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## SPACE ENTREPRENEURSHIP IN ITALY: THE ROLE OF REGIONS

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This article investigates the role of entrepreneurship and SMEs in the Italian space industry. After a first section where entrepreneurship is defined in the different segments of the space sector, the article identifies the different stakeholders in the Italian space entrepreneurship. The Italian space entrepreneurship is analyzed both from a quantitative or financial perspective and from a qualitative one (regulatory aspects, policies, incentives and sources of funding for the space entrepreneurship).

A perspective on the trends, evolutions and challenges in the coming decade is provided based, on interviews with key actors in the Italian space entrepreneurship landscape (SMEs, districts, ASI, associations, financial players...)

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<sup>1</sup> The analyses developed in this paper are those of the author as an individual, and do not represent the position of Astrium.

### I. INTRODUCTION

Entrepreneurship is essential for a nation to succeed in an ever changing and more competitive global market. However, for entrepreneurship to generate sustainable value, it is necessary to create a business environment that favors growth, helping new ventures in crucial phases, such as internationalization or launch of new products and services, which are often perceived as barriers.

New enterprises often fail the transformation, over the years, from being micro- to becoming small-, medium- or large companies. From this perspective, the Italian space sector does not represent an exception: beside the large industries, which belong almost all to the Finmeccanica Group, a significant number of SMEs (especially micro- and small-) is present.

This paper highlights the role that Regions can play in creating a favorable environment for space entrepreneurship to develop and grow, providing sustainable benefits for the citizens and competing in the global market place. After an overview of the

Italian space industry, with a particular focus on SMEs and industry associations, the role of regions is analyzed in line with the European 2020 strategy. In particular, the role of “Lead Customer” is described for Regions to leverage their procurement to implement demand-side innovation policies, concretely accompanying entrepreneur in transforming ideas into new markets and services.

The cases of Apulia and Tuscany regions are presented in this paper. The Apulian Regional Government has been supporting, over the recent years, the launch of new space activities and is now putting in place a demand-driven innovation strategy. In Tuscany, the recently created ToscanaSpazio association is federating the regional space actors.

### II. THE ITALIAN SPACE INDUSTRY

According to a study commissioned by the Italian Space Agency in 2011 [1], [2] (referred to consolidated data of 2007), at a first glance the space industrial sector in Italy is represented by around 130 companies, 75% of which are SMEs. This number

comes from the census of the companies able to produce a space technology, which is why they can be considered the core group of the space industry in Italy.

This core group of space companies represented a value of production of 4.430 billions of Euros and 20.250 employees in 2007. These companies operate not only in the space sector: the approximate rate of space share is 40% (i.e. around 1.850 billions of Euros and 7.800 employees). About 90% of the value of production in space is produced by large companies, but a certain percentage of it is subcontracted to SMEs, that is why 79% of employees are in large industries.

The structure of the space industry in Italy has a significant base on SMEs: 47% are micro companies (less than 10 employees), 31% are small (less than 50 employees), 14% are of medium dimension (less than 250 employees). Almost all the large companies belonging to the core group are owned by the Finmeccanica Holding. Another aspect regards the distinction between manufacture and services/applications: according to the mentioned study, 66% of the value of production is covered by manufacture activities and 34% by services, with similar figures for the number of employees.

From a geographical point of view, the space industries are distributed along the Italian territory in a quite unbalanced way. Territorial clusters of industries can be highlighted: Rome and its surroundings represent the most important pole for Space, followed by Turin, Milan, Naples, Pisa and Lucca in Tuscany. Important activities are also present in Matera (Basilicata) and Bari / Brindisi (Apulia), in correspondence with ASI centers of excellence, mainly in the field of EO applications.

### III. REGIONS AND SMEs: TWO KEY ACTORS IN THE DEVELOPMENT OF THE EUROPEAN SPACE SECTORS

#### Europe 2020 Strategy

The Europe 2020 Strategy [3] launched by the European Commission in 2010, by stimulating the Union to take charge of its future, aims at projecting Europe out of the economic crisis strengthening its assets and *turning it into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion*. In order to reach this overarching goal, all European actors and stakeholders at different levels (political, institutional, academic, industrial, societal etc.) are expected to contribute. As underlined by the European Council [4], *“Regional Policy can unlock the growth potential of the EU by promoting innovation in all regions, while ensuring complementarities between EU, national and regional support for innovation, R&D, entrepreneurship and ICT. Indeed, Regional Policy is a key means of turning the priorities of the Innovation Union into practical action on the ground.”*

European Regions and a related adequate policy play an essential role in favouring innovation processes, encouraging research and development, investments and fostering links and exchange with universities and research centres as well as SMEs. These factors make them essential players towards the achievement of the Europe 2020 strategy, especially with reference to the “smart growth” pillar [5]. The focus on Innovation is particularly at the heart of this strategy which made the concept of “smart specialisation” central to the forthcoming European regional policies and innovation strategies. *“Smart specialisation” requests basically that each region builds on its own strengths, to guide priority-setting in national and regional innovation strategies, as well as cross-border cooperation where appropriate* [6].

Regional innovation strategies for smart specialisation (RIS3) can be defined as integrated, place-based economic transformation strategies that: 1) concentrate public resources on innovation and knowledge-based development priorities, challenges and needs, 2) outline measures to stimulate private RTD investment 3) build on a region's capabilities, competences, competitive advantages and potential for excellence within European and global value

chains, 4) foster comprehensive stakeholder involvement and encourage governance innovation and experimentation, 5) are evidence-based and include sound monitoring and evaluation systems [6]. This new approach will imply mainly the: **selection** of a few **investment priorities** based on a process of entrepreneurial discovery to identify promising areas for specialization; **building on current regional economic specialisation** and **mobilising talent** by matching Research, Technology development & Innovation and business needs and capacities; **developing** world class excellence clusters, cross sectoral links and increased **connectivity between regions**; **collective endeavour** involving not only the academic world, public authorities and the business community, but also innovation users.

#### NEREUS – European Regions using Space Technologies

Established in April 2008, NEREUS [9] is the network set up by European regions involved in the development and use of Space technologies in Europe which acts as the main interface between the Regions and the European Institutions. Regional authorities can make a substantial contribution to Space policy, by creating services for the general public through new market initiatives and by their ability to ensure active participations by the various socio-economic stakeholders in their regions. According to its mission statement, NEREUS aims at fully exploiting the potential of the space technology market for the benefits of its Regions and their actors. NEREUS wants to play an active role in the construction and development of space technology markets in order to ensure that optimal framework conditions are met for the further development of space applications. Ultimately, it strives for an adequate representation of end user needs in terms of space applications and services.

The governance of the NEREUS network is shared by its “Full Members”, which are regions or regional entities from the EU Member States. Other organizations (e.g. companies, associations, universities...) can join the network as “Associate

Members” when their competence, knowledge and interest are in line with the aims of the network.

Seven Italian Regions have joined NEREUS: Abruzzo, Apulia, Basilicata, Lombardy, Molise, Piedmont and Veneto.

The Italian members of the NEREUS Network have recently launched, under the co-ordination of the Lombardy Regional Authority, one of the first strategic experiments in demand-oriented public policy making [10]. One of the preliminary activities conducted as part of this initiative has been the monitoring of the supply and demand in the sector of satellite applications:

- From February to May 2011, an exploratory survey was conducted with the Lombardy Regional Authority to identify the products/services in use and the demand for innovations potentially achievable thanks to satellite technologies;
- From June to October 2011, a second survey focusing on the other Italian partners in the NEREUS Network was performed.

These two surveys have highlighted a vast majority of earth-observation and navigation schemes both in the demand (regional agencies operative needs) and in the supply (projects underway) of satellite based services and applications. Several matches between the needs expressed by end users and the ongoing projects have been identified, meaning that some parties are probably not entirely aware of the opportunities already made available by schemes exploiting satellite technologies that have been implemented by other players. This study highlights the evidence of shortcomings in the expertise of users, who have sometime expressed the need for ad-hoc training on how to use software and other tools for satellite data processing and, more in general, on how to manage the complicated heritage of information that satellites can provide and integrate it with other knowledge sources already available to the public user.

### The Lead Market Initiative: Regions to drive innovation as “lead customer”

Whilst the national/international level is the most appropriate to tackle issues that require long-term planning and the development of extensive political, economic as well as social resources, the regional/local level, through its close contact with a wide array of local stakeholders (citizens, companies, R&D centres...), is extremely important in *linking citizens and the governmental/institutional level*.

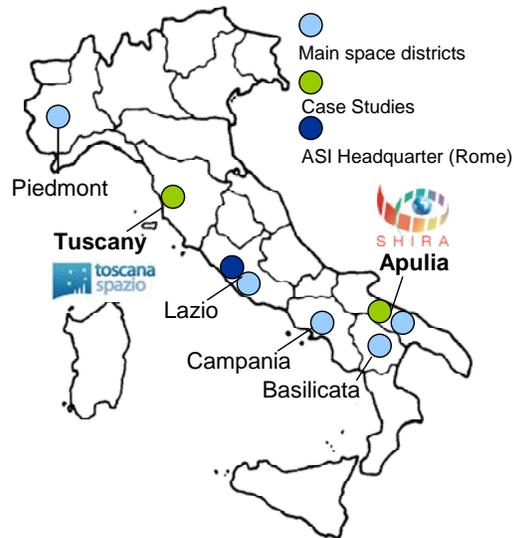
Moreover, regions can play a key role in innovation, by acting as “intelligent lead customer”, encouraging and purchasing innovative products and services which can then go on to further commercial success. Many innovative companies, particularly SMEs, find it difficult to engage with the public sector or to get support for the creation and deployment of new products and services. Regional Governments are nicely positioned to act as “lead customer” thanks to their close contact with the companies and the R&D institutions of their territory and to the *operational know how and needs of the regional agencies*.

Acting as a lead customer means working closely with the business in the pre-commercial stages of product development; sharing challenges and objectives, guiding specifications and testing prototypes before purchasing the resulting solution. In this way the regional government can not only generate better solutions for its own needs but also support future economic growth of its territory by helping business – especially SMEs which may have limited resources – to develop new products and services which can then become competitive in other geographic segments, providing that an open approach is adopted.

#### IV. CASE STUDIES – APULIA

##### Overview of the regional space sector

Apulia is among the Italian regions with a higher concentration of aerospace activities, both in terms of companies and in terms of employees. In 2008, the Apulia’s aerospace sector has generated €800m of



revenues and counted on 4600 employees. The regional space sector, composed by 10 companies, represents around 10% of the regional aerospace sector and 5% of the national space sector.

The space value chain, especially in the services business, appears to be much less rigid than the aeronautical one and is evolving over time allowing also SMEs to take project management roles: Apulia space companies are starting to benefit from a virtuous circle fuelled by the growth of space-based services demand from public and private bodies. At the regional level, space is being perceived as a true service enabler: every innovation and improvement in such area has a positive impact on the entire community, both citizens and enterprises.

##### Regional initiatives to develop the space sector

Since 2009, Apulia Region has been able to leverage the European Regional Development Funds to launch multiple calls for R&D projects in different sectors including aerospace. As part of the National Operative Plan (PON) 2007-2013 for Research and Competitiveness, a roadmap has been established for the strategic development of the Apulia’ Aerospace District. Among the main activities defined in such plan, a three-year project for the study and the development of a Data Fusion Centre has been included. This centre aims at generating value added services based on the integration and the fusion of

earth observation data acquired from satellite and aeronautical platforms together with the data generated by existing ground sensors' networks in order to provide, to public and private actors, improved tools for the environmental monitoring, surveillance and security.

Development of local capabilities (e.g. SHIRA consortium)

Five regional enterprises, with a significant experience in the Earth Observation sector (MerMec S.p.A., Planetek Italia s.r.l., Sitael Aerospace s.r.l., VVN s.r.l. and IMT s.r.l.), form the SHIRA consortium, which has, among its objectives, the study of a thermal infrared high resolution satellite mission and the development of the Data Fusion Centre described above.

The study of this new satellite mission, the hardware and software design for the Data Fusion Centre and the implementation of algorithms and procedures for the fusion of multi-platform and multi-source data are completely oriented towards the future value added services offering to support public and private bodies operating in the environmental monitoring and security fields.

Reinforcing regional operational capabilities through space services: Apulia Region acting as "Lead Customer"

Apulia Region has recently started a procurement strategy to improve the operations of multiple regional agencies thanks to the adoption of space-based services. The main examples include land and urban planning, civil protection, agriculture, fire monitoring, waste monitoring and water management.

Over the recent years, the Regional bodies have frequently relied on new systems and technologies for the environmental monitoring (satellite, airborne, UAV, ground sensors...), however these initiatives have often been running without a systematic coordination among the different systems both in terms of data acquisition and in term of value added services and processing chains.

The Data Fusion Centre aims at becoming the platform that integrates and harmonizes all these data sources in order to deliver sustainable and robust value added services to the public and private bodies.

In August 2011, the Apulia Region has launched a pilot "Pre-Commercial Public Procurement" activity through public calls for innovation. Through this initiative, the regional government has taken a "Lead Customer" role and is concretely supporting the local industry in the successful development of new products and services. The Data Fusion Centre project described in the previous section, will find in this demand-driven innovation strategy the optimal environment for implementing value creative services and applications.

## V. CASE STUDIES – TUSCANY

### Overview of the regional space sector

A recent survey of the field of **space and aerospace in the Tuscany area** revealed previously unsuspected figures such as **about 40 organization employing more than 2.500 highly qualified technical staff, with a gross turnover of around 350 million Euro, and with a large predominance of R&D personnel.**

The actors of the field are very varied:

- large manufacturing and service companies like Selex-Galileo, Ingegneria dei Sistemi (IDS), Intecs;
- a variety of Laboratories in the Academic Departments of University of Firenze, University of Pisa, University of Siena;
- public research institutions like Consiglio Nazionale delle Ricerche (CNR) in its large plants of Pisa and Firenze-Sesto Fiorentino, Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT) with its laboratories in the three Universities above;
- medium-size high-tech companies like AvMap and Sitael;
- a constellation of very successful small and micro companies, often spin-offs from the large

companies and research centers above, which work in the different areas of space science and engineering.

All in all, the region boasts state-of-the art competence in a number of different fields, like: *telecommunications, satellite navigation, optoelectronics, conventional and innovative propulsion systems, design and manufacturing of antennas, power and on-board electronics, data handling and earth observation, exobiology and biological experiments at zero gravity, mission planning and control, space debris tracking*, just to mention a few.

All of the entities above are already in contact with the main public and private stakeholders in the field like the European Space Agency, the European Commission, the prime space companies in Europe and outside.

#### ToscanaSpazio Association

##### Motivation and mission

The **not-for-profit association ToscanaSpazio was established in December 2011** as a response to the situation described above: many companies and research Institutions in Tuscany have been active in the field of aerospace technology for several years, but their activity is fragmented so that it is difficult for them to be recognized as a key asset and a distinctive feature of the region, as also happens in other regions of Italy like Lazio, Piemonte, Campania, Puglia, Basilicata, Lombardia. This is why a group of scientists, executives, and engineers all involved in the field of space decided to start a networking initiative under the motto “**C’è piu’ Spazio in Toscana**” (“**more Space in Tuscany**”) to:

- **create a wide network** of companies and research institutions throughout Tuscany able to **guide, promote and increase** the value of **cultural, training and research activities**;
- **share and develop the knowledge** of its members, thus keeping the valuable technical, scientific and business know-how in the Aerospace sector within Tuscany;

- promote the **development and growth of excellence** within the sectors in Tuscany;
- enhance the complementary nature of groups and **create synergies**;
- encourage **participation** of members and affiliates **in public and private funding instruments**.

The idea underlying this action was that a pervasive network of companies and research Institutions scattered across the whole region of Tuscany would facilitate the creation and strengthening of competence through the development of technologies and services, and would help preventing the “brain drain” and the possible slow decay of technological, scientific, and entrepreneurship assets.

ToscanaSpazio was established to create occasions for Tuscan partners to meet and recognize each other’s competence, to gather groups of excellent partners around specific industrial or research projects financed by national and international companies and Institutions, and to give full (international) visibility to the competences and activities as above through the organization of and participation to meetings, conferences, trade fairs etc..

ToscanaSpazio was established in December 2011 by 14 Founder Associates.

**Today ToscanaSpazio has 23 Full Members** (14 SMEs, 6 Research organizations and 3 Large Companies) and one Affiliate (Astrium Italy). Full members produce total **revenue of 150 million Euro and employ more than 1.900 highly qualified staff**.

The boards of the association are the General Assembly, the Managing Board, the President, the Executive Director.

The members of the Association can be both individual people and legal entities like private companies and public Institutions, with a *peer* level of representation in the General Assembly.

##### Ongoing initiatives

Italian space industries and research centers are gradually organizing themselves into districts or

similar entities. The situation in Tuscany is slightly different because the region is characterized by high fragmentation and by the absence of big players which can act as collectors. In addition, the local Tuscany Government (Regione Toscana, [www.regionetoscana.it](http://www.regionetoscana.it)) has only recently recognized that the Space sector is atomic and horizontal compared to different technological sectors also very well represented in the region like ICT, Optics, and others.

The activity of ToscanaSpazio is organized in three different actions or levels: Regional, National and International. Its main general objective is to achieve wider recognition of the Space sector as one of the priority R&D areas in the Regional strategic development plan. ToscanaSpazio is collaborating with the EU branch of Regione Toscana and is making contributions to the Masterplan for Research in the area. ToscanaSpazio has initiated the “Regional Space System” that overcomes the division created by pre-existing “Poles of innovation” where Space was not present as an independent sector. Such a system will be the fundamental entity of Tuscany Region Government to exploit the potential of Space sector at EU and national level

At the National level, ToscanaSpazio is developing its relationship with the Italian Space Agency i) to promote awareness of the excellence of the different companies/organizations in Tuscany, and ii) to scout products and solutions with the aim of complementarity with respect to the other Italian regions. The outcome that is envisaged is increasing opportunities for Tuscany in the competition for resources that are available in Italy.

At the International level, among the most promising prospects is the opportunity to establish research, development and/or commercial links with other European regions which have complementary needs. With this in mind, ToscanaSpazio is pushing for the Tuscany Government to join the NEREUS network, by proposing itself as the natural technical committee. In addition, a number of ToscanaSpazio associates are planning to establish offices and plants outside

Europe (Brazil and China in particular) and that ToscanaSpazio is working to ensure these efforts are anyway beneficial for all of the other Associates interested in developing their markets in those particular areas.

#### Future challenges

The future challenges of Tuscany lie, in the writers’ opinion, in two main actions for the development of the space sector. On one side, with the effort of ToscanaSpazio and other players in the field, like the recently established Poli di Innovazione (Innovation Poles), the Region has to come to a level of representation and cohesion of the field of Space and Aerospace similar to what has been already done by other Italian and European Regions, like the Regional District or Regional Consortia. On the other hand, whatever the level of structured representation is, the space sector has to concentrate on a “flagship” project to *federate* the different players. The flagship project has to boast and demonstrate at best the capabilities of the regional companies and Institutions in the field of both technology and applications to come to an integrated platform that can deliver services to end-user. Just mention a few examples: i) a satellite network to provide maritime service to leisure vessels in terms of communications, infomobility, meteorology, etc., or, ii) an earth-observation system for early warning and localization of wood fires. Something “Made in Tuscany” that every citizen of the Region can really benefit from.

## VI. CONCLUSIONS

Italian regions are in the position to play an extremely important role in supporting entrepreneurial activity, especially in highly innovative sectors like the space. In order to allow new innovative companies to grow quickly and in a sustainable way, generating wealth and employment, the regional governments must facilitate the enterprises in their internationalization process and in the transition from business-ideas to commercial products and services. Through the creation of local space associations like ToscanaSpazio and through the participation into

European networks, such as NEREUS, the Regional Government can concretely help young companies in building their local and international business network. Moreover, as the Apulia's case demonstrates, by combining R&D funding and incentives with the "lead customer" approach of a demand-driven innovation strategy, the regional government can activate a virtuous circle fuelled by the demand of space-based services by public and private bodies.

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