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Methodological document

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EXECUTIVE SUMMARY

This action aims at outlining the methodology for the most effective action of transfer of the INVESTINFISH approach and new services.

The preliminary results from the study cases (se D4.3.2, D4.3.3, D4.3.4) allowed to collect useful information to identify inputs for the technology transfer approach. The preliminary feedback (step 1) also defines a conceptual framework for innovation, competitiveness, and sustainability.

The Technology Transfer methodology should, first of all, avoid confusion between research and innovation: F&A SMEs are interested in innovation, while they usually can not undertake R&D activities.

From a methodological point of view, it is important to prioritise the key issue for the F&A sector. The study cases (D4.3.2 – D4.3.4) allowed to identify the key priorities, goals and motivations of F&A SMEs.

From an implementation point of view, we recommend the adoption of the DIH EU model (based on 4 services: information/training, networking, test before invest, support to access to finance) to organise the technology transfer services aimed at F&A SMEs.

INVESTINFISH PROJECT

INVESTINFISH - “Boosting INVESTments in INnovation of SMEs along the entire FISHerY and aquaculture value chain” is a project funded by the Italy – Croatia CBC Programme under the Priority Axis 1 “Blue Innovation”, Specific Objective 1.1 (S.O.1.1) “Enhance the framework conditions for innovation in the relevant sectors of the blue economy within the cooperation area”.

INVESTINFISH sees the cooperation of n. 6 Partners from 5 Different Regions: T2I (LP – Italy – Veneto), Sviluppo Marche (PP1 – Italy – Marche), D.A.Re. Puglia (PP2 – Italy – Puglia), Punto Confindustria (PP3 – Italy – Veneto), Istrian Development Agency (PP4 – Croatia – Istria), Zadar County Rural Development Agency (PP5 – Croatia – Zadar).

INVESTINFISH main objective is strengthening of competitiveness of F&A production system through promotion of investment programs aimed at acquisition of innovation services. INVESTINFISH implements pilot actions providing some IT-HR F&A SMEs with a roadmap to innovation instruments & services, boosting creation of marketable innovative products and/or processes that will improve the SMEs potential market positioning.

Expected benefits for enterprises are: accelerate time to market, increase linkages with innovators, increase F&A enterprises R&D expenditures in new & greener components/technologies/services, to boost HR-IT competitiveness. INVESTINFISH intends also to offer to the F&A sector to substitute the value chain concept with value network, proposing a shift from traditional value chains towards more collaborative value networks.

TECHNOLOGY TRANSFER MODEL

First of all, it is useful to remind the overall process of technology transfer. Its effectiveness is based on strong collaboration among the various stakeholders (research organisations, policymakers, training institutions, companies, general public, etc.).

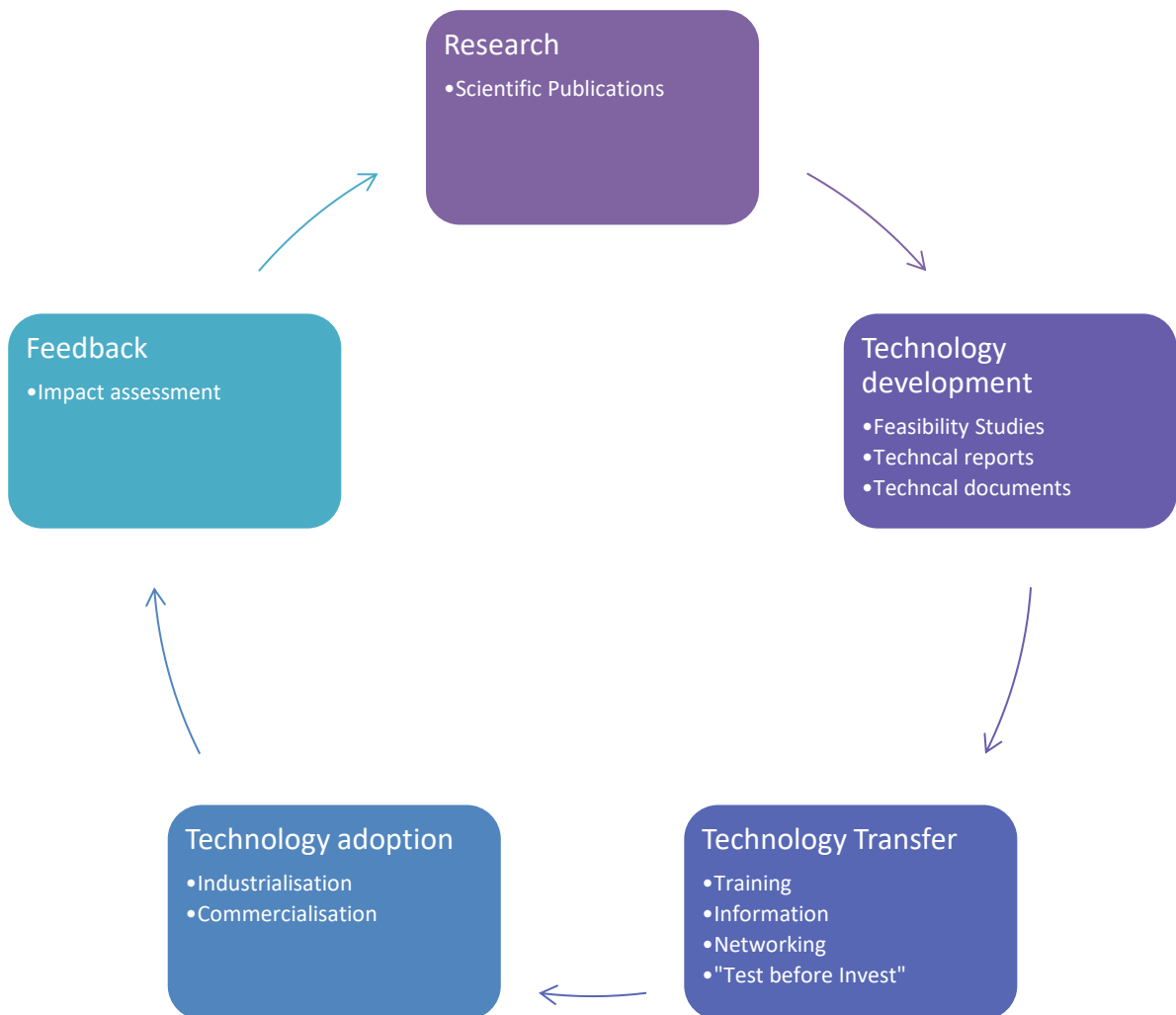


Figure 1 - Technology transfer general process

In the case of the F&A sector, technology consists of the equipment and practises used to find, harvest, handle, process and distribute aquatic resources and their products, including the

organisation and business models. These technologies are subject to change due to innovation processes and technology transfer between regions and fisheries.

There are several reasons for technological innovation and technology transfer in the F&A sector.

The main reason is that F&A companies may be willing to improve the technology they use to **increase the efficiency and cost-effectiveness of their operations**. For this goal, technological innovation depends on the availability of new technologies in the market.

Other reasons for technological change are often related to **new government regulations**, that may establish new standards or requirements, or **social pressure** to use more sustainable technologies.

New technologies can **build on advances made in other industries**. For example, the development of synthetic fibres, improvements in electronic tools, and satellite communications have led to improvements in fishing gear, navigation, and fish location technologies.

The degree of innovation can be summarised in the following scheme, which presents “increasing” levels of innovation.

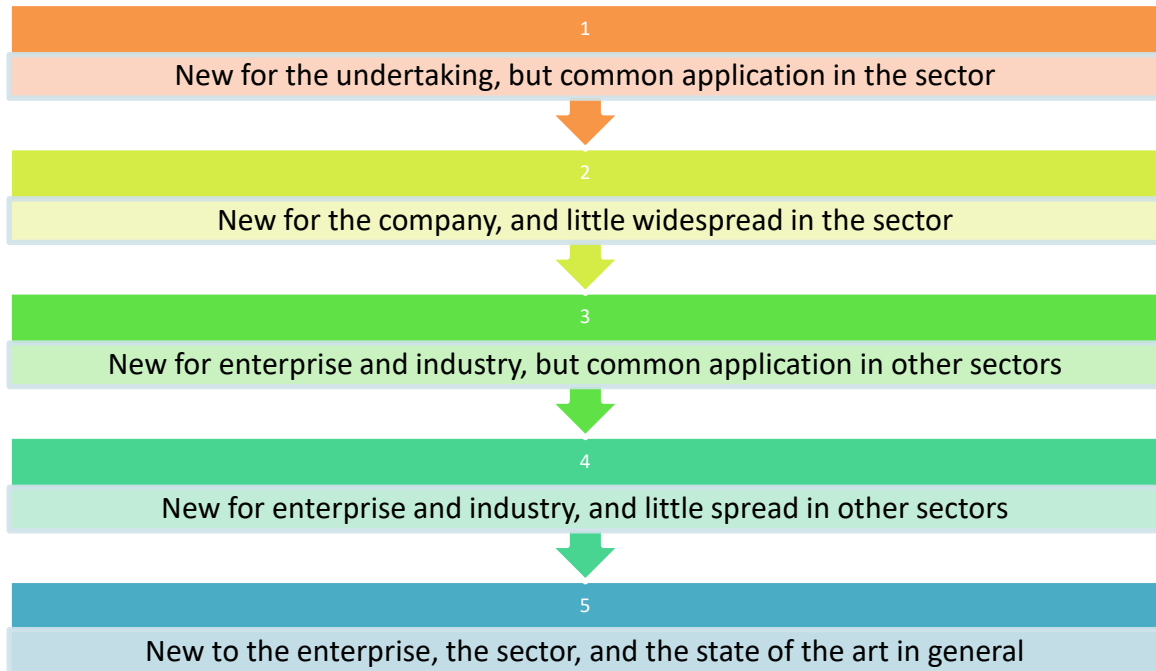


Figure 2 - Degrees of innovation

From a methodological point of view, it is important to avoid confusion between research and innovation. Often, technology transfer action assume that companies will carry on research activities. In fact, most SMEs are not interested in research, but in innovation.

Two key definitions (research and innovation) come from the Frascati Manual and the Oslo Manual. The **Frascati Manual** defines research and experimental development (R&S) as “*the creative and systematic work undertaken to increase the stock of knowledge (including knowledge of humanity, culture and society) and to devise new applications of available knowledge*”. Compared to the above scheme, this includes innovation that in the above scheme are at levels 5, 4, and in part 3.

The **Oslo Manual** define **innovation** as “*a new or improved product or process (or combination thereof) that differs significantly from the company’s previous products or processes and has been made available to potential users (product) or put into use by the company (process)*”

This means that transferred technologies need to have been previously validated, before real world application, since F&A companies cannot take the risks related to research.

Balancing different goals

Although improved technologies can bring benefits, such as increased selectivity of fish caught, reduced waste, increased safety at sea, and more advanced monitoring and control systems for fisheries management, they also can lead to potential problems.

This is because **the goal of F&A companies to increase efficiency and revenues may conflict with societal goals of environmental and social sustainability of fisheries**. For example, if more fish can be caught with the same effort, this can lead to overfishing. On the other hand, if the number of vessels and crews is reduced to protect fish stocks, this has a negative impact on employment in the fisheries sector.

The involvement of stakeholder and of other actors in the supply chain may help to balance the different goals and ensure that the overall impact is the best possible.

Focus on sector priorities

The Technology Transfer methodology should, first of all, consider the sector priorities. From the the pilots carried on in the project, the most pressing issues for the fishing & aquaculture sector are the following:

- High project costs for certain tested innovative solutions and **high initial costs** for the implementation of the diversification strategy
- Need for **innovative and cutting-edge technologies**, thus implying higher costs, constant updating and training sessions for operators
- **Insufficient training on circular and blue economy** issues
- **Weak training and education of fishing operators**, who tend to be older and unfamiliar with technology
- **Lack of digital culture**

- Existence of few realities at local level that can use **artificial intelligence (AI)**. Of course it would be possible to present the idea outside the local market, but this would require additional investment
- **Skepticism** of fish farmers on a local scale
- Difficult **generational change**
- Possible **bureaucratic and regulatory difficulties**
- **Difficulty in finding partnerships** in the small-scale fishing world
- **Need for technical experts** and professionals to carry out certain processes, such as extracting collagen from jellyfish
- **By-products and offcuts may fluctuate** in quantity and quality during the year
- At times, there may be **difficulties in entering an already well-established market** or in entering the market with innovative production processes.
- Lack of willingness of company management to make **changes to the process flow** and unwillingness of companies to change their modus operandi.

With regard to the introduction of e-commerce, on the other hand, it has been noted that some products lend themselves better to the web shop than others because consumers already know more or less what to expect once they buy them.

Some items are more universal and well-known than others that are considered more "niche" and specific, for which e-commerce is not as obvious as it may seem. In the latter case, in fact, the adoption and diffusion of e-commerce becomes more difficult because the customer may be less familiar with the products and less confident in buying them online. In addition, during the feasibility study phase of e-commerce, a certain difficulty was found in the management of product prices, especially for fresh products, which fluctuate daily in relation to various variables, as well as the fact that for certain customers companies make specific discounts. As a result of this, it was decided to implement the e-commerce engine on the site in order to have it ready for the near future, but to temporarily deactivate this function. In the future, however,

it is planned to activate e-commerce for frozen products or products from abroad, which have a more stable and standardized pricing.

Pilots' replicability

All the actions proposed within the various pilot cases have generally shown a high potential, a high degree of replicability and in general also a certain profitability, if appropriately integrated within the company business model, in the fisheries sector. The high potential for replicability is due to several factors such as:

- The proposed solutions are based on the satisfaction of concrete, real and indispensable needs for business growth. Sustainability and innovation are fundamental for the economic growth of the F&A sector;
- The tested pilot actions can have a potential success also if transposed to alternative sectors or if applied in different target areas of the agri-food market;
- The ability to replicate depends both on a thorough analysis of costs and revenues to achieve a positive total net return and on the type of investments to be made;
- There is growing interest, both at national and European level, in exploiting marine resources for alternative uses (e.g. collagen extracted from jellyfish).
- The replicability of solutions related to the use of innovative packaging made of eco-sustainable materials is high and fundamental. It is necessary to use all possible tools to expand actions to replace plastic polymers with bio-polymers and single-use plastics with compostable solutions, throughout the country. Of course, replicability may or may not be immediate, depending on the case and conditions. It is not plausible to propose a priori a type of substitute material that is constantly replicable, but ad hoc solutions must be studied according to the type of products and uses. Finally, it is important to educate and train companies on this issue.
- With regard to the collective brand, this can be positively replicated both within consortia and in other realities, thus stimulating cooperation and networking.
- Digital marketing and e-commerce solutions are also widely replicable by other companies in the fisheries and aquaculture sector, with appropriate adaptations in relation to the market and the product.

- In the case of the use of computer systems, software, databases and/or artificial intelligence (AI) for the detection and analysis of fish in the water, there is a need for constant updates as well as the adaptation of the system to the different requirements of the different areas. Each update requires a process of knowledge and experience acquisition and implementation of the system. The possibility of applying IT systems and intelligent technologies to F&A areas is mainly limited by technology.
- In general, for any action, it is good to stay up-to-date and provide continuous training to all stakeholders.

TRANSFER OF INVESTINFISH APPROACH

In order to support the transfer of INVESTINFISH approach, the key need is to overcome the skepticism of SMEs in the F&A sector, that often consider technology and innovation something far away from their needs and activities. Therefore, focusing on awareness is crucial: this should be obtained through promoting relatable success stories that showcase the innovations.

As a general reference, the Transfer approach will build on the Digital Innovation Hub model, leveraging the experience the partners already have in the field.

The model is based on four pillars:

- **Skills and training** to make the most of digital innovations: “train-the-trainer” programmes, bootcamps, traineeships, exchange of curricula and training material.
- **Test before invest**: Experimentation with new digital technologies – software and hardware – to understand new opportunities and return on investments, also including demonstration facilities and piloting.
- **Support to find investments**: access to financial institutions and investors, in order to get access to follow up finance to bring the results of testing and experimentation to the next phase, access to incubation & acceleration programmes.
- **Innovation ecosystem and networking** opportunities through marketplaces and brokerage activities.



The goal is to act as one-stop-shops to help F&A SMEs to become more competitive regarding their business/production processes, products or services using KET, by providing access to technical expertise and experimentation, so that companies can “test before invest”. It is necessary also to provide innovation services, such as financing advice, training and skills development that are needed for a successful implementation on innovation. Environmental issues needs be considered, in particular regarding water and energy consumption and low carbon emissions. Proximity is considered crucial: the different partner can act as a first regional point of contact, a doorway, and strengthen the innovation ecosystem. It is also important to enable a regional multi-partner cooperation (including organisations such as research and technology organisations [RTOs], universities, industry associations, chambers of commerce, incubators/accelerators, regional development agencies and vocational training institutes).