

Internationalisation of the next Smart Specialisation Strategy

Opportunities and barriers in the Friuli Venezia Giulia region

Smart Specialisation Strategy is a place-based EU policy that seeks to enhance regional competitiveness through leveraging and bolstering innovation in the selected priority areas (industries or technologies) in each region. The new iteration of S3 requires developing cross-border collaborations with regions possessing complex and complementary technological expertise currently missing in a region to upgrade its technological evolution. The reason for this is that new growth opportunities arise from recombining existing technological capabilities while more complex technologies offer strong competitive advantage. This paper presents a simple roadmap for regional S3 internationalisation and the results of an in-depth case study on the opportunities for and barriers to S3 internationalisation in Friuli Venezia Giulia (FVG), a region in the North East of Italy. The paper develops recommendations on how to make the most of the Research, Technology, Development and Innovation endowments in FVG through enhancing the innovation-internationalisation nexus in order to improve competitiveness of the region.

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Keywords: Smart Specialisation Strategy (S3), S3 internationalisation, regional innovation systems, Friuli Venezia Giulia

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Abbreviations and acronyms

CLC	Co-Location Centres
DG REGIO	European Commission's Directorate-General for Regional and Urban Policy
EDP	Entrepreneurial Discovery Process
EIT	European Institute of Innovation and Technology
EPO	European Patent Office
ERDF	European Regional Development Funds
ESF	European Social Fund
ESF+	European Social Fund Plus (2021-2027)
ESIF	European Structural and Investment Funds
ETC	European Territorial Co-operation
EU	European Union
FDI	Foreign Direct Investments
FVG	Friuli Venezia Giulia
GDP	Gross Domestic Product
GVC	Global Value Chain
H2020	Horizon 2020 (2014-2020 EU Research and Innovation programme)
HEI	Higher Education Institution
I3	Interregional Innovation Investment
ICT	Information and Communication Technologies
IE	Interreg Europe
IPR	Intellectual Property Rights
ITS	Higher Technological Institute (Istituto Tecnologico Superiore)
JRC	European Commission's Joint Research Centre
JU	Joint Undertakings
KIC	Knowledge and Innovation Community
MISE	Italian Ministry of Economic Development
MIUR	Italian Ministry of Education, University and Research

MNC	Multinational Companies
MoU	Memorandum of Understanding
MS	EU Member State
OECD	Organisation for Economic Co-operation and Development
R&D	Research and Development
RIS3	Research and Innovation Strategy for Smart Specialisation
ROP	Regional Operational Programmes
RTDI	Research, Technology Development and Innovation
S3	Used for both 'smart specialisation' and 'Smart Specialisation Strategies'
SME	Small and Medium sized Enterprise
TTO	Technology Transfer Office

Executive Summary

Internationalisation of Smart Specialisation Strategies (S3s)

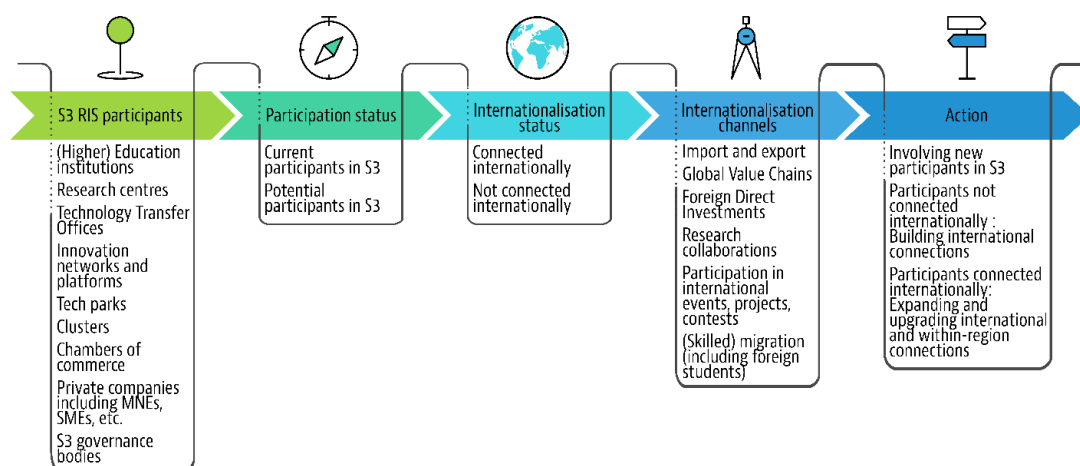
Smart Specialisation Strategy is a place-based EU policy that seeks to enhance regional competitiveness through leveraging and bolstering innovation in the selected priority areas (industries or technologies) in each region.

The new iteration of S3 requires developing cross-border collaborations with regions possessing complex and complementary technological expertise currently missing in a region to upgrade its technological evolution. The reason for this is that new growth opportunities arise from recombining existing technological capabilities while more complex technologies offer strong competitive advantage.

S3 internationalisation is a special case of regional internationalisation with limited practice. This paper presents a simple roadmap for regional S3 internationalisation and the results of an in-depth case study on the opportunities for and barriers to S3 internationalisation in Friuli Venezia Giulia (FVG), a region in the North East of Italy.

The process of internationalisation starts with an assessment of the regional innovation system (as it relates to S3), its actors (existing and potential), their interactions and current international involvement. Next, internationalisation channels should be identified and their advantages and disadvantages evaluated. Overall, an S3 internationalisation strategy needs to build on the strengths, bridge the gaps and help connect the region to the complementary and more complex expertise available internationally (Figure 1).

Figure 1. Roadmap of S3 internationalisation



Source: Authors' elaboration.

Friuli Venezia Giulia (FVG) case

Overview of the FVG S3 and its current internationalisation

Friuli Venezia Giulia enjoys a rich endowment of science and research institutions with diverse and dynamic regional networks, often promoted by the regional government. There are multiple innovation actors (clusters, science parks, etc.) that can initiate and lead internationalisation efforts within the five S3 priority areas (Agribusiness; Strategic production chains, i.e. metal mechanics and “house system”; Maritime technologies; Smart health; Culture, creativity and tourism).

There are bottlenecks to innovation diffusion and coherent functioning of the innovation system. This includes fragmented efforts by several innovation agents and limited planning horizon due to short-term funding. Unclear or narrow mandates of innovation actors (e.g. clusters) can limit their effectiveness. In the private sector, innovation and international activities concentrate in few companies while SMEs are less engaged.

Existing regional international involvement is mostly through exports; the role of FDIs and MNEs is minor. The FVG S3 is not explicitly linked to internationalisation but some S3 sectors (e.g. metal mechanics) are active in collaborating internationally. Regional participation in European projects and networks is expanding but more efforts are needed.

Policy recommendations

Broaden internationalisation channels in traditional regional businesses and build SME innovation capacities. Traditional businesses (usually exporters) and more dynamic young companies (internationalised in various ways) need to be better connected. Locally collaborative firms would need to expand their collaborations worldwide; currently non-collaborating firms need to start collaborations locally first. Internationalisation-tailored support policies should facilitate this, as should efforts to shift the local entrepreneurial culture to become more open to external collaborations.

Define a mid-term vision for internationalisation and use bottom-up governance. Ongoing and future internationalisation actions should be guided by such vision, and resources would need to be allocated accordingly. The S3 governance system needs to integrate new avenues for bottom-up interactions with representatives of the regional innovation system (building on the quadruple helix, i.e. government, academia, businesses and civil society). Such improved interaction should be included in the tools fostering a continuous entrepreneurial discovery process within the S3 as required by the EU regulations.

Strengthen policy guidance role of the region and build capacity to work as a system. The region can establish a permanent “internationalisation steering committee” (a functional body), which would coordinate regional international policy and engage internationalised regional actors. The FVG Brussels Liaison Office can play a more effective role in this process. Key regional players need to learn to act as an innovation system while collaborative policy instruments (e.g. grants for collaborative R&D, support to clusters internationalisation) should be wider used.

Improve analytical skills within the regional policy maker structure. In order to better understand the evolving innovation and internationalisation needs of the territory, regional policy makers should upgrade their analytical skills and tools (indicators, monitoring and evaluation).

Enhance regional insertion in international networks and platforms. The region could more actively participate in S3 Thematic Platforms, the Vanguard Initiative and the European Territorial Co-operation programmes for the S3 internationalisation. Improving and streamlining the circular communication flows among the FVG regional representatives active in various EU and international networks is essential.

1. Introduction

Smart Specialisation Strategy (S3) is an “ex-ante conditionality” for European regions to obtain funding for research and innovation from the European Regional Development Fund (ERDF). S3 is a place-based policy that seeks to enhance regional competitiveness through leveraging and bolstering innovation in the selected priority areas (industries or technologies) in each region. **The new iteration of S3 requires developing cross-border collaborations with regions possessing complex and complementary technological expertise** currently missing in a region to upgrade its technological evolution. The reason for this is that new growth opportunities arise from recombining existing technological capabilities while more complex technologies offer strong competitive advantage.

During the 2021-27 programming period of the EU, regions need to have “measures for international collaboration” in place in order to fulfil the enabling condition for smart specialisation (S3) “Good governance of national or regional smart specialisation strategy”. **Although collaboration is usually an integral part of innovative efforts and S3 is a type of innovation policy, the internationalisation of S3 can take many forms and there are hardly any proven blueprints available to regions to replicate.** In spite of significant policy attention, there are limited practical indications on how to internationalise regional S3s.

The literature on interregional collaboration consistently finds that there are different degrees of ‘outward orientation’ in Research, Technology Development and Innovation (RTDI) policy collaborations (e.g. Uyarra et al., 2014; Mariussen, et al., 2016), from one-off cooperation for specific purposes to the development of integrated innovation strategies. However, whilst multiple configurations for collaboration exist at the conceptual level, in practice, more complex forms of policy integration are extremely rare (Uyarra et al., 2018). Uyarra et al. (2018) find that the increasing appetite for interregional collaboration remains largely restricted to the identification of key common domains, the alignment of priorities and policy learning networks. Examples of closer collaboration, e.g. sharing of programmes or structures across borders or the relaxation of regulations governing geographical eligibility, are harder to find.

For regions, internationalisation efforts should start with an assessment of the state of the regional innovation system (RIS), its actors, their interactions and the existing international involvement. Identifying weaknesses in this system, as well as opportunities for strengthening both innovation and international collaborations, is the next logical step. Based on this, S3 internationalisation efforts need to be designed specifically to build on the strengths and to bridge the gaps by connecting to the complementary reinforcing expertise outside of the regional and national borders.

This paper presents the main results of an in-depth assessment of the RIS in Friuli Venezia Giulia (FVG), a region in the North East of Italy, performed by the OECD Trento Centre for Local Development. The assessment supports efforts by the region to develop a more vibrant regional innovation ecosystem through internationalisation (e.g. fostering exchange of good practices and transnational policy learning, policy alignment, joint actions and projects, exploring potential transnational innovation policy integration, international collaborations in research and innovation, by private and public actors). It offers insights into the current performance of the innovation system and its internationalisation features and prospects.

The paper develops recommendations for FVG to make the most of the regional RTDI endowments through enhancing the innovation-internationalisation nexus in order to improve regional

competitiveness and well-being. The current policy context, although tremendously affected by the persisting pandemic, offers favourable opportunities driven by the combination of the National Recovery and Resilience Plan (currently in elaboration) and the new EU cohesion policies for 2021-27.

2. Internationalising S3s – a simple roadmap

2.1. Smart specialisation and its recent evolution

Smart specialisation is a place-based approach to promoting innovation and growth in European regions. Within this approach, regions identify strategic areas, which are or can plausibly become engines of growth. These areas then become growth priorities in a region, which makes investment choices accordingly.

During the EU 2014-20 programming period, smart specialisation policy formally became an integral part of the European Cohesion policy and design of a regional S3 was imposed as an ex-ante conditionality to access the European Regional Development Fund (ERDF) for regional European Structural and Investment Funds (ESIF) programming and implementation (Guzzo, Gianelle and Marinelli, 2018). As a result, smart specialisation was mainstreamed into the EU Cohesion Policy (Giannelle, Guzzo and Mieszkowski, 2019) together with a broad view of innovation, which encompasses technological, practice-based and social innovation.

Current strategic perspective is defined for the next programming period (2021-27) by the European Green Deal (European Commission, 2019) and the Next Generation EU package¹ for the post-pandemic recovery. Both underline innovation as a contributor to transformative change of sustainability transitions. Because regions serve as the locations from which new solutions emerge, innovation should also build on the regional potential and development needs.

Research and Innovation Strategies for Smart Specialisation (RIS3) continue to receive innovation funding under the Policy Objective 1 and **will play a major part in finding innovative solutions to societal challenges linked to the green transition** (European Commission, 2020). S3 should incorporate a transformative view, which turns them into a more open, adaptable and evolutionary policy instrument (Marinelli, Fernandez, Pontikakis, 2021).

Perhaps the most notable novelty is a requirement of “smart internationalisation” – increased international and interregional co-operation in innovative activities. Generally, smart specialisation, as a place-based approach to innovation and boosting jobs and growth through the identification and development of competitive advantages, should enable and promote interregional and international synergies, complementarities and collaboration (Woolford et al., 2020; Mariussen et al. 2016).

Good governance of national or regional S3 is an enabling condition for smart specialisation in the new programming period (see Box 2.1 for more details). **Measures for international collaboration together with an analysis of bottlenecks for innovation diffusion in a region are among several fulfilment criteria of this enabling condition.**

¹ See https://ec.europa.eu/info/strategy/recovery-plan-europe_en#financing-the-eu-long-term-budget-and-nextgenerationeu (accessed on 02 March 2021)

Box 2.1. Cohesion policy Objective 1 and enabling condition for smart specialisation

Policy objective

A smarter Europe by promoting innovative and smart economic transformation

Specific objectives

- Enhancing research and innovation capacities and the uptake of advanced technologies
- Reaping the benefits of digitisation for citizens, companies and governments
- Enhancing growth and competitiveness of SMEs
- Developing skills for smart specialisation, industrial transition and entrepreneurship

Enabling Condition

Good governance of national or regional smart specialisation strategy

Fulfilment criteria

Smart specialisation strategy(ies) shall be supported by:

- Up-to-date analysis of bottlenecks for innovation diffusion, including digitalisation
- Existence of competent regional / national institution or body, responsible for the management of the smart specialisation strategy
- Monitoring and evaluation tools to measure performance towards the objectives of the strategy
- Effective functioning of entrepreneurial discovery process
- Actions necessary to improve national or regional research and innovation systems
- Actions to manage industrial transition
- Measures for international collaboration

Source: Authors' elaboration based on EC official documents.

2.2. Internationalisation of smart specialisation

Internationalisation of a region is usually linked to greater competitiveness, growth prospects and innovation. For this reason, many regions support internationalisation efforts. Most common support channels include information services provision, promotion, financial support for internationalisation (attraction of FDIs, export credit, etc.) inward investment support, counselling and support to participation in international research projects.² There are four general types of “connections” that characterise internationalisation of a region: business connections, knowledge connections, human connections and infrastructure connections (OECD, 2021_[1]).

Internationalisation of smart specialisation is a special case of regional internationalisation with two very specific distinctive features. First, such internationalisation is more focused on connecting participants of the existing regional innovation system built around smart specialisation priorities. The second distinction is that the goal is not just to link internationally but to link to foreign actors that possess complementary (ideally, with higher value added) technologies to the technological expertise within the

² Based on a presentation by Peter Berkowitz, Head of Unit, DG REGIO G1, European Commission at the OECD webinar “[Internationalisation of Smart Specialisation Strategies](#)” held on 28 June 2021.

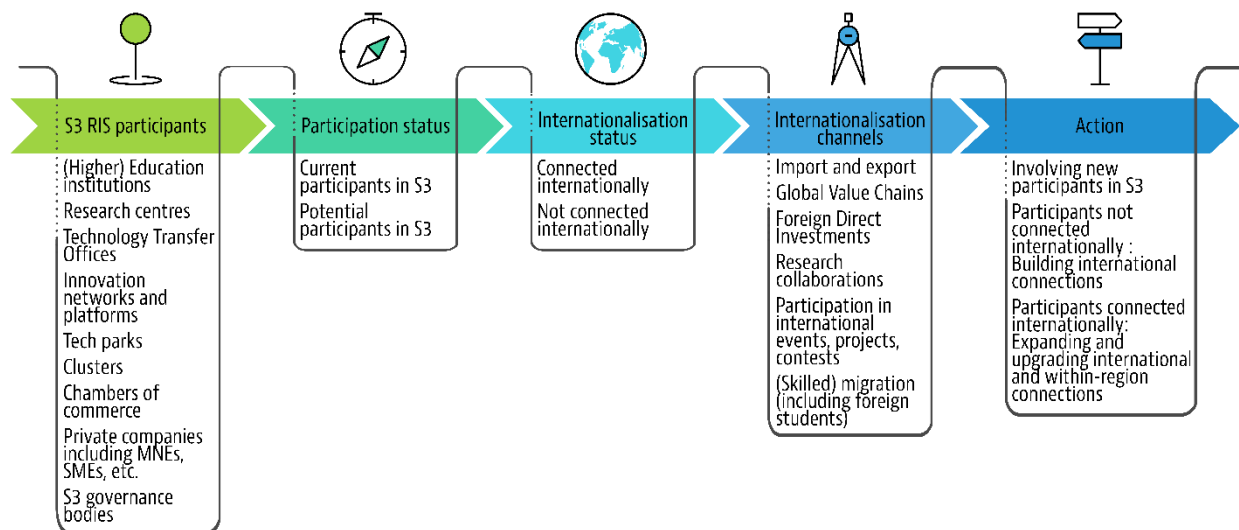
existing S3 strategy of a region. In the regions still building and consolidating their S3, efforts to create a well-functioning smart specialisation strategy and to internationalise it would run simultaneously.

The process of internationalisation should start with an assessment of the regional innovation system, its actors (existing and potential), their interactions and current international involvement.

The next step is to identify weaknesses and opportunities to strengthen innovation and international collaborations through evaluation of possible internationalisation channels as well as their advantages and disadvantages. Finally, an S3 internationalisation strategy needs to be developed that builds on the strengths and bridges the gaps by reinforcing the S3 (if needed) and connecting to the complementary expertise outside of the regional and national borders.

Figure 2.1 offers a roadmap for internationalising a regional S3. The shown graphic does not capture the dynamic interactions across participants and the relative expected pay-offs of pursuing specific connection channels, which differ across regions and should be individually assessed.

Figure 2.1. A roadmap for internationalising regional S3



Source: Authors' elaboration.

3. An in-depth case study: Friuli Venezia Giulia

3.1. S3 in the Friuli Venezia Giulia region – an overview

Structure and governance

Areas of smart specialisation

The Smart Specialisation Strategy of the Friuli Venezia Giulia region is a result of a comprehensive process of elaborations, which engaged all main regional stakeholders (public, private, academia and civil society). Focusing regional industrial, research and innovation policies on the most promising areas of specialisation that constitute S3 will allow to enhance regional competitiveness and identity.

The selection of specific specialisation areas was conducted via an entrepreneurial discovery process (EDP). **The following areas are a part of the S3 in FVG** (see also Table 3.1 for corresponding development trajectories):

- **Agribusiness;**
- **Strategic productions chains (metal mechanics and “house system” sectors);**
- **Maritime technologies;**
- **Smart Health;**
- **Culture, creativity and tourism.**

Table 3.1. Development trajectories for the five S3 specialisation areas in FVG

FVG S3 Areas of Specialisation	Development Trajectories
Agribusiness	Integration of innovation in agrifood chains to create value for the consumer Insertion of circularity and sustainability concepts in the regional agricultural and food economy Value development through continuous integration across the agricultural and food chains
Strategic productions chains:	
<i>Metal mechanics</i>	Solutions and technologies for integrated design and product innovation/smart machines Technologies for advanced manufacturing processes - 'smart factory' Technologies for organisation management and development
<i>House system</i>	Material technologies and innovative design Technologies for improving the efficiency of buildings and production processes Digitalisation of the "Home System"
Maritime technologies	Methodologies for design of new products, processes and services Green technologies and energy efficiency Safety technologies
Smart Health	Biomedical, in vivo and in vitro diagnostics Medical informatics and bioinformatics Innovative therapy Ambient Assisted Living (AAL)

FVG S3 Areas of Specialisation	Development Trajectories
Culture, creativity and tourism	Technologies for conservation and enhancement of goods and products Geomatics and image processing Social and sharing platforms

Note: The development trajectories in the table are the updated ones based on the second revision of the S3 in 2017.

Source: Authors' elaboration.

Overall, the Strategy aims to achieve (1) Competitive consolidation and repositioning of regional industry and production and (2) Change of the regional economic production system towards new areas. The following methodological priorities of intervention are expected to facilitate these goals:

- Developing collaboration and synergies between enterprises and between enterprises and scientific structures;
- Promoting business investment in innovation and industrialisation of research results;
- Promoting new innovative entrepreneurship;

The S3 action plan is based on a "policy mix" principle (Nauwelaers, Periañez Forte, Midtkandal, 2014). The goal is to integrate different means and resources within a framework consistent with the expected changes and the methodological priorities. For that, the FVG S3 identifies three different types of action, as follows:

- Direct actions supporting only the S3 areas of specialisation and their development trajectories;
- Indirect actions that, while outside of the S3 areas, support measures in support of Research, Innovation and Development of the regional economy;
- Context-related measures strengthening the competitiveness and the overall regional context, and complementing or stimulating the prospective implementation of the S3, but not directly connected to it.

S3 governance structure in FVG

The governance scheme for the S3 in Friuli Venezia Giulia has been subject to streamlining where the region worked to put in place a more functional governance structure that **seeks to ensure effective engagement of the quadruple-helix actors (businesses, government, academia, civil society)** as suggested by the EC (Komninos et al., 2018). The new governance architecture became operational in December 2019, and Region considers it fitted for the new 2021-27 S3.

The revised structure consists of the following:

- Regional Government is the political body responsible for approving the Strategy document and its modifications and implementations;
- The Strategy Coordination Structures in charge of S3 management and implementation are the Regional Central Directorate for Productive Activities and the Central Directorate for Labour, Training, Education and Family;
- The Steering Committee is made up of the directors of the Regional Directorates under the coordination of the Region's Director General. This Committee expresses opinions on the Strategy and its implementation, fosters and addresses the work of relevant regional units involved in its implementation and monitors its progress;
- The Strategic Committee ensures the liaison between the Regional Administration and the stakeholders;
- The Technical Secretariat offers technical and operational support to the formulation and implementation of the Strategy.

In 2019, the regional government established the “Agenzia Lavoro & SviluppoImpresa” (Employment and Business Development Agency), as a non-economic public body. The Agency connects regional entrepreneurial system as a part of growth and employment public policies and coordinates the "entrepreneurial discovery process" for the new S3. To this end, the Agency benefits from the scientific support of AREA Science Park, and from regional cluster managers to engage the actors of the regional quadruple helix.

From the financial point of view, the S3 in Friuli Venezia Giulia is a multi-fund strategy that makes use of the ESIF and other, primarily regional, resources. Overall, the provisional budget of the Friuli Venezia Giulia's S3 is about EUR 370 million.³ Overall, most of funding for FVG S3 is coming from the 2014-20 ERDF FVG ROP. About 84% of the total funding (both direct and indirect actions) is from EU sources. The rest comes from either regional or national funds.

However, the S3 is a strategy and not a programme with its own budgeted resources. Therefore, depending on the additional financial resources that may become available either from the regional budget or other national and/or EU sources, other types of additional actions can be considered to contribute to its effective implementation.

Performance

Funded projects

The FVG S3 funded a total of 2 858 projects (Table 3.2). Among the projects allocated to a specific S3 priority area, Metal mechanics is leading in terms of the number of financed projects. The next best performing area is the House system, though quite far behind. Over the years, the total number of projects was steadily increasing in all areas with a particularly strong growth in the ‘Others’ category from about 100 in 2016 to close to 1 600 in 2020.

Table 3.2. Number of projects funded by area of specialisation as of 31 December 2020

Number of Projects	Admitted	Financed	Committed Funds
Direct Actions			
Agrifood	180	180	8 940 969
Metal mechanics	527	527	42 676 899
House system	286	286	20 126 246
Smart health	175	158	26 149 200
Maritime technologies	139	126	26 795 510
Culture, arts and tourism			
Others	1 588	1 581	20 211 839
Total	2 895	2 858	144 900 663
Indirect Actions	769	490	109 498 696
Total (Direct + Indirect)	3 664	3 348	254 399 359

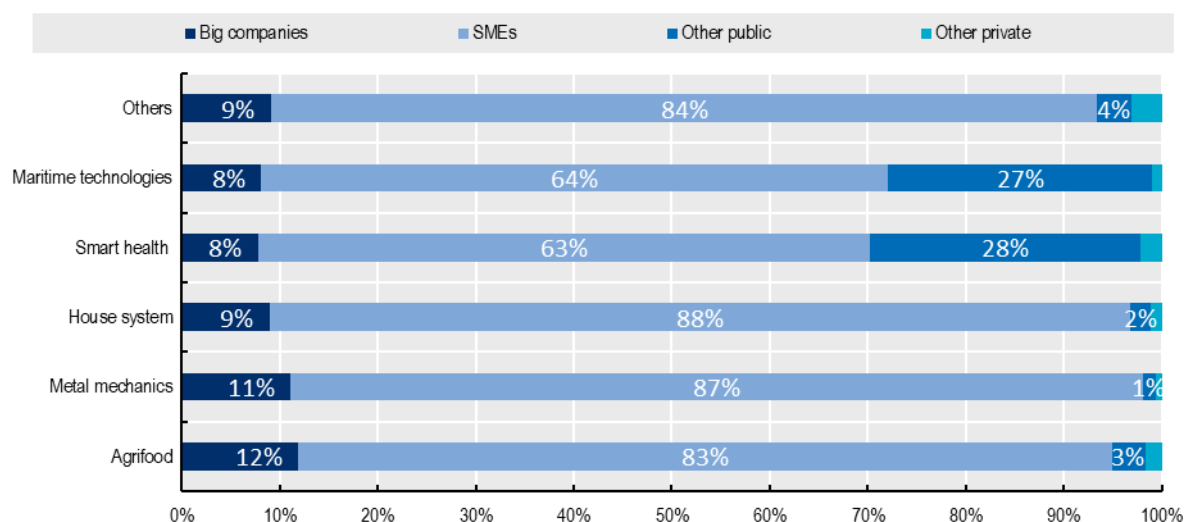
Source: Authors' elaboration on FVG S3 Region monitoring data.

Figure 3.1 shows the shares of S3 projects by business typology. SMEs play a major role across all sectors with highest percentage in Metal mechanics, Home system and Agrifood (above 80% of the total). In Smart health and Maritime technologies, the share is lower but still exceeds 60%. In both these areas, S3 funds beneficiaries include public entities (universities, research centres, etc.), which implies possibility of private-

³ Source: Fourth Annual FVG S3 Report (April 2020) and series of Monitoring Reports issue by Region FVG. See <http://www.regione.fvg.it/rafvg/cms/RAFVG/GEN/programmazione/FOGLIA24/> (Accessed on 4 March 2021)

public partnership approach to project development. The share of big companies across S3 areas is quite similar ranging between 8% (Maritime technologies and Smart health) and 12% (Agrifood).

Figure 3.1. Share of projects by business typology in each specialisation area as of 31 December 2020



Source: Authors' elaboration on FVG S3 Region monitoring data.

Allocation and utilisation of financial resources

Table 3.3 displays financial progress as of the end of 2020 by areas of specialisation. The table shows that, at the end of 2020, the contributions committed under the direct actions amounted to approximately EUR 144.9 million. About 86% of these resources are split by area of specialisation, while the remaining EUR 20.2 million do not refer to a specific area and have therefore been classified as 'Others'.

As highlighted by the S3 regional monitoring and evaluation reports, the originally planned budget for direct actions have been exceeded due to additional allocations made by Regional Operational Programmes (ROPs) of both the European Regional Development Fund (ERDF) and the European Social Fund (ESF). Considering 100% of total activated resources, 90.8% were already committed and 52.5% disbursed at the end of 2020.

Table 3.3. FVG S3 Financial Progress as of 31 December 2020

EUR.

Action type of S3 area	Activated (A)	Committed (B)	Disbursed (C)	Public Co-financing (D)	Private Co-financing (E)	Admitted Expenditure (B + D + E)
Direct Actions						
Agrifood	1 604 704	8 940 969	5 522 783	144 396	14 842 230	23 927 595
Metal mechanics	10 132 644	42 676 899	28 067 712	1 839 838	65 254 969	109 771 706
House system	6 598 197	20 126 246	14 031 434	12 815 187	34 287 880	67 229 313
Smart health	23 076 602	26 149 200	15 619 814	1 105 430	13 525 804	40 780 434
Maritime technologies	26 250 364	26 795 510	18 116 029	1 218 061	13 240 667	41 254 238
Culture, arts and tourism						
Others*	100 827 313	20 211 839	12 322 259	1 356 475	1 037 181	22 605 495
Total	168 489 824	144 900 663	93 680 031	18 479 387	142 188 731	305 568 781
Indirect Actions	105 650 728	102 435 888	42 766 055			
Total (Direct + Indirect)	274 140 552	247 336 551	136 446 086	18 479 387	142 188 731	408 004 669

Note: *The item refers to actions with resources not preassigned to a specific area of specialisation.

Activated resources refer to the allocations made for both direct and indirect actions and include any addition/subtraction occurred after the activation of the procedure. Disbursed funding consists of contributions paid to the beneficiaries as of 31 December 2020. Public co-financing reflect expenditures that remain at charge of the beneficiary, when this is public, or that the beneficiary generally receives from other sources of public funding. Private co-financing is the amount of eligible expenditures that remains at the disposal of a beneficiary, which is private or beneficiary that receives funding from non-public sources. Admitted expenditure is the total eligible expenditure covered by the funding (S3 commitments plus co-financing).

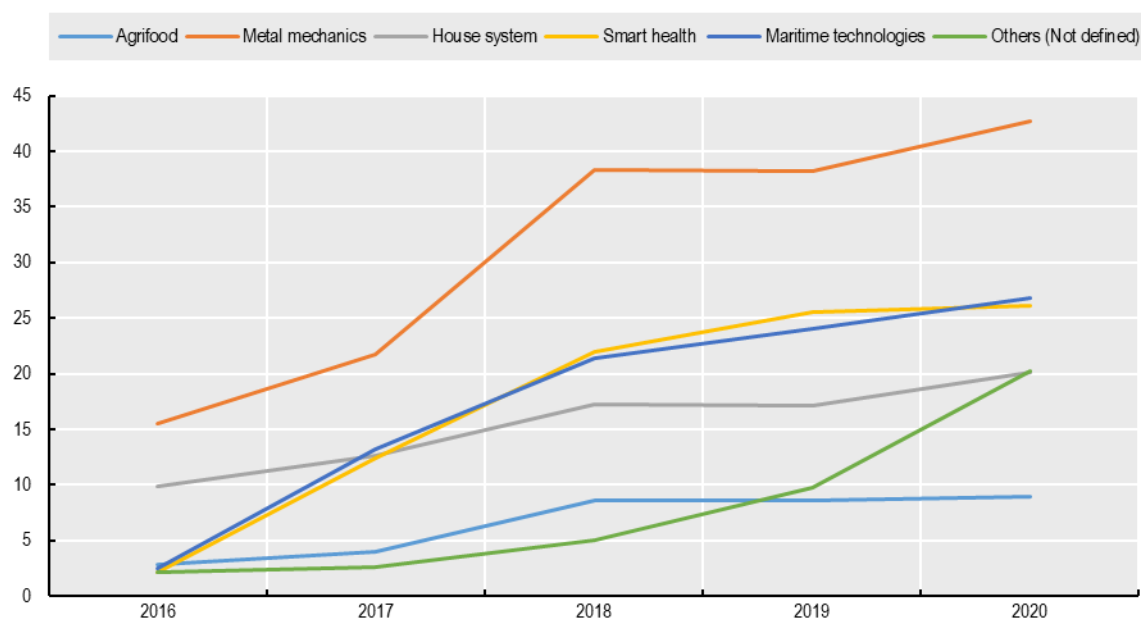
Source: Authors' elaboration on FVG S3 Region monitoring data.

In some sectors, the actual absorption (see the committed column) exceeds the resources initially estimated in the S3 policy mix (indicated by the activated resources). This is possible because in the case of Agrifood, Metal mechanics and House system, the source of funding such as the European Structural and Investment Funds (ESIF) ROPs is not pre-allocating a budget to a specific S3 area of specialisation. Consequently, if a sector is active and successful in getting the projects funded, it may exceed the total amount planned in the S3 policy mix allocation. In contrast, for Smart health and Maritime technologies the resources are pre-emptively assigned.

Over time, the amount of committed resources was steadily growing in all S3 priority areas except for Agrifood where the amount was steady between 2018 and 2020. The largest increase was observed in Metal mechanics, Maritime technologies and Smart health (Figure 3.2).

Figure 3.2. FVG S3 committed resources by area of specialisation over time

EUR million.



Source: Authors' elaboration on FVG S3 Region monitoring data.

Fulfilment of the “Good governance of national or regional S3” criteria

The process of elaborating the new S3 in FVG started in 2019 when the region revised the existing strategy in some of its critical features, as highlighted by the S3 independent evaluation⁴. The entrepreneurial discovery process, the governance and the monitoring and evaluation chapters of the S3 were updated. The revised S3 was endorsed by the regional government in December 2019. The process of further reformulation and refocussing of the FVG S3 is currently ongoing for 2021-2027 with the idea of enhancing its positive impact in the new period and qualifying for the funds from the EU. **Table 3.4 shows progress in fulfilling the criteria of the “Good governance of national or regional Smart Specialisation Strategy” as of February 2021.**

⁴ The FVG Regional Public Investment Evaluation and Verification Unit (NUVV) oversees the evaluation activity of the regional S3. <https://www.regione.fvg.it/rafvq/cms/RAFVG/GEN/programmazione/FOGLIA24/> (accessed on February 25 2021).

Table 3.4. The current progress in fulfilling the criteria of the “Good governance of national or regional Smart Specialisation Strategy” enabling condition

Fulfilment criteria	Comments about the advancement	Fulfilment to date (self-assessment)
1. Up-to-date analysis of bottlenecks for innovation diffusion, including digitalisation	Synthesis of the Bottleneck Analysis in Chapter 4 of the present paper	Yes
2. Existence of competent regional/national institution or body, responsible for the management of the smart specialisation strategy	New governance in place since December 2019 (see above in the text)	Yes
3. Monitoring and evaluation tools to measure performance towards the objectives of the strategy	The regional Public Investment Assessment and Verification Unit (NUVV) oversees the assessment of the regional S3, which has been included in the FVG region's Unified Evaluation Plan for regional development and cohesion policies	Yes
4. Effective functioning of entrepreneurial discovery process	The adopted methodology relies on four Phases the EDP, each of which has been articulated into Objectives, Actions and Roles: 1. Analysis of the regional context and innovation potential 2. Ensuring the participation of external stakeholders 3. Vision updating 4. Priorities identification	Yes
5. Actions necessary to improve national or regional research and innovation systems	Measures aimed at strengthening a sound innovation ecosystem in FVG have been planned for 2021-27. Grounded on systemic actions already in place (see details on FVG SiS and ARGO system in next § 3.2.6) the Region plans to further pursue a twofold action: - To strengthen research and innovation capacities and the introduction of advanced technologies (38MEUR) - To fund research infrastructure of a complex nature (20MEUR)	Yes
6. Actions to manage industrial transition	A document has been elaborated on main actions the Region is undertaking focusing on two main challenges(*): - Preparing for the jobs of the future, in the context of Industry 4.0 - Transitioning to a low-carbon circular economy	No
7. Measures for international collaboration	Main measures adopted are: the S3 Thematic Platforms; Smart specialisation and the macro-regional approach: the EUSAIR macro-strategy and the EUSALP macro-strategy; S3 and the European Territorial Cooperation Programmes (ETC) of interest for FVG; Actors, Networks, Alliances for competitive advantage. The present OECD paper is expected to offer further substance to the criterion fulfilment.	Yes

Note: *Main source of information on industrial transition used by Region Friuli Venezia Giulia is OECD (2019).

Source: Authors' elaboration.

3.2. Current setting for the S3 internationalisation in FVG

Innovation

Smart Specialisation Strategy is a place-based innovation policy concept, which motivates regions to discover and strengthen their technological endowments through innovation. In this sense, innovation is at the centre of S3.

The research and innovation policy of the Friuli Venezia Giulia region enjoys a rich endowment of science and research institutions, which places the region quite high nationally (Table 3.5) and internationally (Box 3.1). Over decades, these institutions have established diverse and dynamic networks at the regional level, most often promoted and fostered by the regional government. The S3 had a catalysing effect on the regional innovation system, yet, the synergies and linkages can be further strengthened and streamlined for a consolidated and well-functioning system of R&D and technology development.

Table 3.5. Some innovation-related statistics for FVG

Indicator	Value	Ranking in Italy (out of 21 regions)	Year and source
Total tertiary education (ISCED2011 levels 5 to 8), 25-64	21.1%	7 th	2018 (ISTAT)
R&D expenditures (% GDP)	1.57%	4 th	2016 (OECD)
<i>From business</i>	0.85%	Above nat. average (0.83%)	2016 (OECD)
<i>From government</i>	0.27%*		*2015 (OECD)
<i>From higher education institutions</i>	0.40%*		*2015 (OECD)

Source: Authors' elaboration on ISTAT (Italian National Institute for Statistics) and OECD data.

All main regional R&D and innovation institutions active in Friuli Venezia Giulia are a part of a formalised network, the SiS FVG (The Scientific and Innovation System of Friuli Venezia Giulia⁵). Established in 2016, it has four objectives defined in the 5-year Programme Agreement signed between the Region, the Italian Ministry of Foreign Affairs and International Cooperation and the Ministry of Education, University and Research.⁶ The objectives are: (1) Creation of a “Scientific network of excellence” to reinforce the capacity for action, attractiveness and competitiveness of the institutions at a national and international level; (2) Rationalisation of the regional structures that operate in the valorisation of research, technology transfer and the development of innovation; (3) Promotion and services for the internationalisation of the centres present in the Friuli Venezia Giulia region and (4) Technical and scientific communication and innovation diffusion.

The promoting institutions and partners of the SiS FVG include universities and conservatories, national research institutions, international research institutes and science and technology parks⁷.

Currently, the SiS FVG engages across all partner institutions 9 030 staff members, of them 5 866 are active researchers. In addition, about 2 000 more researchers are engaged in R&D departments of FVG private companies. More than 35 000 students are enrolled in all regional partner HEIs. Over the last years (2016-19), the SiS FVG partners developed 388 International research and cooperation projects. Among the partners, AREA Science Park based in Trieste provides operational support in particular for the achievement of the objectives (2), (3) and (4).

⁵ <https://www.sisfvg.it/> (accessed on 25 February 2021)

⁶ For further details see

https://www.sisfvg.it/sites/default/files/Accordo%20SIS_%20Friuli%20Venezia%20Giulia_traduzione%20inglese.pdf (accessed in 4 March 2021)

⁷ In particular, Universities and Conservatories include University of Trieste, University of Udine, International School for Advanced Studies (SISSA), Music Conservatory of Trieste “Giuseppe Tartini”, Music Conservatory of Udine “Jacopo Tomadini”; national research institutions include AREA Science Park, Elettra - Sincrotrone Trieste S.C.p.A, National Institute of Oceanography and Experimental Geophysics (OGS), the regional sections of the Italian National Research Council (CNR), National Institute for Astrophysics (INAF) - Trieste section, National Institute of Nuclear Physics (INFN) - Trieste section; international research institutes include International Centre for Genetic Engineering and Biotechnology (ICGEB), Abdus Salam International Centre for Theoretical Physics (ICTP), TWAS - The Academy of Sciences for the Developing World, InterAcademy Partnership (IAP) and Science and technology parks include Friuli Innovazione, Polo Tecnologico of Pordenone, Consorzio Innova FVG.

Box 3.1. FVG innovative performance – more details

Selected facts about innovative activities in the region

- R&D per capita values are higher than the Italian average.
- R&D to regional GDP ratio is among the top regions in Italy.
- A large share – more than two thirds – of private R&D is conducted by a relatively small number of large firms.
- Around a half of regional firms with more than 10 employees have some innovation activity; this indicator is higher than the national average.
- Not all of innovation performance indicators are above the national average.
- Innovation expenditures are more on acquisition of machinery than internal R&D.
- There are relatively low levels of innovation based on external R&D (6% in 2014 and 2016).
- Levels of cooperation in innovation are also low (less than 20% of innovative firms cooperate in innovation).

Regional Innovation Scoreboard (RIS) performance

Adding also figures on public research and innovation, Friuli Venezia Giulia appears to be particularly strong vis-à-vis other Italian regions and also when compared to the EU average. This result is evident looking at the Regional Innovation In the last edition (2021), Friuli Venezia Giulia appears among the leading group of the 6 Italian Regions ranked as “Strong Innovator -” just after Emilia Romagna, the only one ranked as “Strong Innovator”. Overall the FVG performance has increased over time (+25.1% from 2014 to 2021). Also in the previous editions of the RIS ranking, Friuli Venezia Giulia has shown good or excellent performance, especially after a revision in the RIS ranking methodology. It was in the strong innovators group (previously named “innovation followers”) in 2014 and 2016, together with other Italian regions. FVG was in the third group together with the rest of Italy in the 2017 edition. This trend has to be taken into consideration, as in the very first editions, regional performance was good but lower than larger Italian regions such as Lazio, Lombardy, Piedmont and Emilia-Romagna (see RIS 2006).

Source: Authors’ elaboration based on selected FVG statistical sources (*Regione in cifre, Rapporto statistico annuale*).

As part of the SiS FVG network activities and pursuant to its second objective (rationalisation of the regional Research, Technology Development and Innovation structures) the ARGO System (Sistema ARGO) was launched in 2018.⁸ The ARGO’s main objective is to better link industry and (public) research in order to foster product and process innovation, stimulate collaboration and knowledge flow and to strengthen technological infrastructure with the final goal of stimulating economic development⁹. To develop a modern regional production system, ARGO focuses on:

- Digitalisation and innovation of production processes;
- Industrial development through attraction of new investments;
- Research and training in strategic sectors to develop regional economy through the shared public-private use of research infrastructure and human capital with high added value;

⁸ Memorandum of Understanding signed on 1 March 2018 between the Autonomous Region of Friuli Venezia Giulia (region), the Ministry of Education, University and Research (MIUR) and the Ministry of Economic Development (MISE), and subsequent implementation agreement signed on 3 December 2018 between the Region and MIUR.

⁹ See <https://www.sistemaargo.it/en/> (accessed on 1 March 2021).

- Strengthening the capacity to create and grow innovative enterprises.

The System currently includes 47 partners. Table 3.6 provides more details of specific assets, their objectives and activities.

Table 3.6. ARGO System assets, objectives and activities (2018-2021)

Assets	Objectives	Activities
Industrial Innovation Harbour (IIH)	IIH has the objective of designing and testing an innovative industrial hub model, capable of attracting investments from national and foreign companies in the Trieste retro-port industrial area, benefiting from the synergies among the existing logistic infrastructures, the advantages offered by the regime of Punto Franco (Free Zone) of Trieste and the local research institutions	<ul style="list-style-type: none"> • Eco-innovative industrial plants (evolution of the IIH concept) • 1 regional industrial symbiosis platform • 9 partners • 4 lines of action
High Impact Net (HIN)	HIN aims to develop a unique model for regional incubators based on defined areas of specialisation, organically inserted in a structure that sees Friuli Venezia Giulia in a role of a hub for attraction and generation of innovative start-ups	<ul style="list-style-type: none"> • 2 systemic intervention model experiments • 4 strategic sectors (ICT, Life science, cultural and creative industries, circular economy) • 190+ supported start-ups • 3 international missions (2018-19-20 CES Las Vegas)
Industry Platform 4 FVG (IP4FVG)	IP4FVG aims to create a territorial ecosystem to support digital transformation on a regional scale, able to guarantee FVG enterprises access to tools and services for orientation on the subject of digitalisation	<ul style="list-style-type: none"> • 4 Regional Technology Nodes • 29 partners • 4 thematic sectors and services (Internet of Things, Data analytics and AI, Data optimisation and simulation, Advanced Manufacturing)
Technology Platforms	This Asset contributes to the systemic impacts of the ARGO system by supporting research and industrial development, in particular by making optimal scientific and technological conditions available to public and private subjects to carry out innovation projects, experimental activities and services of excellence, thanks to the access to research laboratories and their scientific expertise, equipment and instrumentation that cannot be easily replicated	<ul style="list-style-type: none"> • Regional infrastructure supporting basic research and applied research • 12 partners • 3 platforms (new materials, genomic and epigenetic, structural biology) • 20+ Research institutes • 70+ Targeted requests from businesses

Source: Authors' elaboration on SiS FVG and ARGO data.

The region is engaged in certain international activities, including in the area of innovation, which are in many cases not explicitly linked to its Smart Specialisation Strategy. These include research projects undertaken by regional actors within Horizon 2020, Interreg Programmes and a number of institutional collaborations. A more S3-relevant initiative is a bilateral agreement with Bavaria Government signed in 2016. The agreement is centred on actions of common interest within the manufacturing sector. In 2017, representatives of metal mechanics/mechatronics clusters (FVG COMET cluster and the Bavarian cluster Mechatronik & Automation) started their collaboration. Since then, linkages between Friuli Venezia Giulia and Bavaria have been extended to other regional clusters.

Several institutional activities within scientific collaboration and S3 have been launched with Slovenian partners. An example is the Slovenia–Friuli Venezia Giulia Joint Committee, held annually in the form of plenary sessions. This agreement covers a very wide range of fields: transport, energy, the environment, spatial planning, agriculture and rural development, the economy and tourism, research and innovation, protection against natural and other disasters, social affairs, health, education, culture, and minority issues.

Through its Liaison Office in Brussels, the Region participates in the Working Groups set up within the ERRIN (European Regions Research and Innovation Network) and in the Community of practice of the Horizon 2020 Programme with reference to the Seal of Excellence of the SME Instrument. In 2019 an agreement concerning researchers' mobility, scientific communication and joint participation in

international events was signed between Friuli Venezia Giulia and the Joint Research Centre (JRC) of the European Commission.

Also beyond EU borders, **the regional government has opened collaborations with US institutions** (e.g. the FVG-USA Innovation Forum, cooperation agreement between the Region, the regional university system and the Massachusetts Institute of Technology). Other relevant agreements have been signed with partners from the United Arab Emirates (e.g., the Innovation Bridge Trieste – Dubai 2020), Russia and Cuba (e.g., pilot action “Promotion of investment and cooperation opportunities on maritime and smart health sectors” related to two S3 areas of specialisation of Friuli Venezia Giulia).

Aside from the regional S3 policy efforts, companies in the region actively benefit from national policies, such as Italian Start-up Act. Whilst start-up rates in FVG are in line with expectations given the national trends and the share of regional population, the new companies are considerably more likely to be innovative. The share of innovative start-ups in the population of young firms in FVG (5%) is notably higher than the national share (3%) and lags only Aosta Valley (slightly over 5%) and the Autonomous Province of Trento (7.5%) (OECD 2020).

The next S3 generation calls for dealing more convincingly with the regional innovation internationalisation challenge, which is an explicit fulfilment criteria of the S3 enabling condition as established by the European Commission. To yield real and long-lasting benefits for the region, its firms and residents, an approach to the S3 internationalisation must be well designed with the goal of addressing specific regional needs and leveraging regional assets and not just driven by the need to fulfil an EU prescription.

Innovation and internationalisation

Innovation and internationalisation can be two key drivers of economic growth in the Friuli Venezia Giulia region but the performance of the region in these dimensions needs to be strengthened (Box 3.2). Generally, innovation and internationalisation are considered in academic and policy literature, as well as in most policy making, separately, which limits a better understanding and deployment of synergies. In FVG, no study using official statistics on innovation (e.g. Community Innovation Survey) has explicitly explored the internationalisation of innovation cooperation.¹⁰

Yet, **there is full awareness about the importance of innovation and internationalisation among policymakers, researchers and practitioners in FVG.** This is confirmed by the good results achieved in national and international rankings and by a great attention devoted to these issues in studies and research projects conducted within the region. Indeed, over the years, the regional government has internally produced or externally commissioned and funded several analyses centred on these topics.

These studies and other rankings suggest that the culture of collaboration in the region is somewhat limited. For example, among the 2017 RIS indicators for the region, the lowest was “innovative SMEs collaboration” followed by the “public-private co-publications” one. Although these indicators for Friuli Venezia Giulia were still higher than the Italian average, the region underperformed the European mean. In the 2019 RIS edition, the indicators did not improve significantly. In particular, the value of “innovative SMEs collaborating” only slightly increased.

¹⁰ Gandin and Cozza (2019) explore CIS data for Friuli Venezia Giulia in order to identify the best variables for predicting innovation with machine learning techniques. They excluded the variable “innovation cooperation with foreign partners” as it represented only a 3% of the total sample.

Box 3.2. FVG innovation collaboration performance

- Firms scarcely co-operate in innovation, both with other firms and with public institutions.
- Exports are a strong asset of the regional system, although they declined after the Global Financial Crisis (GFC).
- The attraction of FDI, which used to be an asset of the regional system, has also declined after the GFC.
- A limited number of firms benefit from regional R&D policies, which contributes to polarisation of innovation in the region.
- A heterogeneous set of actors provides innovation services.

Note: The results are based on secondary data analysis and surveys conducted in 2010-12. Although the data appear to be old, more recent work suggests that the overall patterns did not change substantially.

Source: Authors' elaboration based on "Unitary Evaluation on the Implementation of Policies Related to the Research and Innovation System (LOT 4)" by Fondazione Brodolini (2014).

"White Book on research and innovation" (Friuli Venezia Giulia, 2014¹¹) reports that firms in FVG – as in the rest of Italy – tend to collaborate little. The existing collaborations usually happen within region or within nation. International collaboration is very uncommon. Another observation is that the international dimension of research is higher than that of innovation. This is especially due to the public research system, often involved in international publications, in international co-publishing and in international scientific workshops and events. On the other hand, patent internationalization in the region is low. Patent applications are relatively more frequent at the Italian Patent Office, rather than at the European one. International co-patenting is rare.¹²

Concerning internationalisation of the regional economy, FVG is a strong exporter particularly to advanced countries (US, Germany, France) and within certain sectors (mostly Metals and machining or Building of ships). Recent statistics by ISTAT (December 2020) show that even in the first three quarters of the dramatic year 2020, exports decreased by only 6% between January and September against a 13% drop nationally, a 12% drop in the Italian North Centre and a 10% drop in the Italian North East (two reference macroregions for FVG).

While export is considered a strong regional asset, FVG involvement in GVCs and FDI is still limited. Recent statistics (2018 as reported in December 2020) by ISTAT show that both the presence of international MNCs and of the regional MNCs abroad is proportional to the regional contribution to GDP. FVG is relatively less attractive for foreign MNCs than top Italian regions (Lombardy and Lazio) and it is considerably less projected abroad than close regions (Veneto and Emilia Romagna) where the presence of local MNCs is higher than their share of national GDP.

3.3. Opportunities for and bottlenecks to innovation diffusion

Presence of innovation actors in a territory does not guarantee a well-aligned regional innovation system that activates and expands synergies across economic and social actors to deliver a vibrant and self-sustaining innovation landscape. A proper innovation system with a clear and shared regional vision

¹¹ See "Libro Bianco sulla ricerca e l'innovazione" (Friuli Venezia Giulia, 2014).

¹² The majority of the results in the "White book" come from a sample of actors involved in the analysis for a wider purpose, not for assessing internationalization of the regional innovation system.

is a precondition for an increased international presence. The many strengths of the region, indeed, need to be valorised with an international perspective.

To analyse the existing bottlenecks in innovation diffusion in the Friuli Venezia Giulia region, a mix-method study was implemented, which combined a survey aimed at gathering quantitative data and a set of focus groups gathering qualitative data. The survey targeted firms and sought to understand the demand for innovation-support services, whilst the fieldwork (organised as a set of focus groups) was directed to clusters, technology parks, universities' technology transfer offices (TTOs) and higher technological institutions (ITSs or Istituti Tecnologici Superiori), as regional actors who can offer innovation support services. The study, therefore, identified the bottlenecks to innovation diffusion by articulating and comparing the demand and supply of innovation-support services.

Innovation services supply

Innovation services supply in the Friuli Venezia Giulia region is plentiful as evidenced by a multitude of reputable suppliers working within a pre-designed and evolving structure. Yet, their actions often are fragmented, insufficiently outward-oriented and short-term bounded. Such conclusions emerge from a number of focus groups with clusters, higher technological institutions, universities and technology parks.¹³ Box 3.3 lists focus group participants and summarises main opportunities and challenges that they face when delivering innovation services to the regional actors.

¹³ Four focus groups were conducted in the second half of November 2020, each covering one set of regional innovation actors, namely: clusters, technology parks, universities TTOs and ITS (Istituti Tecnologici Superiori). Interviewees were asked to describe their activities and evaluate them, across different business needs (contacts, management, financing, equipment, qualified personnel, knowledge and digitalisation). Actors were also asked to reflect more broadly on the functioning of the innovation system and the challenges they face.

Box 3.3. Innovation supply: Lessons from focus groups with innovation actors

Clusters

Clusters are consortia of private and public actors (including universities), which support their own sector of activity by promoting collaboration, sharing infrastructure, knowledge and skills. Clusters operate in both traditional and high-tech sectors. The region legally recognises their importance as tools to enhance local economic networks and foster their competitiveness.

The focus group* investigated the ability of clusters to mediate between the needs of the territory and the direct providers of technology and innovation support services (i.e. universities and technology parks). The following strengths and weaknesses of clusters were identified:

- + Have clear structured activities to reach out to firms (e.g. deploying mapping and surveys sometimes in collaboration with universities to understand how firms relate to innovation).
- + Are devoted to the mission of articulating the demands of SMEs and translating them in potential innovation projects.
- + Possess expertise and enjoy trust to successfully act as innovation intermediaries.
- + Represent FVG in several EU innovation networks and are well placed to support local firms in proactive engagement in the EU and global arena.
- Budget constraints and financial uncertainty result in less frequent mapping and reduced networks and capacity building activities.
- Inadequate support at the institutional level; clusters are legally required to perform public services which are neither clearly defined nor sufficiently budgeted.

Higher Technological Institutes (ITs or *Istituti Tecnologici Superiori*)

ITs provide post-secondary technological training, closely aligned with the needs of the private sector. Half of the teachers must be high-standing professionals in the private sector. ITs grant a High Technical Degree corresponding to level V of the European Qualification Framework. ITs were introduced in 2010 to address the challenge for Italian students to enter the labour market. ITs are organised as Foundations with participation of enterprises, universities, research centres, local authorities and educational centres. They must be linked to the six nationally-defined strategic technological areas.

The focus group** covered ITs' key activities and the ability to support local innovative firms through right skills development. The following strengths and weaknesses were identified:

- + ITs' graduates have a high employment rate in key technological sectors and are critical to the functioning of the regional innovation system.
- + Constructive and collaborative relationship with the regional government (the main funder), universities (no competition) and clusters (for translating firms' skills needs into curricula).
- + Selective admissions (more applications than places available).
- Relatively unknown to students and families who keep preferring the traditional university route.
- Annual funding cycle hinders the ability to plan beyond one year, which is particularly detrimental for multi-year curriculum development and hiring of high-level practitioners.
- The educational model is resource- and skills-intensive, which limits its scalability.

- Internally-oriented: ITSs do not engage in centrally managed European programmes, notably Erasmus+, which supports precisely the type of training ITSs offer.

Universities

The FVG higher education systems is multi-faceted, comprising organisations with different historical roots and missions and therefore heterogeneous approaches to both third mission and the engagement with the territory. Generally speaking, with the important exception of OGS (National Institute of Oceanography and Experimental Geophysics), for which interaction with industrial partners is part of the core business, the “third mission” of universities in FVG is in its infancy. The focus group*** covered issues of the third mission, technology transfer, collaborations and other topics. The following strengths and weaknesses were identified:

- + Intention of increasing the engagement with the territory among some participants (Universities of Trieste and Udine).
- + Industrial doctorates and industry-co-designed master programmes are offered and well-received by the firms.
- + Innovation labs that connect students and companies are implemented by placement offices of the two universities.
- + Pooling of resources for technology transfer among several actors (International School of Advanced Studies; University of Trieste; University of Udine).
- + Functional and frequent relationships with other regional actors, such as clusters and technology parks.
- No strategic plans for more active engagement in the third mission and somewhat limited ability to reach out to firms for technology transfer (usually such relations are initiated by firms).
- Inadequate monitoring tools for the third mission engagement (only contractual relations are counted, softer forms of collaborations are not monitored).
- The third mission and engagement with the region/community are not prominent parts of career progression in academia.
- Limited attention to the opportunities for tech transfer and the third mission initiatives offered by international programmes such as H2020 or ERASMUS+ *knowledge alliances*, or by international networking initiatives.

Technology Parks

Science and technology parks are a common instrument used by regional and national authorities for regional development. Their main objective is to foster knowledge-based growth and entrepreneurship, through innovation and technology transfer. STPs have been promoted in Friuli Venezia Giulia since the late 1970s, with the creation of AREA Science Park. The regional STP landscape is a complex one with globally recognised scientific actors feeling less anchored in the territory compared to other technology parks.

The focus group**** identified the following strengths and weaknesses:

- + High-quality services that satisfy the demand of strong innovators and give rise to long-lasting partnerships.
- + Sufficient financing for the current level of activity.
- A lack of capacities for reaching out to potentially innovative SMEs and scaling up the impact.

- Inertia in the system: High degree of repeated collaborations with very limited involvement of new firms, seeming predominant reliance only on the region for funding and no strategy to engage in European competitive projects and programmes.

Note: * Participants included: Cluster AGRIFOOD (Agrifood and Bioeconomy); Cluster Arredo e House System (House System); Cluster CBM (Centre for molecular biomedicine); Cluster COMET (Metalworking); Cluster DITEDI (Digital technologies); Cluster MARE (Maritime Technologies). ** Participants included: Adriatic Nautical Academy (Istituto tecnico superiore accademia nautica dell'Adriatico, Trieste); New lifesience technologies (Istituto tecnico superiore nuove tecnologie della Vita, "Alessandro Volta" di Trieste); ICT (ITS ICT Kennedy | Istituto tecnico superiore per le tecnologie della informazione e della comunicazione, Pordenone); Mechatronics and Aeronautics (MIST - Malignani | Istituto Tecnico Superiore, Udine); Consorzio Friuli Formazione, an organisation whose mission is to develop a high-level professional training system in the FVG region. *** Participants included: National Institute of Oceanography and Experimental Geophysics – OGS; SISSA - International School of Advanced Studies; University of Trieste; University of Udine. **** Participants included: Agenzia per l'energia del Friuli Venezia Giulia (APE); AREA Science Park; Consorzio Innova FVG; Friuli Innovazione Centro di Ricerca e di Trasferimento Tecnologico; ICGEB - International Centre for Genetic Engineering and Biotechnology; ICTP - International Centre for Theoretical Physics; Polo Tecnologico di Pordenone; Electra Sincrotrone Trieste S.C.p.A.
Source: Authors' elaboration.

Innovation services demand

On the demand side, there are relatively few (large) firms that can pursue innovation either internally or through collaborations with regional actors. The vast majority of SMEs, however, are unable to innovate and may attempt it only in response to the potential availability of public grants. Innovation, in other words, is not yet an organic function; it is an ad hoc process largely dependent on exogenous availability of funds. Another observation is that the demand for innovation services is generally not articulated among many firms, particularly SMEs, as they often do not even try to reach to innovation services providers in the regions. The gap is especially big for smaller firms and science and technology parks (STPs) where other actors (e.g. clusters) can step in to help SMEs in articulation of their innovation services demands.

More specifically, **a survey¹⁴ of innovative firms¹⁵ in FVG explored how firms self-evaluate their situation**, whether they need external support, whether they used external supports and how they rate the experience (Table 3.7).

The survey revealed an unmet demand for innovation support. Across the business needs explored, a large proportion of firms admitted needing external support and not accessing it, as summarised Table 3.8.¹⁶

¹⁴ The survey was sent to 2 335 firms and a total of 332 responses were collected (14.2% response rate). Most respondents belong to more than one S3 specialisation areas (3.4 on average). Among those who returned filled survey, nearly 75% belong to Maritime technologies, followed by 63% in Home system and Agrifood, 59.3% in Smart health, 54.2% in Metalworking and 28.9% in Culture, creativity and tourism. In terms of ATECO Code, the most common sector of activity is Manufacturing, which accounts for 50.9% of the sample, followed by Wholesale and retail trade, Repair of motor vehicles and motorcycle (9.9%) and ICT services (9.3%).

¹⁵ The respondent firms were sampled from the database Innovation Intelligence FVG (Box 3.4), hosted by AREA Science Park. The survey was sent to all registered firms in Innovation Intelligence with one or more of the following characteristics: (1) innovative, i.e. having a patent filing at the national and/or international level; participating in EU-funded and/or Region-funded research or innovation projects or recognised by the Italian Ministry of Economic Development as "innovative start-up" or as "innovative SME"; (2) potentially innovative as defined by an algorithm applied to the balance sheet information and ISTAT surveys on R&D and innovation and (3) participants in "network contract" (i.e. "contratti di rete", formalised networks of firms, often aimed at improving their technological and organisational capabilities).

¹⁶ It must be stressed that the gap between need for external support and access to external support could be much larger when analysed at the level of individual "external solution".

Table 3.7. Framework for Innovation bottlenecks survey to firms

Business needs	External solutions	Survey questions for each business need
Contacts	Matchmaking, Networking, etc.	Self-assessment of the ability to meet this need Need for external solution Use of services that address this need (by actor) Assessment of the support received
Management	Business plan support, IPR support, etc.	
Financing	Funding, Joint Venture, etc.	
Equipment	Living labs, Fab labs, etc.	
Qualified personal	Trainings, etc.	
Knowledge	Support to R&D consulting, feasibility test, etc.	
Digitalisation	Analysis of digitalisation, etc.	

Source: Authors' elaboration.

Table 3.8. Gap between demand and supply of external support

Business need	Firms needing (any) external support	Firms accessing (any) external support
Innovation management	49.1%	34%
Finance for innovation	41.9%	29.5%
Access to infrastructure and equipment	26.8%	12%
Access to knowledge	49%	34%
Digitalisation	48%	28%

Source: Authors' elaboration.

Across all the business needs explored, by far the most common “service-provider” was the residual “other”. In other words, when firms want to innovate, they do not turn to clusters, technology parks and university TTOs. In addition, a clear polarisation seems to emerge: 28% (92 out of 332) of firms ask exclusively “other” innovation service providers for support, while just 9% (31 out of 332) of firms turn exclusively to more specialised innovation services providers such as clusters, Technology Parks and University TTOs.

Areas for improvement

A worrying mismatch between demand and supply of innovation support

The regional system is characterised by an unmet demand for innovation services¹⁷. Clusters, which are recognised as being better able at interpreting firms' needs, face financial and human capital constraints and are therefore unable to operate at the needed level of capacity. At the same time, the other actors lack the sector-specific skills required to reach out and support regional SMEs. All in all, the FVG innovation system is currently catering mainly to those who are able to request innovation-support services, leaving behind a large proportion of firms. Increasing participation in international RDTI networks and activities requires strengthening the capacities of all firms. Supporting SMEs in articulating and pursuing innovation is a stepping stone towards increased international presence.

Innovation without a system: limited reliance on clusters, technology parks and university TTOs

The survey shows clearly that firms do not rely on publicly funded actors when they decide to innovate. Across all the business needs explored, the most common “service-provider” was, by far, the residual category “other”. Moreover, there is significant “inertia” among actors on the supply side.

¹⁷ There is also some evidence that there might be unexpressed demand for innovation services among surveyed firms in the FVG region.

Universities and technology parks tend to collaborate largely with the same firms over time, generating a sort of “elite” within the region. Whilst in FVG there are actors capable to support innovation, there is not yet a proper system that can foster sustained and widespread interaction between business and research, transforming the needs of the firms in opportunities to innovate and engage in the international arena.

Quality but not quantity

Qualitatively, technology parks and universities are able to provide a satisfactory service to those who asked for it. This aspect emerged clearly from both the survey and the focus groups. However, there are constraints to scaling-up university knowledge service provision if, as it is desirable, a bigger demand emerges. This is both because there are no clear strategies for outreach and upscale and because of a substantial reliance on regional funds for innovation support activities. Such narrow reliance is a critical weakness of the system, which undermines its sustainability in the long run.

An inward-looking system geared towards the short term

The regional system has limited ability to plan. On the one hand, clusters and ITSs indicated that uncertainty about funding generates significant strains. On the other, actors in the system do not appear to work synergistically following a shared long-term vision. No strategies have emerged from the fieldwork in relation to territorial outreach, internationalisation and national or EU fundraising. The different actors appear to work independently, cooperating ad-hoc and largely responding to the short-term financial incentives coming from within the region. In particular, in light of the forthcoming EU recovery funds, it is critical that regional actors work together to understand where their joint potential lies, and which strategic projects could be pursued in the region and could project FVG internationally.

The way forward and the way outward

The clear mismatch between supply and demand of innovation support services in the regional system has probably multiple causes and historical and structural roots. Nevertheless, it is important to find ways to support a deeper penetration of innovation-related services in the regional territory. This could require conditioning financial support, on the supply-side, to increased outreach. This should be done taking into account that specific skills are required, in each sector, to articulate firms’ potential innovation demands. In turn, some measurement of actual penetration would be needed to avoid dispersing resources. Secondly, suppliers of innovation services should develop more independence from monetary resources of the regional government, competing for direct EU and national funds with innovative project-proposals in cooperation with local firms. This aspect is closely related to the need for strategic attention to internationalisation. Local actors should develop collaborative projects valorising regional assets in international consortia.

3.4. Current state of S3 internationalisation in FVG

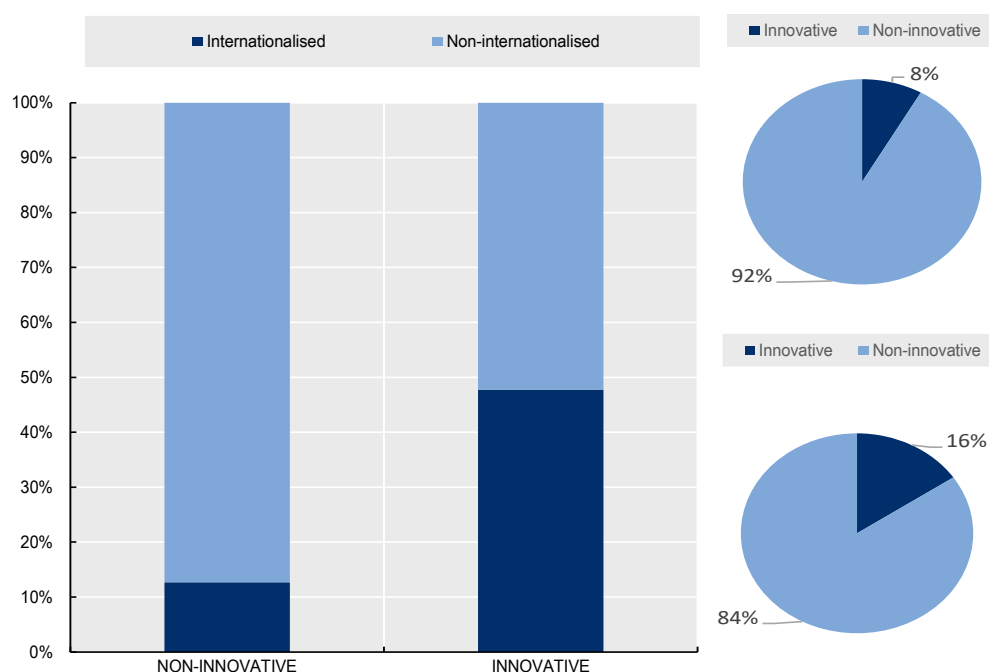
Innovation and internationalisation are extensively studied in academic literature and are an important target of economic policies. Yet, their joint analyses, particularly at the regional level, are rare. This chapter offers a detailed analysis of innovation and internationalisation in Friuli Venezia Giulia. The study relies on the Innovation Intelligence FVG database compiled and maintained by the region (Box 3.4).

S3 internationalisation and innovation performance

Regional overview

Figure 3.3 shows distributions of the overall innovation and internationalisation propensities¹⁸ in FVG. About 16% of firms in the region have an “international propensity” and 8% of firms are innovative. While only 13% of non-innovative firms have internationalisation propensity, almost 50% of innovative firms have internationalisation propensity. **Innovation and internationalisation mutually reinforce each other, although the meso-level analysis presented here cannot establish a causal relation.**

Figure 3.3. Share of firms by innovation and internationalisation propensities



Note: Based on 21 923 firms active in Friuli Venezia Giulia, according to the latest version of the Innovation Intelligence FVG database.
Source: OECD Trento Centre elaborations based on Innovation Intelligence FVG database.

Analysis by S3 area

Internationalisation of S3 is analysed at the meso-level, i.e. aggregating information for all firms belonging to the same S3 specialisation area within the region.¹⁹ Because many firms in FVG benefit from S3-related public funding in several specialisation areas, the analysis is performed by S3 first for all companies assigned to each smart specialisation area even if they belong to other areas (broad S3 definition) and then for companies that are uniquely assigned to one S3 area (strict S3 definition).

¹⁸ The internationalisation propensity in the Innovation Intelligence FVG database signals firms with an export behaviour higher than regional average or, in the case of non-exporting firms, the fact of being part of a MNC group.

¹⁹ All firms in the database are labelled with the S3 area of specialisation they are active in. A firm can be included in an S3 (and apply for dedicated public funding) if any of its economic activities (NACE codes) are included in the list of codes for that S3. As a result, close to 60% of firms in the current version of the database belong to multiple S3 areas, with about 20% operating in only one S3 area and the remaining companies not assigned to any S3.

Box 3.4. Innovation Intelligence FVG database

The Innovation Intelligence FVG database is harmonised firm-level data of companies active in the region. The database draws on various sources to offer information on innovation (e.g., OECD PATSTAT for international patenting, ISTAT CIS and R&D surveys for innovation behaviour, FP7 and Horizon 2020 databases for EU-funded projects) and internationalisation (ISTAT data on export and on foreign investment). Propensity to innovate is estimated by an original algorithm (see Gandin and Cozza, 2019). The database indicates for each firm if internationalisation propensity is present (without making it explicit if it derives from export or foreign investment) and/or an estimated innovation propensity is present (without making it explicit if it derives from the ISTAT survey or from the algorithm developed in AREA Science Park). If a firm is known to apply for patents or receive EU or regional innovation funding, the firm is labelled as “objectively innovative”. Anonimisation techniques are applied to ensure confidentiality of companies included in the database.

The Innovation Intelligence FVG database is updated at least once a year. Latest versions include data for over 20 000 joint stock or limited liability companies active in Friuli Venezia Giulia (both firms with headquarters in the region and firms having a branch there). Despite being a minority among firms active in the region (between 10% and 20% depending on the year), such companies represent a large majority of industrial production and of innovation and internationalisation activities. To make another comparison, the Bureau van Dijk ORBIS database provides a list of around 16 000 firms (PLCs and LLCs) resident in Friuli Venezia Giulia in 2019.

Source: Authors' elaboration.

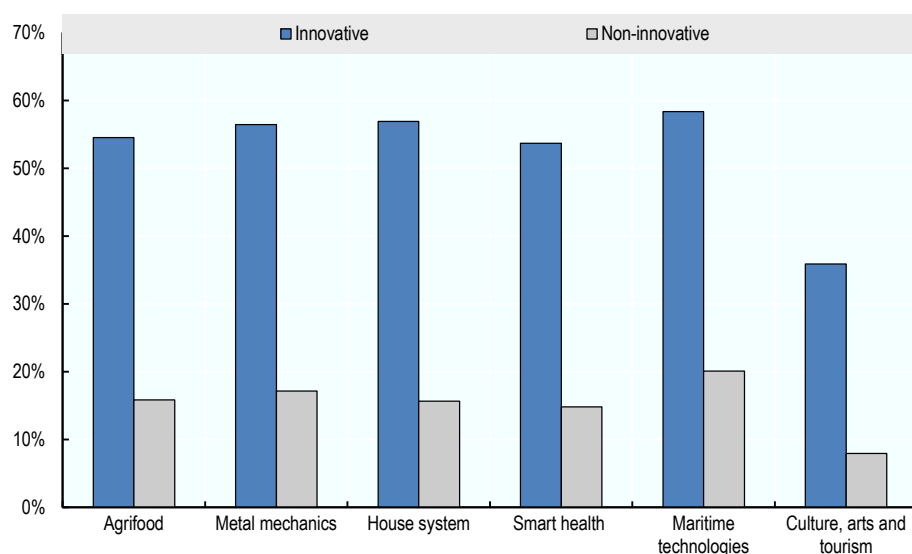
Broad S3 definition

A broad S3 definition allows for a comprehensive view on the degree of innovativeness and of internationalisation of the entire Friuli Venezia Giulia industrial system. However, it is not possible to assign a portion of economic activity of a firm to a specific S3 area, which leads to an inflation of the estimates by S3 specialisation area, particularly if there are strong performers in one S3 area that happen to be also involved in other areas. Nevertheless, a focus on a broad definition is useful for deriving several insights about innovation and internationalisation in the region.

Figure 3.4 shows how the share of internationalised firms vary across the six S3 areas of specialisation by innovative propensity. The main take-away is that **non-innovative firms are quite unlikely to be internationalised**²⁰, indicating an area for improvement. The low internationalisation is particularly pronounced in Culture, arts and tourism, which is striking given the transnational nature this area, particularly in the digital age.

²⁰ Given that the shown values are likely to be somewhat inflated to the “double-counting” of firms in the broad S3 definition, the actual levels of internationalisation are even lower than the ones shown.

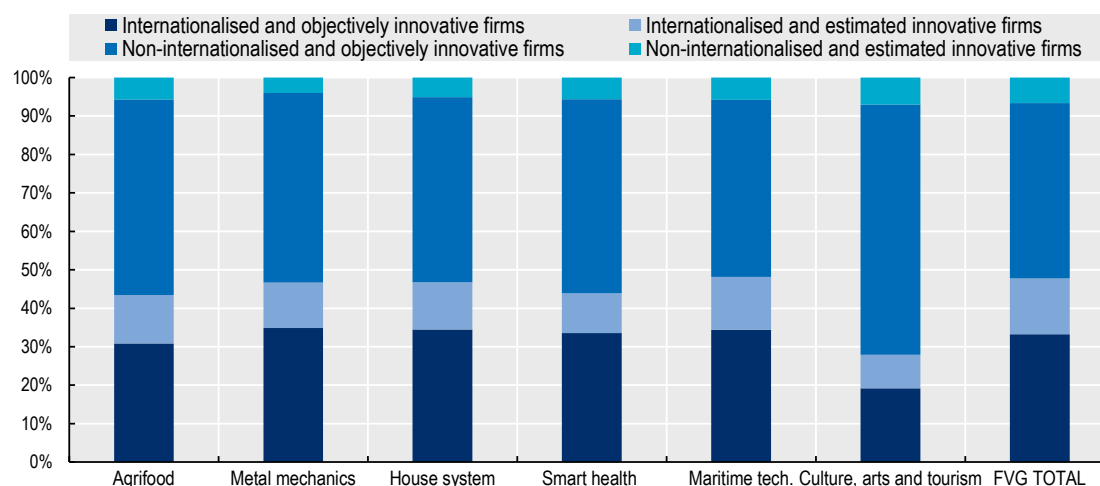
Figure 3.4. Share of internationalised firms by innovativeness status and broad S3 area



Source: Authors' elaboration based on Innovation Intelligence FVG database.

A more detailed Figure 3.5 plots internationalisation performance by innovation type (objectively innovative and estimated innovative as recorded in Innovation Intelligence FVG database) and S3 area.

Figure 3.5. Share of firms by innovation type, internationalisation status and S3 area



Source: Authors' elaboration on Innovation Intelligence FVG database.

Figure 3.5 confirms low internationalisation of (objectively) innovative firms in Friuli Venezia Giulia, illustrating the pertinence of the new focus of the S3 policy on collaborations for the region across the borders. A more detailed look reveals a particularly small population (less than 1% in each S3 areas) of SMEs and start-ups that are both innovative and internationalised Table 3.9.

Table 3.9. Internationalisation of firms in FVG

Area of specialisation	Share of internationalised firms	Among internationalised firms:			
		Share of innovative firms	Share of innovative start-ups	Share of innovative SMEs	Share of firms in high-tech and knowledge-intensive industries
S3-1. Agrifood	19%	28%	0.6%	0.5%	12%
S3-2. Metal mechanics	24%	43%	0.9%	0.8%	18%
S3-3. House system	21%	36%	0.7%	0.6%	12%
S3-4. Smart health	20%	37%	0.9%	0.8%	15%
S3-5. Maritime technologies	25%	32%	0.5%	0.5%	10%
S3-6. Culture, arts and tourism	10%	23%	0.6%	0.7%	26%

Source: Authors' elaboration based on the Innovation Intelligence FVG database.

Strict S3 definition

Only firms engaged in one S3 area of specialisation are analysed under the strict S3 definition. This avoids the problem of overestimation inherent in the broad S3 definition but the analysis covers only 20% of companies listed in the Innovation Intelligence FVG database.

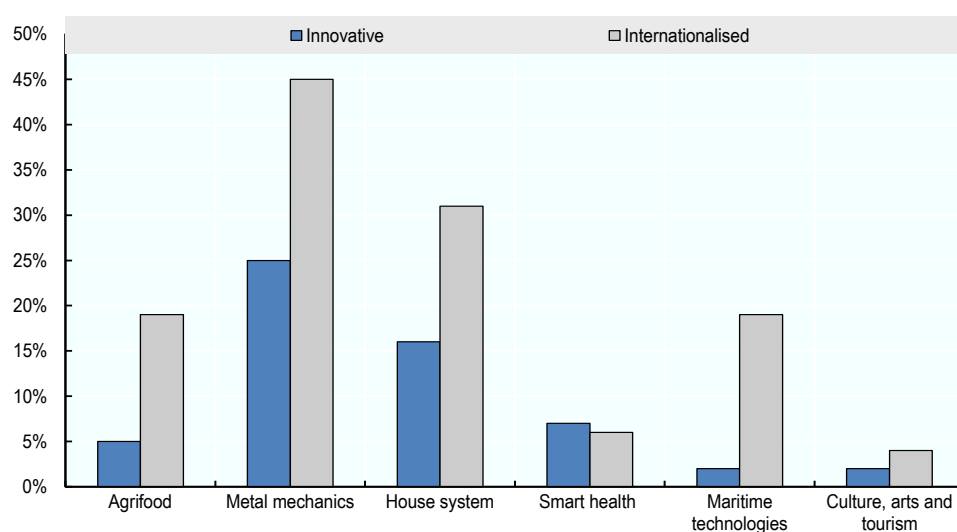
Figure 3.6 shows the prevalence of innovation and internationalisation among companies in FVG that are engaged in only one S3 area. **In all areas except for Smart health, larger share of companies are internationalised than innovative.**²¹ There are also notable differences across smart specialisation areas. While only 2% of companies in Maritime technologies and Culture, arts and tourism are innovative, in Metal mechanics 25% of firms are engaged in innovation. The range of internationalisation is even broader, from 4% of internationalised businesses in Culture, arts and tourism to 45% in Metal mechanics.

Following a well-established literature, dating back to the first introduction of the concept of foreign direct investment (Hymer, 1960), it is expected that firms internationalise because they possess some kind of knowledge (technological) advantage. Indeed, Figure 3.7 shows that innovative firms are notably more internationalised than non-innovative firms across all S3 areas. This results holds regardless of the S3 definition selected (compare Figure 3.4 and Figure 3.7).

Overall, **Figure 3.6 and Figure 3.7 are useful in identifying S3 areas that lead and those that lag in innovation and internationalisation.** Metal mechanics is a clear leader in both metrics; 25% of all companies in this sector are innovative and 45% are internationalised. Among the innovative firms, almost 90% are internationalised. On the other hand, Culture, arts and tourism scores quite low on both internationalisation and innovation. The small subset of innovative firms in this sector, however, performs relatively well – close to 40% of them are internationalised. Another sector that displays a unique pattern of internationalisation and innovation is Smart health. It is the only S3 area where the share of innovative firms (7%) is higher than share of internationalised ones (6%) but innovative companies are quite unlikely to be internationalised – only 10% of them are engaged in international activities.

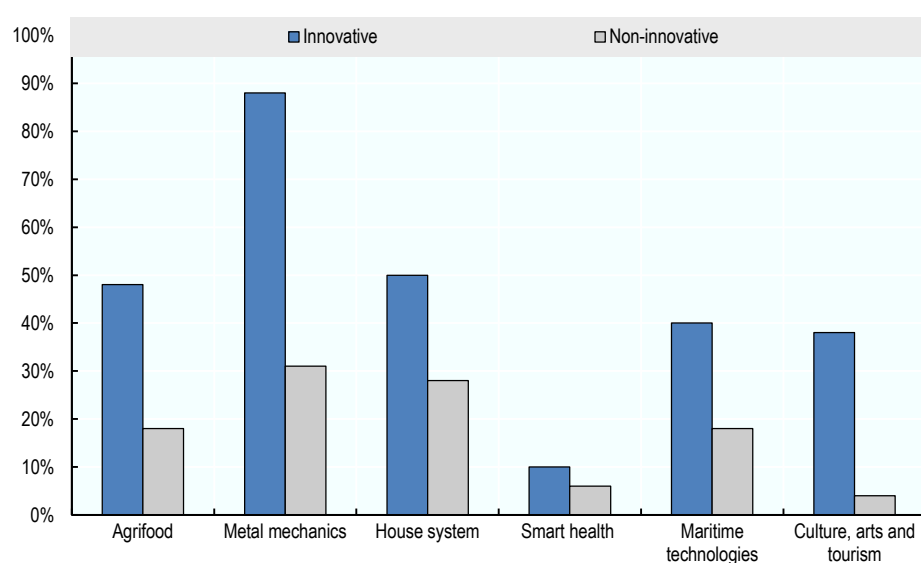
²¹ These two categories are not mutually exclusive.

Figure 3.6. Share of innovative and internationalised firms in FVG by *strict* S3 definition



Source: Authors' elaboration based on the Innovation Intelligence FVG database.

Figure 3.7. Share of internationalised firms by innovativeness status and *strict* S3 area



Source: Authors' elaboration based on the Innovation Intelligence FVG database.

Analysis by groups of S3 areas

The analyses presented in the two preceding sections suggest sizable differences across S3 specialisation areas in terms of internationalisation and innovation. The results of focus groups described in Section 3.3 point to an uneven landscape in the region where relatively few companies engage in internationalisation and innovation. Also in this vein, Table 3.9 indicates that certain types of companies (start-ups, SMEs) are very unlikely to be involved in international activities. To explore these imbalances in internationalisation and innovation further, Table 3.10 presents information on participation of the FVG businesses in EU-funded projects (both Horizon 2020 and FP7 programmes) and patents registered by the European Patent Office (EPO) and by the Italian one (UIBM) for comparison (top six groupings).

Table 3.10. Share of EU-funded projects and patent filings by FVG firms

S3 Area of specialisation	Share of firms	Share of H2020 projects	Share of FP7 projects	Share of EPO patents	Share of UIBM patents	Share of EPO co-patenting	Share of UIBM co-patenting
1. Agrifood, 2. Metal mechanics, 3. House system, 4. Smart health, 5. Maritime technologies, 6. Culture, arts and tourism	8%	46%	41%	11%	10%	6%	7%
1. Agrifood, 2. Metal mechanics, 3. House system, 4. Smart health, 5. Maritime technologies	6%	24%	26%	43%	38%	45%	51%
1. Agrifood, 2. Metal mechanics, 6. Culture, arts and tourism	3%	7%	5%	1%	1%	17%	6%
2. Metal mechanics, 3. House system, 4. Smart health, 5. Maritime technologies	2%	6%	9%	6%	4%	13%	3%
1. Agrifood, 2. Metal mechanics, 4. Smart health, 5. Maritime technologies	1%	0%	1%	8%	4%	0%	4%
3. House system, 4. Smart health, 5. Maritime technologies	5%	1%	1%	2%	5%	0%	1%

Note: No double-counting exists in this table, as companies belong on one and only one row.

Source: Authors' elaboration on the Innovation Intelligence FVG database.

Table 3.10 documents that internationalisation and innovation tend to be highly concentrated. The differences between values in the first and the rest columns in the table are quite large. In particular, companies engaged in all S3 areas (8% of total) account for 46% of H2020 projects and 41% of FP7 projects. Businesses active in 5 out of 6 areas of specialisation (all S3s except for Culture, creativity and tourism), which account for only 6% of firms, are responsible for close to half of all patents in the region, including co-patenting activity. Their participation in the EU-funded project is also high. Other relevant areas of specialisation are the ones corresponding to one or more top performance indicators highlighted in light blue.

Finally, Table 3.11 provides an overview of internationalisation in all firms in Friuli Venezia Giulia, broken down by groups of S3 areas to avoid double-counting. The table shows the share of Italian Multinational Firms (ITM), both including (first column) and excluding (second column) firms headquartered in another Italian region as well as the share of subsidiaries of Foreign Multinational Firms (FMN), both including (fourth column) and excluding (fifth column) firms headquartered in another Italian region.

Table 3.11. Presence of multinational firms in FVG

	Share of ITM	Share of ITM with HQ in FVG (outward internationalisation)	Share of subsidiaries of FMN	Share of subsidiaries of FMN (inward internationalisation)
FVG total	3%	2%	6%	5%
2. Metal mechanics, 3. House system, 4. Smart health, 6. Culture, arts and tourism	100%	100%	0%	0%
1. Agrifood, 3. House system, 6. Culture, arts and tourism	33%	33%	0%	0%
2. Metal mechanics, 3. House system, 4. Smart health	20%	0%	0%	0%
1. Agrifood, 2. Metal mechanics, 4. Smart health, 5. Maritime technologies, 6. Culture, arts and tourism	14%	13%	0%	0%
1. Agrifood, 2. Metal mechanics, 4. Smart health, 6. Culture, arts and tourism	11%	0%	11%	0%
1. Agrifood, 2. Metal mechanics, 3. House system, 4. Smart health, 5. Maritime technologies	9%	6%	9%	7%
1. Agrifood, 4. Smart health, 5. Maritime technologies, 6. Culture, arts and tourism	8%	0%	8%	0%

	Share of ITM	Share of ITM with HQ in FVG (outward internationalisation)	Share of subsidiaries of FMN	Share of subsidiaries of FMN (inward internationalisation)
1. Agrifood, 5. Maritime technologies, 6. Culture, arts and tourism	7%	3%	10%	7%
2. Metal mechanics, 4. Smart health, 5. Maritime technologies, 6. Culture, arts and tourism	7%	7%	3%	4%
1. Agrifood, 4. Smart health	7%	4%	15%	11%
2. Metal mechanics, 5. Maritime technologies	6%	5%	7%	6%
5. Maritime technologies, 6. Culture, arts and tourism	6%	3%	10%	8%
1. Agrifood, 4. Smart health, 6. Culture, arts and tourism	5%	0%	16%	11%
2. Metal mechanics	5%	3%	12%	10%
2. Metal mechanics, 3. House system, 5. Maritime technologies	3%	2%	10%	9%
3. House system, 4. Smart health, 5. Maritime technologies, 6. Culture, arts and tourism	2%	2%	15%	18%
1. Agrifood, 4. Smart health, 5. Maritime technologies	2%	0%	16%	14%
3. House system, 4. Smart health, 6. Culture, arts and tourism	1%	0%	10%	7%
2. Metal mechanics, 3. House system, 5. Maritime technologies, 6. Culture, arts and tourism	0%	0%	18%	20%
1. Agrifood, 2. Metal mechanics	0%	0%	12%	13%
2. Metal mechanics, 4. Smart health	0%	0%	12%	8%

Note: No double-counting exists in this table, as companies belong on one and only one row. Information on the presence of multi-national firms in the region come from Bureau van Dijk ORBIS, which is merged to the Innovation Intelligence FVG database (20 143 firms out of the 21 923 or 92% of Innovation Intelligence FVG database were successfully matched). The table shows only groupings accounting for 10% or more in any of the indicators; ranked by the share of ITM.

Source: Authors' elaboration on the Innovation Intelligence FVG database.

The table shows a limited presence of multinational companies in the Friuli Venezia Giulia region.

Only 2% of firms located in the region are ITM and only 5% are subsidiaries of FMN, hence the role of MNEs in internationalisation of the region remains marginal. Firms active in multiple S3 areas of specialisation are often more internationalised, although this is especially true for subsidiaries of FMN.

To conclude analysis of S3 internationalisation in FVG, Box 3.5 summarises main findings from a set of interviews²² with companies that focused on their innovation and internationalisation activities as well as involvement in S3.

²² Interviews were conducted in February and March 2021 with top or R&D managers of 10 companies (five SMEs and five MNCs) which are engaged in S3 and innovation (objectively innovative or estimated innovative). At least one company from each of the FVG's provinces was interviewed.

Box 3.5. Qualitative assessment of internalisation in FVG

SME culture of self-sufficiency undercuts co-operation in innovation

Interviews have confirmed the low propensity of small firms to set-up R&D and innovation linkages with external partners. Generally, all interviewees have highlighted – directly and indirectly – a cultural problem behind these limited international linkages. Many SMEs in the region lack a culture of connecting to external partners. The notion of self-sufficiency is particularly strong among companies established decades ago. When entrepreneurs have a business idea, they tend to develop it internally with little resources devoted to R&D and innovation. A “double cultural gap” in the direction of external cooperation for innovation and with foreign partners seems still too difficult to bridge. This entrepreneurial attitude of older generations is slowly fading away. Overall, the regional system of SMEs might suffer from an “illusion of self-sufficiency” that less viable in a globalised world.

MNCs actively collaborate in innovation internationally

On the other hand, MNCs located in Friuli Venezia Giulia – both foreign and domestic ones – have a high propensity to undertake, and maintain in the medium term, R&D and innovation linkages also with foreign partners. These firms have a well-established internal structure devoted to R&D and innovation. External collaborations are not always key, but all larger firms perceive them as an opportunity to discover new ideas and competences. There are, however, differences across MNCs. Some of them perform R&D and innovation in the same global sites where they produce. Others, instead, have non-overlapping internal networks of production and innovation.

Weaker embeddedness of MNEs into the region compared to SMEs; universities can be bridges

On average, smaller firms are more linked to public and local partners, especially universities including those in neighbouring regions (e.g., in Veneto). Large MNCs exploit, instead, their internal network of international subsidiaries. Through them, MNCs are linked also to foreign partners, both public and private. Large MNCs are relatively less linked to local partners (especially SMEs on the territory) as these are often missing key competences. The only exception is represented by local universities, which tend to possess needed competences.

S3 likely did not change the trajectories of international innovation engagement of both MNEs and SMEs

For all interviewed firms, the introduction of the S3 in the 2014-2020 programming period did not affect their decision to set-up ‘international innovation linkages’. Only some interviewed firms reported a positive effect of S3, its priorities and public funding on local innovation linkages. Overall, the additionality of public funding for innovation is low. Larger firms set-up innovation linkages and start new projects independently from public support. Smaller firms, instead, have sometimes anticipated some research/innovation projects thanks to the regional funding; however, also smaller firms would likely have started these projects even without public money.

Larger firms find too much bureaucracy in regional funding, vis-à-vis other EU programmes, especially large-scale projects, international public-private collaborations and international lobbying activities. Nevertheless, all larger MNCs are well aware of the FVG S3 as they have been directly involved in the process of its definition.

Finally, the majority of firms still see the lack of a real regional strategy. There is an excessive focus on some topics and no attention towards other areas, especially at the technological frontier.

Regional innovation system needs to be streamlined along several dimensions

Regional strategies other than the S3 (technology parks, clusters, regional agencies and other components of the regional innovation system) also have a positive but limited impact on firms’

innovation, collaboration and internationalisation. Both larger and smaller firms perceive a certain degree of confusion on “who does what” in the regional innovation system. Some interviewees see these actors as competing against each other implying that the regional innovation system is not really a “system”. A higher degree of coordination is needed, but with less hierarchy. Firms that learnt to navigate the regional innovation landscape spend time and money to achieve this.

Overall, larger firms have a better knowledge of local actors and a higher ability of cooperation with them. Many of larger firms have a higher degree of interaction with clusters, rather than with technology parks, but this depends pretty much on the specialisation of firms and/or of their innovation projects. Some interviewees have expressed a very positive view on attempts of inter-regional cooperation. Several firms, in fact, find that Friuli Venezia Giulia is too small to develop competencies in all possible technology fields. Many of the interviewees, however, find it difficult to look for competencies at the national level. Inter-regional cooperation actions involving public and private organisations are seen as a solution. An example is the SMACT competence centre (public-private institution bringing together companies, research organisations and all universities of the three regions of Veneto, Friuli Venezia Giulia and Trentino Alto Adige).

Source: Authors' elaboration.

Opening the FVG S3 internationally

An increased involvement of regions in international collaborative networks in the area of innovation requires awareness about existing opportunities and generally revolves around two main dimensions: (1) development of capacities and policy tools to coordinate RTDI policy interventions and (2) exploitation of synergies between regional funds and other centrally managed programmes, for example H2020.

Main EU programmes to promote innovation and internationalisation

The European Union has a wide range of programmes in place to promote innovation and internationalisation of its member countries and regions within them. The most notable examples include the European Territorial Co-operation (ETC) Programme, H2020 and others. While the specifics of regional participation vary, it is common for regions to be involved through their governments and public or private actors. The European Territorial Cooperation²³, also known as Interreg, is an important tool to foster policy learning and policy experimentation. Understanding how to make the most of these experiences is of strategic importance. More precisely, the Interreg Europe²⁴ projects support peer learning, policy-testing and capacity building, going as far as developing specific action plans within Regional Operational Programme. At the same time, other ETC programmes offer opportunities for policy experimentation to find better ways of future inter-regional collaboration.

European Institute of Innovation & Technology (EIT)-Knowledge and Innovation Communities (KICs) and Joint Undertaking are two initiatives funded under H2020, which seek to support innovation by building upon public-private partnerships.

EIT was created in 2008 to strengthen Europe's ability to innovate. The EIT's mission is to contribute to sustainable European economic growth and global competitiveness by reinforcing the innovation capacity of the Member States (MSs) and the EU, by promoting cooperation among higher education, research and business. At the core of the modus operandi of the EIT lies the creation and support of

²³ [Interreg - The portal to all Interreg programmes, financed by the EU](#)

²⁴ <https://www.interregeurope.eu/>

Knowledge and Innovation Communities, the operational arms of the EIT. They are organised as trans-European partnerships built around specific themes (societal challenges). In each EIT-KIC, stakeholders from higher education, research, business, as well as cities, regions and NGOs collaborate intensively.

Each EIT KIC consists of a network of nodes, the so-called Co-Location Centres (CLC) and are led by an EIT KIC Head Quarter (HQ). The eight EIT KICs²⁵ are anchored in the local innovation ecosystems through their CLCs. CLCs are the main instruments to manage activities and foster knowledge flow. Furthermore, they leverage existing infrastructures (e.g. labs, offices, campuses and existing CLCs) to physically bring together talents from all sides of the knowledge triangle to facilitate intensive collaboration and support innovative activities. In 2014, the EIT launched its Regional Innovation Scheme (EIT RIS), which aims to disseminate knowledge and know-how of the EIT Community and widen participation in its EIT KICs in countries and regions where innovation capacity is considered to be moderate or modest.

As highlighted in Ozbolat et al. (2019), there is ample room for collaboration among regional departments engaged in Smart Specialisation and EIT KICs, as the objectives and stakeholders involved overlap significantly. There are significant opportunities to enable policy synergies and complementarities, focussing on education, research and innovation. Indeed, formal agreements or Memoranda of Understanding (MoUs) have been set up between the EIT and other public bodies, such as a MoU between EIT InnoEnergy and Ministry of Economics of Latvia and the Ministry of Energy of Lithuania.

Another possibility is a joint use of the infrastructure. For instance, Twente University is using an ESIF funded incubator to host start-ups supported by EIT Digital. Last but not least, the EIT KICs have offered trainings relevant to S3. EIT InnoEnergy provided training sessions and knowledge sharing services to the Regional Managing Authority of Malopolska (Poland) and governmental venture capital HiVentures in Hungary.

Joint Undertakings (JU) are thematic public-private partnerships in research and innovation and are a potential mechanism to upscale international and business engagement. Like EIT KIC's, JUs can pool critical mass around their objectives, providing regions with access to international networks. The following "Joint Undertakings" are currently active in the EU²⁶:

- Innovative Medicines Initiative 2 (IMI2) develops next generation vaccines, medicines and treatments, such as new antibiotics;
- Fuel Cells and Hydrogen 2 (FCH2) accelerates market introduction of clean and efficient technologies in energy and transport;
- Clean Sky 2 (CS2) develops cleaner, quieter aircraft with significantly less emissions;
- Bio-based Industries (BBI) researches the use of renewable natural resources and innovative technologies for greener everyday products;
- Electronic Components and Systems for European Leadership (ECSEL) seeks to boost Europe's electronics manufacturing capabilities;
- Shift2Rail has been created to develop better trains and railway infrastructure that will drastically reduce costs and improve capacity, reliability and punctuality;
- Single European Sky ATM Research (SESAR) develops a new generation of European Air Traffic Management system that will enhance performance of air transport;

²⁵ EIT Climate-KIC, EIT Digital, EIT Food, EIT Health, EIT InnoEnergy, EIT Manufacturing, EIT Raw Materials and EIT Urban Mobility.

²⁶ <https://ec.europa.eu/programmes/horizon2020/en/partnerships-industry>

- EuroHPC, the Joint Undertaking on High Performance Computing (HPC) pools EU and national resources in HPC to develop a World Class Supercomputing Ecosystem in Europe.

According to Haegeman et al. (2019)²⁷, there is a need to raise mutual awareness of JUs and of regional departments in charge of S3. This is a pre-condition to exploit the synergies and increase the international visibility of S3. Moreover, regions can benefit from mapping their activities against the international agendas of JUs and from promoting JU's calls to local firms through regional workshops (or other means) in collaboration with the JU.²⁸

The S3 Thematic Platforms²⁹, intended to provide an interactive and participatory environment in support of interregional cooperation in given smart specialisation areas, are also considered an important form of policy experimentation in interregional collaboration.

The EC has been looking into new instruments to support interregional co-operation. Building on the networking experience of the S3 Thematic platforms, in 2021-27 period, cohesion policy will count on a new funding instrument. The so-called I3, "Interregional Innovation investment" will support interregional partnerships to deliver investments on S3 related priorities and to reinforce globally competitive EU value chains.³⁰

Much of the debate about the effectiveness of the existing programmes has focussed on achieving synergies at the project-level through finding mechanisms to combine funds responding to different rules. **Current evidence, however, suggests that project-level synergies are limited and are occasional rather than an outcome of a systematic process** (European Commission, 2017; Remotti et al., 2017). The different intervention logic, funding rates and eligibility rules hamper the full development of synergies. Furthermore, differences in state aid rules under the ESIF and Horizon 2020 lead to legal uncertainty for potential beneficiaries.

In light of these obstacles, pursuing synergies that align agendas across regional and H2020 initiatives, whilst building RTDI capacity among local actors at the policy-level, might be justified (Pontikakis et al., 2018). This is seen as a more viable strategy as well as a pre-condition for ripping the benefits of project-based synergies, should adequate instruments arise in the future. Whilst the immediate returns of policy-synergies may be limited, pursuing alignment with H2020-funded networks/initiatives, such as EIT-KICs or JU, is crucial for opening up a regional Smart Specialisation Strategy.

Participation of FVG in European programmes

International networks for smart specialisation

Friuli Venezia Giulia has designated its clusters to represent the region in international networks for smart specialisation (Table 3.12). FVG clusters are a part of the European Cluster Collaboration Platform and are starting to engage with the Vanguard Initiative, which the region joined in June 2020. All clusters (with the exception of Legno e Arredo) are engaged with the ETC programmes and macroregional strategies.

²⁷ <https://publications.jrc.ec.europa.eu/repository/handle/JRC116094>

²⁸ Calls for proposals launched by the different JUs are usually addressed to consortia composed of a variety of members. Therefore, it is important to get in touch with other regions and organisations that may have similar S3 priority areas.

²⁹ <https://s3platform.jrc.ec.europa.eu/thematic-platforms>

³⁰ [Public consultation on Interregional Innovation Investment supported by the European Regional Development Fund \(ERDF\) - Regional Policy - European Commission \(europa.eu\)](#)

Table 3.12. FVG Cluster participation in S3 Thematic Platforms – Summary

Platform	Partnerships	FVG Partners
Industrial modernisation	“Efficient and Sustainable Manufacturing”	COMET
	“High Performance Production through 3D-Printing”	COMET
	“Efficient and Sustainable Manufacturing”	COMET
	SMEs Integration into Industry 4.0	Regional administrations + COMET + some SMEs
Energy	Sustainable building	Cluster Legno, Arredo e Sistema Casa
Agrifood	Traceability and Big Data	AGRIFOOD cluster

Source: Authors' elaboration.

Clusters in Friuli Venezia Giulia³¹ are committed to their territory and firms but they also differ along several important dimensions when it comes to innovation and internationalisation. The differences are often driven by characteristics of the industry a cluster serves. For example, for MARE, innovation is crucial given the global nature of the sector. FVG is home to big global players (Fincantieri) and SMEs, which are global niche leaders. Innovation is endemic in the sector; the local supply chain is resilient and able to react swiftly to global dynamics. Innovation is also important for COMET and AGRIFOOD but companies are mostly inwardly oriented and need help in articulating their innovation needs. In cluster Legno, Arredo e Sistema Casa, innovation is considered as not particularly strategic, as it is relevant mostly in relation to wood as a raw material, which is small compared to furniture and home systems. A window for the region to the world and vice versa.

With the exception of cluster Legno Arredo e Sistema Casa, there is a widespread appreciation for the opportunities afforded by participating in inter-regional EU networks. In the case of cluster MARE, participation in such initiatives is seen largely as an opportunity to prove an international standing of regional maritime firms, thereby providing a strong rationale for the regional administration to recognise and valorise such strategic actors. For clusters COMET and AGRIFOOD, inter-regional co-operation networks are opportunities to expand the field of action of local firms, enabling them to reach collaborators, skills and capacities that they would not be able to access independently.

Joining S3 Platforms, the Vanguard Initiative or similar projects, implies having the opportunity to participate in the pilot actions directly stemming from those networks. Most importantly, however, it implies being active in the EU arena, which is something perceived as crucial for most clusters. Taking part in such networks, indeed, raises awareness of other calls and initiatives, thereby offering the possibility of joining new consortia and take part in strategic discussions. Such opportunities are especially valued by COMET and AGRIFOOD, whose firms would otherwise struggle to reach the EU arena.

Noteworthy, clusters are “unusual” partners in interregional co-operation networks. Usually regional agencies or representatives of the regional administration participate in these initiatives. This means neither automatically nor easily. Clusters in FVG are latecomers in the S3 Thematic Platforms and the Vanguard Initiative. As such, the FVG clusters had to penetrate pre-existing formal and informal structures, trying to build trust and rapport with other partners. This required an investment of time and effort, which did not always lead to successful outcomes. The FVG clusters had to learn how to read network dynamics and how to position themselves as representatives of a small region, only recently active

³¹ Based on interviews with four clusters in FVG, AGRIFOOD (Agrifood and Bioeconomy); Legno, Arredo e Sistema Casa (Wood, Furniture and House system); COMET (Metal mechanics) and MARE (Maritime technologies), conducted in February 2021.

in such arenas. A systematic and long-term presence is necessary to reap the benefits of such initiatives, building the skills, capacities and relationships to navigate these processes.

Joining international networks or projects must be seen as the first step of a longer and broader process of capacity building. A pro-active participation in these networks requires understanding broad EU dynamics and policies³². Moreover, such type of engagement is resource-intensive and it is difficult for FVG clusters, which are currently operating under significant constraints, to maximise the impact of such activities. Finally yet importantly, a stronger regional mandate would enable clusters to be bolder in their approach: clusters have been delegated by the regional government to take part in these initiatives; however, such delegation has been somewhat informal. There are no defined boundaries, directions or indications on the duration of such responsibilities. This puts clusters in an uncertain position, limiting the initiatives they can take.

To exploit the benefits of international networks, it is also crucial to have a regional governance system that can receive the input from clusters and process it through a broader policy cycle. To this end, it seems essential to establish clear feedback and communication channels between clusters and the regional administration. As innovation processes are not compartmentalised by sectors, it is necessary to improve communication across different segments of the administration, developing a mission-oriented approach to research and innovation policy. Last but not least, the FVG Brussels Office appears a critical element in this *governance chessboard*. Its support is considered essential by clusters and it is important that sufficient resources are devoted to ensuring an adequate regional presence in Brussels.

H2020 projects

As shown in Table 3.13, Friuli Venezia Giulia is receiving close to EUR 117 million in net EU contributions from H2020, accounting for 2% of the Italian total. The total number of grants signed is 323, which accounts for 4% of the Italian total. Considering that FVG accounts for 2% of both the national population and the national GDP, and that the success rate in FVG is 13% as opposed to 12% in Italy as a whole, the region is performing slightly above the national level.

Table 3.13. Italy vs FVG participation in H2020 – Key statistics

	Net EU contributions (Mln)*	Signed grants*	Success rate*	Population**	GDP 2019**
Italy	5 220	7 309	11.81%	59 641 488	1 789 747
FVG	117	323	12.80%	1 206 216	38 735
FVG/IT	2.24%	4.42%		2.02%	2.16%

Source: Authors' elaboration based on *Cordis and **ISTAT data.

Within the region, H2020 participation and funds are concentrated in Trieste (which accounts for nearly 64% of the participation³³ in H2020 and for over 71% of the funds) as reported in Table 3.14:

³² Anecdotally, cluster COMET, in order to position itself at the European level, hired someone with a multi-annual direct experience of the EC policy in Brussels.

³³ Participation, according to the Cordis definition, is the act of involvement of a legal entity in a grant agreement. A single participant can be involved in N grant agreement and therefore be counted as N participations.

Table 3.14. Participation of FVG to H2020 by NUTS3

	Participation		Net EU Contribution (EUR)	
	Number	%	Total	%
Trieste	260	63.73%	83 035	71.16%
Udine	113	27.70%	24 981	21.41%
Pordenone	25	6.13%	6 300	5.40%
Gorizia	10	2.45%	2 368	2.03%
Total	408		116 682 886	

Source: Authors' elaboration based on Cordis data.

Out of the 108 organisations that take part to H2020 projects in FVG, universities are the most active. SISSA is the institution receiving by far the most funds (it accounts for 19% of the total funds), followed by Università di Trieste (13%) and Università di Udine (5%). The engagement of technology parks varies significantly with Electra Sincrotrone ranking 4th (receiving 5% of H2020 funds in the region), OGS ranking fifth (4%), whilst AREA Science Park, Polo Tecnologico di Pordenone and Friuli Innovazione ranking respectively 17th (1.5% of funds), 32nd (0.5%) and 38th (0.4%).

Table 3.15 provides an overview of the actors most active in H2020, comparing Italy and FVG. Whilst the rate of firms is similar in FVG and Italy, there are significant differences for the other actors. **Strikingly, public bodies account for 35% of H2020 funds in FVG, but only for 3% in Italy.** On the other hand, the higher/secondary education sector accounts for a third of the total in Italy and for 19% in FVG. Research organisations account for only 7% of the funds in FVG, whereas their share is 24% in Italy.

Table 3.15. Net EU contribution by organisation typology (%)

Type of Organisation	Italy	FVG
Private for profit (excl. education)	37.2%	38.2%
Higher or secondary education	33.1%	18.9%
Research organisations	24.4%	6.9%
Public body (excl. research and education)	2.9%	34.9%
Others	2.3%	1.1%

Source: Authors' elaboration based on Cordis data.

The countries with which FVG has more H2020 collaboration links³⁴ are Germany (1 027), Spain (907), France (838) and the United Kingdom (736). Overall, universities and firms are most engaged in H2020 projects. It is essential to build on these experiences and network of relationships to increase the region's international presence.

The European Territorial Cooperation

Friuli Venezia Giulia, as a border region, has access to multiple European Territorial Co-operation (also widely known as Interreg) programmes. Regional actors in general are well equipped and knowledgeable in taking advantage of these programmes given the long-term experience dating back to the very beginnings of Interreg more than 30 years ago.

In 2014-20, FVG had access to 11 ETC programmes, three for cross-border cooperation (with Austria, Croatia and Slovenia), four transnational ones (Adriatic-Ionian, Alpine Space, Central Europe and

³⁴ Collaborative links are a measure of collaboration. According to the Cordis definition, a collaborative link is assumed to exist between each pair of participants in each contract.

Mediterranean), one interregional (Interreg Europe) and three networking programmes (EPSON 2020, INTERACT III and URBACT III). The EU KEEP database on ETC programmes and projects³⁵ since year 2000 counts approximately³⁶ 706 projects in which FVG stakeholders were directly involved and a total of 1 137 regional partners engaged.

In the 2014-2020 period, ETC programmes were funded with the 3% of the total EU cohesion policy budget (EUR 10.1 billion) and were aligned with the general priorities and Thematic Objectives of the European Cohesion. As a first approximation, the ETC projects relevant for S3 are defined as all those related to Thematic Objective 1 (Research and Innovation) and Thematic Objective 3 (SME competitiveness). For the 2014-20 programming and considering the three strands of the ETC (cross-border, transnational and interregional), the projects involving at least one partner from FVG are 58, engaging 95 partner entities from the region. Noteworthy, for 26 of these projects the Lead partner was based in the region. Table 3.16 shows ETC programmes, RTDI- and SMEs-related projects and their financing for the FVG-based partners.

Table 3.16. ETC RTDI and SME cooperation projects with FVG partners (2014-20)

	Number of Projects	FVG Partner Funding (Euro)	FVG Lead Partner Funding (Euro)	Total Budget for FVG based partners (Euro)
Interreg Europe	4	769 350		769 350
INTERREG VA Italy - Austria	17	3 264 259	1 764 528	5 028 787
INTERREG VA Italy - Croatia	7	2 394 108	671 190	3 065 299
INTERREG VA Italy - Slovenia	15	6 061 404	1 523 775	7 585 178
INTERREG VB Adriatic - Ionian	2	407 663		407 663
INTERREG VB Alpine Space	3	426 665	533 775	960 440
INTERREG VB Central Europe	6	1 665 025		1 665 025
INTERREG VB Mediterranean	4	993 489		993 489
Grand Total	58	15 981 963	4 493 268	20 475 231

Source: Authors' elaboration based on the KEEP database (<https://keep.eu/>).

Regional RTDI actors are quite active in the ETC projects, which are seen as one of the relevant channels for funding initiatives. Although not included in the current S3 policy mix, the sources of the ETC programmes may become important in contributing to the development of the regional innovation system. Even more programmes like these may play an important role in the future S3, in particular considering the challenges of its internationalisation process.

Another relevant opportunity for fostering internationalisation of the FVG innovation system is the EU macro-regional strategy approach. According to the European Commission³⁷, a macro-regional strategy is a policy framework, which allows countries located in the same region to jointly tackle and find solutions to problems or to better use the potential they have in common (e.g. pollution, navigability, worldwide business competition, etc.). By doing so, they benefit from strengthened co-operation, which allows for more efficient policies compared to those implemented in isolation. An EU macroregional strategy can be supported by EU funds, including the ESIF.

The FVG region is participating in the EU Adriatic-Ionian (EUSAIR) and Alpine (EUSALP) macro-regional strategies. The two strategies have defined a strategic policy framework through their thematic

³⁵ See <https://keep.eu/>

³⁶ According to the dataset structure, less than 100% of ETC projects implemented from year 2000 are included and there may be inconsistencies in the partners ID, which may result in some duplicated cases.

³⁷ See EC (2017) "What is an EU macro-regional strategy?" Factsheet. (<https://t.ly/e7GL> accessed on 3 March 2021)

working groups in charge of implementing action plans also relevant for the RTDI regional co-operation. Indeed, some of the projects identified therein and co-financed with European funds, both in the framework of the cohesion policy under the ETC (in particular the transnational strand) and under directly managed programmes, as well as with regional resources, offer some preliminary insights into the ways the macro-regional strategies may be an asset for S3 internationalisation.

Past experience may also contribute to understanding of what ETC programmes can offer and the role they can play in supporting S3 internationalisation.

In the programming period prior to 2014-20, a wide area cross-border co-operation programme was operating across the Adriatic basin. The programme was absorbed by the new ETC programmes. Such a programme, the EC IPA Adriatic CBC Programme 2007-13³⁸, was a hybrid cross-border initiative extending to a wide area and including territories in Italy, Greece, Slovenia, Croatia and other western Balkan countries. **Two strategic projects were funded through this Programme, PACINNO and SMART INNO engaging FVG partners. Both projects focused on international cooperation for innovation.**

3.5. Recommendations for developing and strengthening interregional collaboration in the new S3 period

The Friuli Venezia Giulia research and innovation system is an important asset for the regional economy and society, which can play a central role in regional growth and prosperity over the years. The Smart Specialisation Strategy is a key policy instrument in the hands of the regional government to enable this asset to meaningfully contribute to the multifaceted regional business community. It appears that many companies in the region are not trying or are unable to incorporate higher levels of knowledge and innovation in their operations. Indeed, the dissemination and absorption by businesses of the results of science and research generated by the regional actors is not pervasive enough to lead to a transformation of the innovation system.

Additionally, the COVID-19 pandemic, an unprecedented global crisis with structural impacts not yet fully understood, affected the region profoundly. Regional economy can speed up its recovery and increase its resilience to other shocks by becoming more knowledge-based. Such transformation can help in addressing the impending challenges of climate change, increasing inequality and other significant threats to local wellbeing, as is increasingly recognised by the EU policy.

Such a context calls for every single action to be considered carefully in light of its ability to help seize opportunities to build more resilient businesses and local communities. This report examines the innovation–internationalization nexus and its implications for regional development, which is crucial in the ESIF regulations 2021-27. It is now imperative to fully leverage existing local assets and to develop new ones by building stronger and durable European and international regional networks and collaborations pursuing transformative innovation to be beneficial for local businesses and communities.

Overall, the innovation-internationalisation nexus calls for a twofold intervention logic, openness towards change (innovation) and willingness to share (internationalisation). This chapter offers comments and synthesis of the main recommendations in order to strengthen internationalisation of the FVG regional innovation system within its S3. Some of the presented points do not refer directly to S3 internationalisation in its narrow sense. Instead, they are the required prior conditions for reaping the benefits of internationalisation and are included in the synthesis.

³⁸ See https://ec.europa.eu/regional_policy/en/atlas/programmes/2007-2013/crossborder/adriatic-ipa-cross-border-co-operation-programme-2007-2013 (accessed on 3 March 2021)

Broaden internationalisation channels in traditional regional businesses

The FVG businesses are successful in exporting products and services, but export-related international connections rarely lead to more structured interlinkages with the market destinations. There is a potential, not yet explored, to leveraging export networks for more systemic and broader internationalisation.

The local entrepreneurial fabric relies considerably on mature production sectors, which have evolved from “industrial districts” of the 1970s and are still well represented in the local economy. Over the last decades, these sectors faced major changes due to globalization and reorganisation of the productive activities globally. Trends induced by the pandemic might generate reshoring dynamics in some cases and in general, they call for action and for a stronger and more resilient integration of FVG local businesses into global value chains³⁹.

Showcasing the advanced and dynamic regional businesses can help other firms to learn. The regional industrial structure mostly relies on mature sectors, whereas more innovative and dynamic businesses in the region, occupying advanced niches and well represented by the innovative start-up dynamics, are often internationally connected. The challenge is to bridge the gap between these two types of companies, primarily working on the local entrepreneurial culture and pushing it for a change towards collaboration, innovation and internationalisation.

In order to promote international R&D and innovation linkages, a two-level approach should be considered by the region. On the one hand, firms already collaborating locally should be supported in their efforts to extend collaborations worldwide. On the other, non-collaborating firms can benefit from support for starting innovation collaborations at first locally (or domestically, with partners from other Italian regions).

Another important observation is a differentiated dynamics inside the region between Friuli and Venezia Giulia. It is recommended to separately tailor start-up support strategies to the needs of the Friuli sub-region, whose businesses are more oriented towards manufacturing, and to the area of Trieste, where companies are more oriented towards “intangible” research and digital technologies.

Build SME innovation capacities as a pre-requisite to support internationalisation

The regional system is characterised by an unmet (and potentially unexpressed) demand for innovation services by SMEs. In other words, firms are either unable to articulate their demand for innovation or, if they are aware of their needs, they do not count on regional actors to address them. At the same time, clusters, which can help firms to assess and articulate their needs, often face financial and human resource constraints and are unable to operate at an optimal level of capillarity. Strengthening innovation diffusion, by supporting firms in their ability to innovate is an essential step to increase the region’s international standing.

Instruments and support activities, such as technology brokerage and local and international networking, can facilitate the process of demand articulation. Such activities are resource-intensive and require specific skills and in-depth knowledge of industrial and sectoral dynamics. Clusters are well positioned to carry them out and should be duly empowered to support firms in their process of innovative services demand articulation. It can be the first step in bridging the territory with the regional and international knowledge flows. At the same time, technology parks and university TTOs should develop the ability to cater to broader constituencies, devising, together with clusters, adequate innovation-support services.

³⁹ See OECD (2020). COVID-19 and Global Value Chains: Policy Options to Build More Resilient Production Networks. <http://t.ly/cYOo> (accessed 25 February 2021).

Showcasing good practical examples of these services can help companies, and star-ups in particular, to benefit from the existing resources, for instance in the uptake of emerging digital technologies. Exploiting funding and infrastructure available from the EU initiatives in the field of artificial intelligence and ensuring wide and affordable access to high-quality consulting services (via “Digital Innovation Hubs”) and testing facilities are other possibilities.

Needless to say, the development of measures to support matching between the demand for and supply of innovation services should be framed within the strategic vision of FVG accompanied by clear objectives, targets as well as output and result indicators.

A strong reliance of the Friuli Venezia Giulia innovative businesses on “other” innovation services providers signals that the region can import some of these services. It is plausible given a lack of critical mass in some areas of innovation in FVG and a small size of the region, despite its high investments. The lack of critical mass also stems from a missing culture of collaboration and coordination among innovation actors in the region. A critical mass of innovation services can be built by linking the existing FVG suppliers, as done by the SMACT interregional competence centre⁴⁰ or an inter-university collaboration in technology transfer activities. The idea for such consolidation activities is to improve collaboration and to reduce duplications in the regional innovation system.

Strengthening interregional alliances and networks with strong RTDI services suppliers from the neighbouring regions (e.g. Triveneto, Emilia Romagna, Lombardy, but also Carinthia and Slovenia) to meet the unsatisfied regional demand can be a useful way of overcoming the limitations of the regional innovation system and building innovative collaborations.

Define a mid-term vision for internationalisation of the regional innovation system

Actors in the innovation system (clusters, universities, etc.) operate mostly without coordination. A culture of collaboration and coordination needs to be built, as the challenges ahead require all actors to be actively engaged to promote innovation and internationalisation and to maximize the benefits of these processes. A vision for the FVG innovation system should consider it within the international (or at least EU) setting, based on the premise that many challenges and opportunities are not regional in scope. The regional government should own such vision and ensure that adequate resources, capacity building and governance processes are in place to ground it in the reality of the policy arena.

Embrace a bottom-up approach in the governance system

Repeatedly, key actors in the innovation system reported a lack of systematic communication with regional government. Decisions related to innovation policy do not appear grounded in sufficient stakeholder dialogue. Interactions between the key actors and the regional government tend to be fragmented, bilateral or isolated and do not amount to a systemic approach. This may leave parts of the regional government unaware of key industrial trends or lead to overreliance on local players, which can be detrimental in the long term.

The governance system needs to integrate new avenues for the bottom-up interactions with representatives of the local innovation system, such as (among others) clusters, universities, research centres, technology parks, start-ups, incubators and ITSs. Such interactions would benefit both the regional government and the industry, as they can mutually inform each other on the planned policy measures and on the recent industrial and technological developments. In relation to the implementation of S3, such interaction should be included in the tools fostering a continuous entrepreneurial discovery process, as required by the regulations.

⁴⁰ See <https://www.smact.cc/?lang=en> (accessed on 5 March 2021).

The bottom-up approach can also open avenues for most competent actors in the region to contribute to policy design in the areas of immediate relevance, thus increasing the “competence coherence” in policy decision making. This is particularly important for internationally highly competitive areas, such as RTDI.

Build the capacity for regional innovation and international projections

Investing in capacity building activities appears essential for Friuli Venezia Giulia where actors tend to work in isolation and to be inwardly oriented. To develop a new approach to innovation and regional development policy, it is essential that key regional players engage in more systemic exchanges by, for example, developing a collaborative approach to research and innovation, as well as spaces and methods for interaction.

For policy makers this means becoming familiar with collaborative instruments which promote experimentation (i.e. Innovative Public Procurement), as well as with methods that engage stakeholders throughout the policy cycle. For universities and research centres, this requires becoming more strategic in their technology transfer and territorial engagement activities (notwithstanding the limitations of the current regulatory environment). Technology parks need to improve their ability to reach and support firms at a higher level of territorial granularity. The role of intermediaries, such as clusters, is crucial in this process. As actors at the interface of the demand and supply of innovation, they need to strengthen their capacity to link SMEs to local or international innovation providers.

Opening up (to a variety of participants and to the world) and building vibrant intertwined ecosystem, it is advisable to invest more in facilitators and intermediaries. This needs to be done with a view of turning the FVG innovation system into one open to the external world and targeting other Italian and EU regions. Such integration will contribute to building more resilient and integrated economy based on innovation and internationalisation.

Improve analytical skills within the regional policy maker structure

A specific capacity building should be offered to the policy practitioners of the region in charge of S3 and its internationalization efforts. Well-trained and prepared human resources in the regional administration are a must for the regional development policy. In order to better understand the needs of the territory, in terms of both innovation and internationalisation, a set of skills should be developed internally within the regional government that would allow understanding both the current trends but also their evolution over time. In particular, a continuous monitoring on the internationalisation propensity of FVG businesses and institutions as well as internationalisation potential of not-yet-internationalised firms should be implemented. Regional policy makers need to rely on (close to) real time indicators, as also reviewed in this report, to perform such monitoring activity. External analyses might be unable to offer sufficiently up-to-date information. Upgrading the skills of policy practitioners in charge of the S3, innovation and internationalisation strategies may facilitate an updated S3 definition that would allow a better alignment between the needs to support firms and to monitor the results of such support. A narrower and more precise definition would allow a nuanced and adaptive policy action inside each specific S3 area of specialisation.

Enhance regional insertion in international networks and platforms

Joining and exploiting the opportunities offered by international networks for innovation is an important way to open up regional actors to the EU opportunities. FVG is already participating in several initiatives but further efforts are needed. The region should intensify participation in the S3 Thematic Platforms and the Vanguard Initiative and give clusters, which are often representing FVG in these initiatives, a more formal and longer-term mandate. Horizontal communication flows among the FVG regional representatives active in the EU and international networks should be improved and streamlined.

It is important for Friuli Venezia Giulia to know which of its actors are active internationally. Open data from the Cordis and KEEP databases allow to easily identify stakeholders that are involved in H2020 and ETC projects. The region can establish contact and engage these stakeholders, as they are an important asset and can importantly contribute to the policy discussion. More active interactions with H2020 and ETC participants can increase the benefits and spillovers from these projects into the regional system.

Moreover, in the new ESIF programming, it is recommended to pursue a more effective and integrated use of the ETC projects as a lever for the S3 internationalisation. This will build on the prior experience during the 2014-20 period (e.g. the macroregional strategies EUSALP and EUSAIR). A weak integration between ETC and other mainstream ESIF regional OPs needs to be improved. To this end, the next ETC OPs and the ERDF / ESF+ FVG ROPs must be geared and more effectively coordinated, bridging internationalisation and innovation.

Finally, Friuli Venezia Giulia should start engaging with European Institute of Innovation and Technology Knowledge and Innovation Communities (EIT KICs) and Joint Undertakings (JUs) to explore synergies between their respective activities. Both EIT KICs and JUs have not so far interacted sufficiently with regional administration, yet they can provide international networking opportunities.

Strengthen the policy guidance role of FVG for S3 internationalisation

FVG benefits from a well-established and consolidated experience in its international action, facilitated by being a border region with a special autonomy statute. However, often these activities lack a strong common vision and a clearly defined and coordinated strategy towards external players (European institutions, EU regions, agreements and protocols with international institutions, international collaborations, decentralised co-operation, business internationalisation, etc.). The new focus of the S3 on internationalisation is a good impetus to move these international relations up to the next level. A permanent “internationalisation steering committee” can be organised to ensure active and coordinated efforts in this area. The committee can be organised as a functional rather than a bureaucratic body. It would coordinate regional “international policy” action and engage various regional actors participating in international and European innovation projects and initiatives.

In such a context, the FVG Brussels Liaison Office should play a more effective and horizontal role, recognized across regional directorates sharing responsibility for the S3 and international operations. This would allow a better connection of the FVG S3-relevant actors and stakeholders to the European institutions and networks. This role may be eased by the fact that the Office depends on the General Directorate of the Region. In fact, during the interviews, stakeholders referred to the Office as an asset for the regional system, but currently operating mostly on a case-by-case basis.

One of the components of this “enhanced” internationalisation strategy may be establishing Friuli Venezia Giulia as a gateway to the Italian market for entrepreneurs in Central Europe and in the Western Balkans. It is recommended that the region more consistently engages its stakeholders with ecosystem players in target countries to disseminate information about start-up incentives, preferably in the local languages, and engage them in innovation collaborative initiatives. Learning from the best local experiences (e.g. a multi-national start-up ecosystem as described in OECD, 2020) is another recommendation.

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