

FINAL EVALUATION REPORT

V.1.1

EXECUTIVE SUMMARY

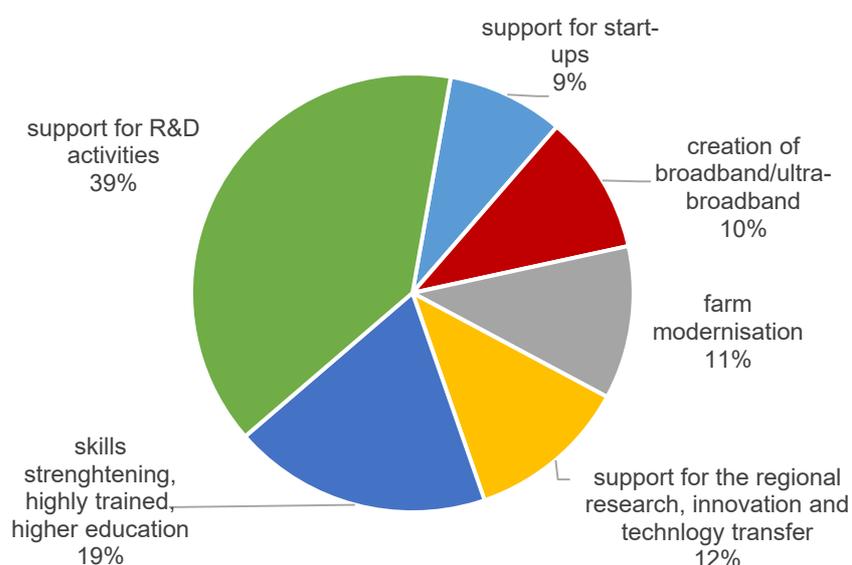
The Final Evaluation Report produced by ISRI - Istituto di Studi sulle Relazioni Industriali, as part of the "Evaluation service of the Regional Research and Innovation Strategy for Smart Specialization - S3" is entirely focused on the analysis of the interventions financed as part of the direct and indirect actions that contribute to the implementation of the regional S3.

The evaluative analyzes contained in this Report were mainly based on the monitoring data made available by the representatives of the Evaluation and Verification Unit of Public Investments (NUVV) of the Friuli Venezia Giulia Region updated as at 30 April 2021; in addition, the results that have been gradually achieved during the entire evaluation process that has developed over the last five years have also been naturally taken into account.

a) What projects are we financing?

With the total resources assigned to the regional S3 (approximately 280 million euros), approximately 4 thousand projects were financed, almost 90% attributable to direct actions, the only ones attributable to the areas of specialization.

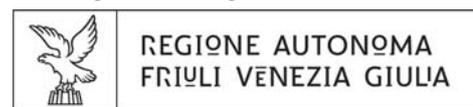
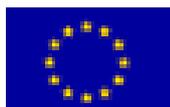
Fig. 1. The breakdown of resources activated by S3 by macro type of intervention



Source: ISRI elaborations on monitoring data

As emerged from the analyzes carried out in the Report, it is a very wide and articulated range of interventions which, with some simplification, can be traced back to six main areas:

- Projects involving the implementation of R&D activities or which are, more generally, aimed at encouraging the introduction of innovations in companies;
- Interventions for raising the skills of workers, for higher education and higher training.



- The contributions made to the numerous structures that make up the regional system of research, innovation and higher education;
- Funding provided by the RDP to promote, more generally, the modernization and diversification of regional farms.
- The interventions - in collaboration with the MISE - for the construction of broadband / ultra-broadband infrastructures, in line with the European Digital Agenda.
- Projects that concern, more specifically, the start-up of new businesses.

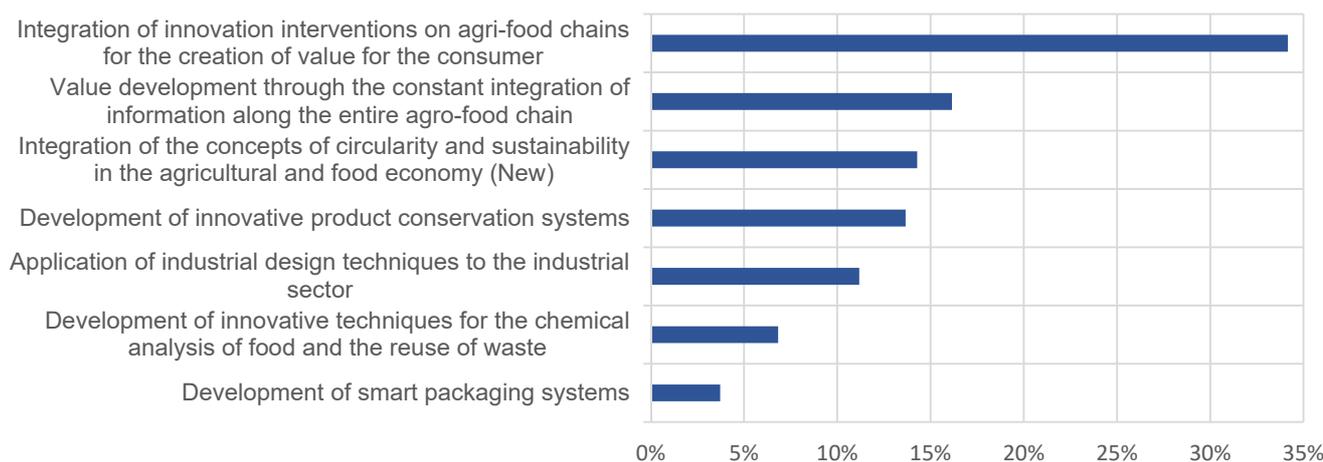
The breakdown of the aforementioned projects by area of specialization indicates a prevalent concentration in metalworking, followed by a considerable amount of the home system. The other three areas of intervention identified by the regional S3, on the other hand, have a much lower impact.

b) What trajectories are we following?

Given that the information in question is available only for projects funded by the ERDF ROP, a summary framework is proposed below concerning the trajectories of technological development on which the greatest number of projects in each area of specialization is concentrated.

As far as the **agri-food** chain is concerned, the trajectory of greatest interest for companies is that concerning the *integration of innovation interventions on agro-food chains for the creation of value for the consumer* (more than one third of the projects refer to this one).

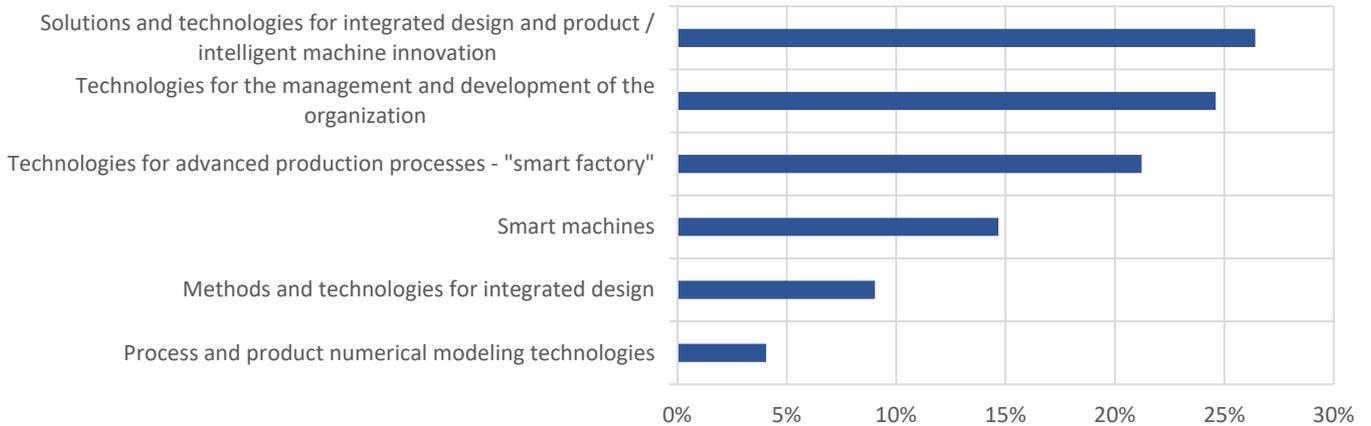
Fig. 2. The technological trajectories pursued in the agro-food sector



Source: ISRI elaborations on monitoring data

As regards the **metalworking** sector, the trajectory to which the greatest number of projects refers is that concerning product innovations and which concerns, more specifically, *solutions and technologies for integrated design and product / intelligent machine innovation* (over a quarter of the projects funded overall). Moreover, many of the projects concerning the development of *intelligent machines*, approved in the first phase of implementation of the regional S3, seem to be attributable to this first trajectory, that is, before the technological trajectories were revised.

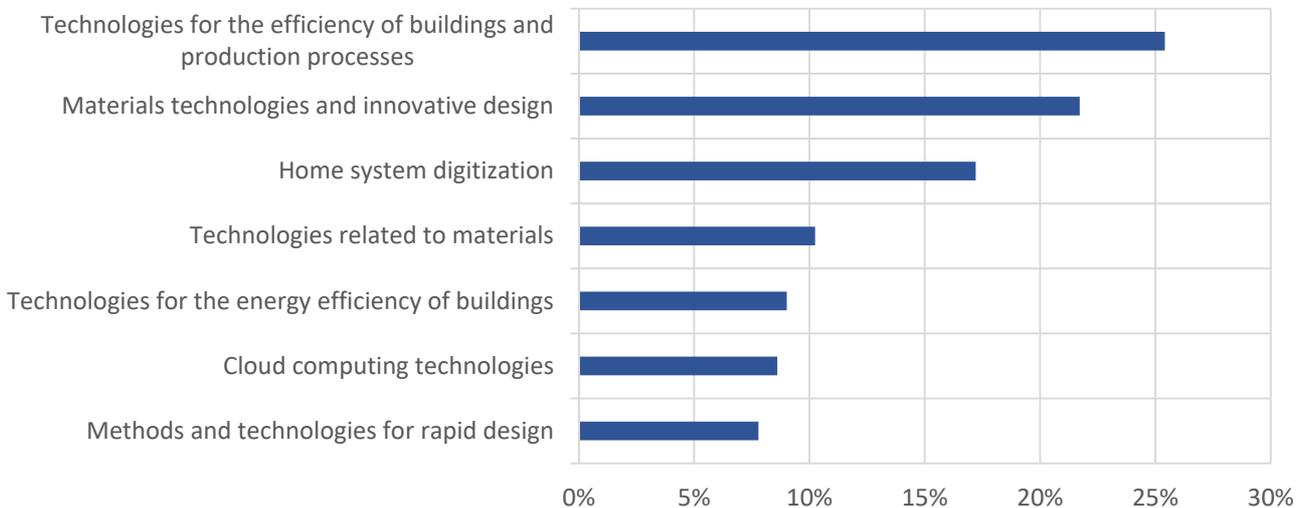
Fig. 3. The technological trajectories pursued within the metalworking production chain



Source: ISRI elaborations on monitoring data

With regard to the production chain of the **home system**, the analyzes conducted reveal two areas of innovation on which the largest number of projects has focused. The first concerns energy efficiency, including projects that concern the *adoption and / or development of technologies for the efficiency of buildings and construction and production processes* (25%), as well as those concerning, more specifically, *technologies for the efficiency of buildings* (9%). The second technological area, on the other hand, concerns innovation in materials. We refer, first of all, to the development trajectory called "*materials technologies and innovative design*", on which about 22% of the funded projects are concentrated. The projects concerning *technologies related to materials* (10% of the total), approved before the process of reviewing the technological trajectories, can also be traced back to this same trajectory, with some inevitable examples.

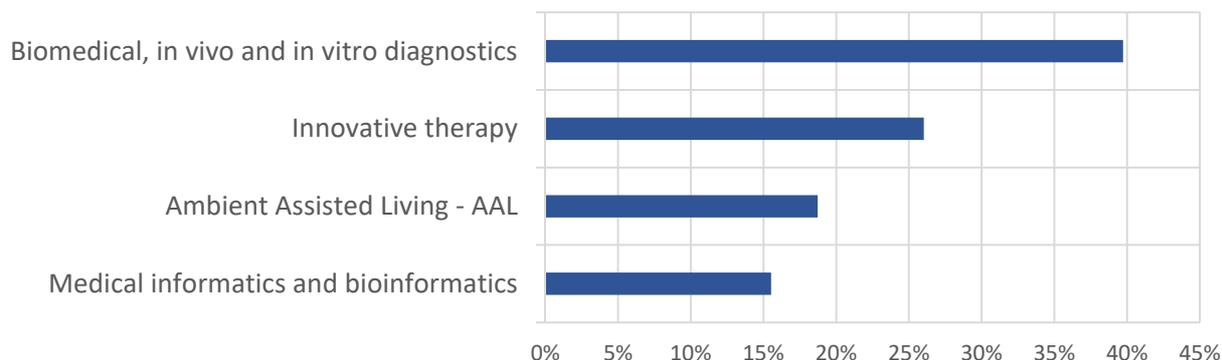
Fig. 4. The technological trajectories pursued within the home system production chain



Source: ISRI elaborations on monitoring data

In the case of **smart health**, the trajectory most pursued by regional companies that have had access to funding concerns *biomedical, in vivo and in vitro diagnostics*, with an incidence equal to 40% of the total. As can be seen from the observation of the following graph, the other 3 trajectories met with relatively more limited interest.

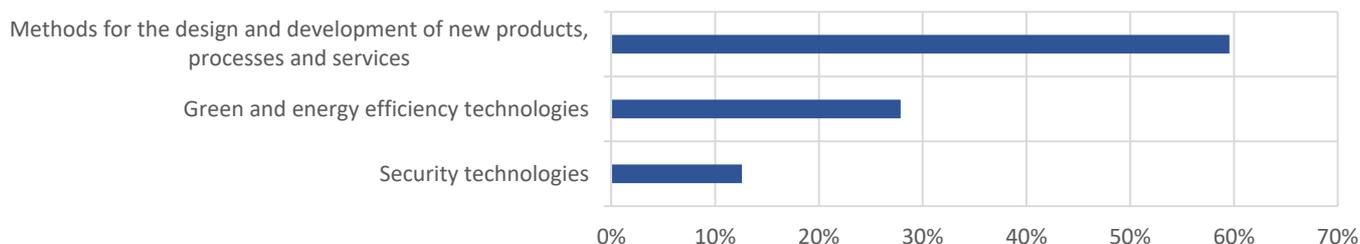
Fig. 5. The technological trajectories pursued in the field of smart health



Source: ISRI elaborations on monitoring data

Finally, moving on to the field of **maritime technologies**, it is evident that the interest of regional companies has focused on a main trajectory, that concerning the design and development *methodologies of new projects, processes and services*, to which about 60% of the companies refer. operations funded overall by the POR FESR.

Fig. 6. The technological trajectories pursued in the field of maritime technologies



Source: ISRI elaborations on monitoring data

c) Did the collaboration change the behavior of the subjects?

Among the actions of the S3 that aim to develop collaboration, there is no doubt that the most significant is represented by **action 1.3 of the ERDF ROP**.

In the second half of 2019, this action was the subject of a thematic study that highlighted how the loans granted have produced very significant results, inducing an effective strategic change in the behavior of all those directly involved in the partnerships. The analyzes showed in particular that:

- This action has favored the birth of new partnerships; in fact, about 36% of the companies and about 30% of the research structures that have benefited from the funding have started a new collaboration with at least one partner with whom they had never previously collaborated;
- Participation in collaborative projects has had positive repercussions both for companies and for universities / research bodies; as regards the first type of beneficiaries, in about three quarters of the cases the R&D activity favored the introduction of a new process technology and in about 50% the development of a new or significantly new product / service improved; with regard to universities and research institutions, the most important repercussions concern: the launch / opening of new research fields closer to the interests of regional companies; the acquisition of new specialist skills; the temporary hiring of one or more researchers;
- As regards the longer-term effects, the analyzes showed that participation in the projects would seem to have induced some significant discontinuities in the strategic behavior of all the parties involved; in fact, among the beneficiary companies, over 40% planned to steadily increase: investments in innovation, starting with R&D expenditure; the propensity to innovate not only its products and processes, but also marketing strategies and company organization; finally, the aptitude to collaborate more permanently with external parties to carry out R&D and / or innovation activities. Also with regard to

universities and research institutions, the expected changes would seem to be very significant concerning: on the one hand, the growing participation in networks / networks with regional companies, to carry out R&D and / or innovation activities; on the other hand, a strong increase in applied research activities.

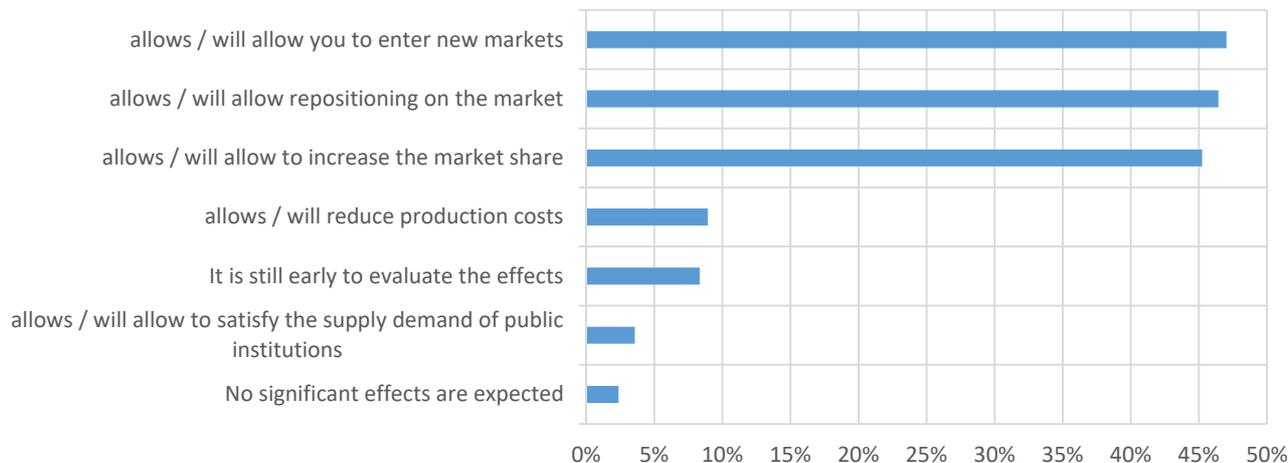
d) Has the competitiveness of the beneficiaries improved?

A complete answer to this evaluation question is currently impossible, for at least two reasons:

- The first depends on the fact that many of the funded projects are still in progress or have been completed for too short a time (less than one or two years) for the conditions to exist to assess the effects that these may have had on the level of competitiveness. of the beneficiary companies;
- The second refers to the unfavorable economic situation experienced in the last two years due to the emergency from COVID-19; this, in fact, had very negative repercussions on the performance of many regional companies, especially as regards the trend in turnover.
- In any case, to prefigure the effects that the S3 funding could have had on the competitiveness of the beneficiary companies, reference was made to the self-assessments expressed by the same entrepreneurs who benefited from the funding of action 1.3 of the POR FESR who were interviewed in the second half of 2019, before the COVID-19 pandemic was proclaimed.

One of the questions contained in the survey questionnaire concerned precisely the assessment of the expected effects on the competitiveness of the beneficiary companies. The following graph summarizes the answers provided by the interviewees in this specific regard. As can be seen, most of the companies expressed very relevant expectations, believing that the R&D project, in the medium / long term, could offer a significant contribution to the improvement of company competitiveness, because the product and / or process innovations introduced thanks to the loans would likely have allowed us to: enter new markets; reposition the company in its traditional reference market; increase its market shares to the detriment of its main competitors.

Fig. 7. The opinion of the companies benefiting from action 1.3 on the expected effects on business competitiveness



Source: ISRI elaborations on direct survey data

e) Do start-ups “hook up” the market?

In the context of the regional S3, the direct actions that refer to Priority C "Promote the new innovative entrepreneurship" are only two, of which: one financed under the POR FESR - Action 1.4.b - "Support for the creation of innovative start-ups and a spin off of research "; the other applies to the POR FSE - "IMPRENDERO" ("I will undertake") 4.0". Unfortunately, both of these actions have had a rather delayed start, so much so that most of the projects have only started in the last 2 or 3 years and, in many cases, have not finished yet.

As regards the action of the POR FESR, as of April 30, 2021 the beneficiary companies amounted to a total of 38 units, of which only 22 that, on that same date, had already completed their investment plan.

These are obviously very small numbers, considering how in Friuli Venezia Giulia, on average, around 1,400 companies are born a year in the highly knowledge-intensive sectors. These have 3-year survival rates ranging between 50% and 60% of the total.

The financing of about forty companies cannot therefore have had any impact on the growth dynamics of innovative start-ups, even if it should be recognized that the new entrepreneurial initiatives encouraged by Action 1.4.b would seem at the moment to show survival rates very high.

Having said that, some interesting information regarding the beneficiaries of this specific line of intervention can be taken from the Thematic Report produced by the independent Evaluator of Unit Programming (ISMERI).

- If we consider the 38 companies financed, as of 31.12.2020 these were all still in business, with only two exceptions (one merged by incorporation into another company and another placed in liquidation).
- Between 2018 and 2019 the turnover of the beneficiary companies was almost stable, while in the same period there was a slight growth in employment; in analyzing the growth dynamics, it must however be considered that almost all the beneficiary companies declare a turnover of less than 100 thousand euros, while more than half have no more than one employee; this shows that they are new entrepreneurial realities that are still in the very early stages of their life cycle and for which it is still too early to say whether or not they have really "hooked" the market..

With regard to the intervention of the ROP FSE called "IMPRENDERO", the following emerges from the analyzes carried out by the independent Evaluator of the unitary Programming.

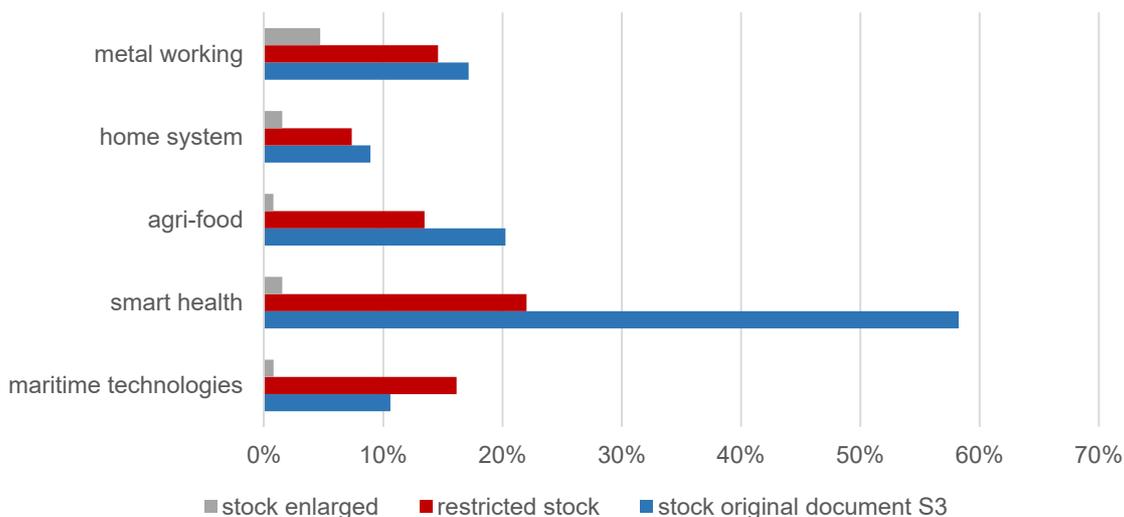
- From the interviews conducted on a sample of recipients, it emerged that about 12% of these have actually started a business / self-employed activity or, more rarely, a company, after completing the training and / or consulting course;
- Given that, at the time of the survey (May 2021), about half of the interviewees stated that they had started their own business or business for no more than a year, at that date the survival rate was around 88 % of the total;
- Very few companies / autonomous activities had not encountered difficulties in the start-up phase, while the majority indicated more or less significant difficulties in entering the market, as well as complaining of financial problems;
- That said, it is however positive to note that over 50% of respondents indicated that they had registered an increase in their turnover, despite the effects of the COVID-19 crisis.

f) To what extent is the regional system involved?

Based on the data up to 30 April 2021, the regional S3 has financed about 4 thousand projects, able to involve, overall, over 1,800 beneficiaries, of which the vast majority are SMEs.

If we compare the data on the beneficiaries to that relating to the total number of companies in Friuli Venezia Giulia (over 90 thousand units), it appears that the S3 involved less than 2% of the regional entrepreneurial system.

If, on the other hand, reference is made only to companies operating in the areas of specialization of the regional S3, it emerges that the entrepreneurial system has been involved in a rather significant way, considering that, on average, between 10% and 20% of companies have benefited from the Strategy.

Fig. 8. Rate of involvement of the entrepreneurial system in the areas of specialization of S3


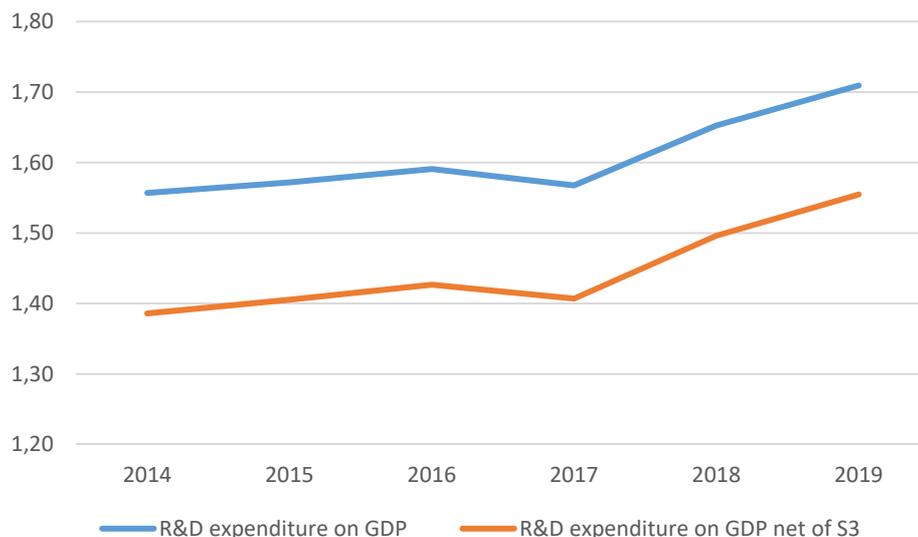
Source: ISRI elaborations on data from various sources

g) Has the innovative capacity of the regional system improved?

Having ascertained that the Strategy has actually involved a fairly significant share of companies operating in the areas of specialization, it is possible to investigate what more general effects this may have had on the innovative capacity of the regional economic system.

On the basis of the estimates made in the Final Report, it can be assumed that the incentives granted under the various direct and indirect actions that implement the regional S3 have led to an overall expenditure in R&D quantifiable in over 300 million euros.

To understand the relevance of this amount of resources, it is necessary to consider how the annual R&D expenses during the five-year period 2014-2019 (latest available data) were, on average, around 600 million euros in Friuli Venezia Giulia, a year, of which just over 50% attributable to the private sector of the economy. Assuming that the R&D expenses incentivized by the S3 are referable to at least five years, it would be, on average, over 60 million euros per year, which represent - approximately - 10% of the entire public R&D expenditure and private sector which on average takes place at a regional level.

Fig. 9. The contribution of the regional S3 to the R&D expenditure of the regional economic system


Source: ISRI elaborations on data from various sources

If it is assumed that this amount of expenditure was entirely additional, i.e. assuming that it would not have occurred in the absence of the incentives, this would lead to estimate the contribution of S3 to regional R&D expenditure at about 0.16 percentage points of GDP, as highlighted in the following graph.

Therefore, if it is realistic to hypothesize that S3 has offered an effective contribution to the growth of R&D expenditure, it is more complex to establish whether this has also had an effect on the ability to innovate of the regional economic system. In this case, in fact, the most up-to-date statistics refer to the three-year period 2016-2018 and indicate that 50.6% of regional companies had successfully introduced technological product and / or process innovations, against a national average figure equal to 49.7%. However, considering the period to which the aforementioned data refer (the three-year period 2016-2018), it is difficult to establish whether these results were significantly influenced by S3. Many of the projects funded by the Strategy at that time had not yet been completed. Furthermore, in many cases, these concerned the implementation of R&D activities which, once concluded, still require a few months / years before they can eventually give rise to innovations within the companies.

h) Has the competitiveness of the regional economic system improved both in general and in the areas of specialization of S3?

As illustrated in the Report, this evaluation question aims to analyze the effects that have occurred with respect to the **two major changes expected** to which the regional strategy for smart specialization aims, namely a) the consolidation and competitive repositioning of companies operating in the areas of the S3; b) the structural change of the regional economic system.

With regard to the **first major expected change** that aimed to determine the S3, the focus of the analysis was placed on the **export trend**, believing that this could constitute a suitable indicator for measuring changes in competitiveness. To avoid incurring possible distortion factors related to the unfavorable economic situation induced by the COVID emergency, we focused on the trend recorded in the 2014-2019 period, therefore not considering the data relating to 2020. From the analyzes conducted, the following emerges.

- The export dynamics recorded in the six years prior to the crisis caused by the COVID-19 emergency, indicate a general improvement in the competitive positioning of the regional industry on foreign markets;
- By analyzing more specifically the export trend in the main product sectors that are attributable to the areas of specialization of the regional S3, some interesting evidence emerges, briefly summarized below.
 - The **food and beverage** industry in the six years preceding the recent pandemic crisis (2014-2019) recorded an excellent export performance (+ 31%) which however appears slightly lower than that which characterized, on average, the divisions territorial higher level (Italy and North-East);
 - the **metalworking** export of Friuli Venezia Giulia, before the 2020 crisis, recorded a trend (+ 20.6% in the 2014-2019 period) slightly better than the Italian average (+ 17.1%), although substantially in line with what detectable in the north-eastern part of our country (+ 21.3%);
 - in the period preceding the 2020 crisis (2014-2019), the **wood and furniture** industry - the most important component of the home system - recorded not only a positive export trend (+ 22.5%), but also better than that of the North-East (+ 20.3%) and of Italy as a whole (+ 18.3%);
 - the main product categories that refer to **smart health** recorded a truly exceptional growth trend in exports (+ 69.8% in the 2014-2019 period) which, among other things, was significantly higher than what is recorded, on average, in the higher level territorial divisions (+ 40% in the North-East and + 50% in Italy);
 - finally, as regards the area of maritime technologies, the export analysis can only be referred to the shipbuilding sector, as no other sectors entirely referable to the area of specialization in question can be identified. This undoubtedly limits the scope of the analyzes and the interpretation of the resulting results. In view of this, the regional shipbuilding industry went through a particularly happy period, as evidenced by the fact that exports almost doubled in the 2014-2019 period (+ 82.4%), even if it recorded a clear decline in 2019 (-21 % compared to 2018), presumably due to a reduction in the orders assigned to Fincantieri.

The other change that aimed to determine the regional S3 concerns the **transformation of the regional economic system and the development of new production areas with a higher innovative content**, capable of generating new employment and opening new markets.

To assess to what extent the regional economic system has actually undergone a change of a structural nature in the direction desired by the Smart Specialization Strategy, reference was made to the indicator

that measures "the share of employees of industrial and service companies employed in knowledge-intensive sectors".

The data up to 2020 indicate the presence in Friuli Venezia Giulia of just 17,600 employees in the high-tech manufacturing sectors and in high-tech service activities, with an incidence equal to 3.4% of the total, compared to a national average figure 3.9%. If on the one hand it must be recognized that the sectors with the greatest innovative and technological content in our region have a very low relevance, on the other it is positive that the total number of employees grew by + 39% in the whole of 2014-2020 (about 5 thousand more employees), compared to a much more modest + 15.6% recorded, on average, at the national level. These are very weak positive signals, which would however indicate that the direction in which the regional economic system is moving is the one actually desired by S3.

i) Is governance effective and inclusive?

The survey conducted in this specific regard has highlighted how the process of initial definition and subsequent revision of the regional S3 recorded a wide and varied participation in all phases by the main categories of regional stakeholders (several hundred subjects in total).

Beyond the numerical data, which in any case is already significant in itself, the field survey also revealed that those who participated in the various phases of the planning process expressed substantial satisfaction and sharing of the path, since :

- More than 50% of the stakeholders interviewed considered their role positive and active;
- More than 75% considered the participation of regional stakeholders to be good or sufficient;
- More than 35% rated the contribution of stakeholders to the definition of the regional S3 as very significant;
- About 80% said that the S3, as defined, was able to enhance the strengths and potential of the regional innovation system.

In the face of these results, which indicate how the process was effective and inclusive, some partial criticalities also emerged, briefly recalled below:

- According to approximately half of the interviewees, the choices made in the definition phase of the S3 would seem to reflect some positions better than others;
- Furthermore, it was reported by several parties that some subjects, particularly civil society, were not involved in the process, also due to the difficulties in identifying adequate representatives of interests at the regional level.