation and IP licencing agreement have been established in preparation for product launch, which was a key objective of the EIT funding model.

IMPACT

The main goal of the Aquaculture Insights project was to create a digital solution in the form of an open data platform to not only amalgamate the important data generated from numerous sources surrounding salmon production, but to provide a single access point for the visualisation and interpretation of data, allowing improved management efficiency. This open data platform will bring cutting-edge technology closer to fish farmers and allow the aquaculture sector to improve its competitiveness and growth potential.

Future developments in this digital technology may offer opportunities for estimating fish population, optimising feeding and growth models, identifying disease indicators, and adjusting feeding based on fish population or behaviour. Moreover, by providing a better understanding of the relationships between individual parameters, this may lead to improvements in overall production efficiency.

CONCLUSION

This was an ambitious project for the aquaculture sector, bringing in expertise from software development and data visualisation with a pedigree in the financial sector. A lot was learned and proven across the project. Uptake of the platform was not achieved within the given timeline, but the project leads – Uhuru – is interested in developing this further for the benefit of businesses in aquaculture that want to drive efficiency through the use of existing data.

ADDITIONAL INFORMATION

Pioneering pilot project aims to open up data opportunity for aquaculture