THINKING SMART

Toolkit for the engagement of HEI in regional growth

Politecnico di Milano (POLIMI)

The Entrepreneurial Discovery in HEIs

January – September 2017

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1. Politecnico di Milano (POLIMI)

This report is a key output of the ERASMUS+ Thinking Smart project and presents the results of WP3 - Entrepreneurial Discovery in HEIs for each Partner University. This WP started with the definition of a staged methodology (based on the creation of a self-reflective case study, the organisation of 2 workshops, the administration of a survey/interviews, and the production of a final report – this one) which has been implemented locally under the supervision of the WP3 leader Newcastle University. However, each partner (POLIMI included) felt and was left free to adapt this methodology to its particular context. In the case reported here, 3 (rather than 2) workshops have been organised between May and September 2017, respectively with representatives of the Regional HEIs under the auspices of the Lombardy Region, a public keynote lecture of Prof Andrea Bonaccorsi from the University of Pisa, and an internal (closed door) meeting with POLIMI Heads of Department.

The general aim of WP3 in the Thinking Smart project was to deepen existing knowledge on the extent of matching between local needs/priorities as expressed by the Regional Smart Specialisation Strategy (RIS3) and the capabilities of each partner HEI, seen both as an academic institution and as a hub of relationships with other local stakeholders from the so-called 'Quadruple Helix'. This experiment has been named "HEI Entrepreneurial Discovery process" due to its similarities with the same process introduced by the RIS3 as per DG REGIO and IPTS guidelines and instructions. Its ultimate goal was to achieve a higher level of understanding of whether and to which extent the individual HEI aligned itself to regional development needs and priorities and to support a strategic and operational change in the research, teaching and engagement priorities of the partner institution.

Based on the contents reported herein, we can set out the preliminary conclusion that the Thinking Smart project team has certainly ignited, but not yet finalised, an Entrepreneurial Discovery process within Politecnico di Milano, and that some more targeted and purposeful actions need to be planned and implemented, by the impulse of the Academic Senate.

1.1. Introduction

This report on the POLIMI Entrepreneurial Discovery process is based on the information collected by multiple sources, including:

- A case study that was carried out in the context of the project's WP2 in Spring 2017 supported by a number of direct interviews to internal stakeholders (directors or key academic staff of the various POLIMI Departments);

- The first in a row of three workshops (rather than only two) organised within the project's WP3, on 10th May 2017 at the premises of Lombardy Government, where the representatives of the 13 HEIs and 9 Technological Clusters operating in the region were invited to an open discussion on the gaps, challenges and opportunities related to an enhanced role of HEIs in the definition of R&D and innovation policy;

- A second seminar organised on 4th July 2017 at the premises of POLIMI as a side event to the internal co-design workshop foreseen by the project's WP5, which took place on the following day. The seminar took benefit from the keynote lecture of Prof Andrea Bonaccorsi from the University of Pisa on the topic of "Universities and Smart Specialisation. Challenges and Ways Ahead". In addition to the consortium and advisory board members of Thinking Smart, the event was attended by some members of POLIMI academic staff as well as participants in the May workshop;

- A third, closed door meeting held on 18th September 2017 at Politecnico di Milano to complete the Entrepreneurial Discovery process of WP3 and pave the way for the definition of an action plan within WP4. The meeting involved the POLIMI Heads of Department as well as other key University staff members.

1.2. Overview of the Regional RIS3

The Lombardy Region was one of the first in Europe to release its own smart specialisation strategy (RIS3) at the end of 2013; revised in 2014, 2015 and 2017, the RIS3 aims at concentrating resources to support innovation processes that help the regional productive system recover in terms of competitiveness within the globalized market scenario. In order to achieve that overarching aim, the integration between actors is promoted, favouring the realisation of an enabling context, prone to creativity and open innovation, and which adopts the perspective of Smart Cities as a cross cutting element, in order to enhance territorial attractiveness and to promote the emergence of new industries according to a demand-pull approach.

Seven priority areas are identified, quite a large set of options indeed, which is due to the peculiarities of the regional scenario, highly specialized while at the same time also highly differentiated. Three main actions qualify the Lombardy's RIS3: an updated mapping of regional competences and research infrastructures; the reconstruction of regional value chains by way of an open innovation platform as a tool for entrepreneurial discovery; and a definition of priorities done in association with those of the Regional Technological Clusters, as the table presented in Annex A displays.

In particular, the RIS3 has proposed to abandon the territorial focus or vertical logic of past research & innovation promotion policies, in order to enhance the development of systems of competences across the different sectors. In so doing, the identification of value chains and emerging manufacturing systems goes hand in hand with the promotion of collaboration capacities among regional actors. In this vision, Technological Clusters are identified as both spaces for supporting entrepreneurs who develop new, cross-sectorial innovations and as innovative governance loci connecting regional authorities with academia and the productive systems.

The design of RIS3 was itself the product of a process of collaboration among various Regional directorates and between the regional and the national levels; at the same time,

it was the result of a vast involvement of local stakeholders, through specific working groups aimed to identify the key specialisation areas. All regional HEIs, POLIMI included, together with other Quadruple Helix stakeholders, were involved in that process. It has to be noted, however, that after the latest reform in Italy a University is now made of Departments and these respond to changes in the external environment according to their autonomous choices, which makes it quite difficult to speak of a unitary strategy in a large HEI as the majority of those located in Lombardy are.

Additionally, the pivotal role played by the Regional Technological Clusters has added new and further layers of complexity to the basic HEI-RIS3 interaction scheme, as several HEIs (or better to say, HEI Departments) are individually represented in the governing boards of the Technological Clusters, which is often considered enough to justify a sort of delegation from the HEI to the Cluster of some initiatives that might otherwise be easily classified under the header of "second" or "third" mission. This does not imply, on the other hand, that ALL activities of mission implementation are delegated to the Technological Clusters, making the appreciation of the reciprocal contributions even more difficult to realise in objective terms.

1.3. The role of the HEI in RIS3 design and implementation

The different Departments of Politecnico di Milano span across many of the RIS3 priorities of the Lombardy Region, which include all the key domains of modern R&D and innovation – from Aerospace to Energy, from Life Sciences to Smart Manufacturing etc. – as the table in Annex A exhibits. It is also important to highlight Smart Cities and Communities as a transversal area of RIS3 having the specific purpose (among others, which are more related to EU research and practice) of attracting and consolidating emerging industries according to a demand pull perspective. As mentioned, POLIMI representatives were constantly and deeply involved by the Region in the co-creation of RIS3 drafts through their active participation in the thematic working groups that preceded and accompanied the release of

the Strategy. It has to be stressed, in addition, that POLIMI and its departments are either founding members or key stakeholders of the Regional Technological Clusters, which in many cases pre-existed to the publication of the RIS3 in Lombardy and to the official acknowledgment of Regional and National Clusters (see the WP2 report).

As far as the RIS3 implementation is concerned, POLIMI representatives play an active role both in the governance systems of these Technological Clusters – which act as filters or soft interfaces between regional and local authorities on the one hand, and the productive system on the other – as well as in the formation of consortia participating to the calls for R&D proposals launched from time to time by the Regional government – including for the experimentation of innovative forms of public-private partnerships in the context of multi-stage, negotiated funding procedures, as predicted by the Regional Law No, 29 of 2016 (Lombardia è Ricerca – 'Lombardy is Research'), further discussed in Section 1.6 below.

However, if we look at Politecnico di Milano as a monolithic institution and search for a strategic orientation of the Academic Senate and/or any internal evidence dealing with the regional S3 we can find no official document. Although this may be a source of concern in general terms, it was generally not felt as such by the interviewed Heads of Department who individually declared themselves satisfied with the current level of interaction with the Regional government, the other regional HEIs and the private businesses belonging to the different industries, areas and domains prioritized by the Lombardy RIS3.

In this respect and based on the evidence from the WP2 case study report as well as the proceedings of the September 2017 closed door meeting, we can affirm that the University-Region relationship is mature and consolidated since its foundation, as is the positioning of POLIMI within the regional and national entrepreneurial milieus: this allows an optimal degree of collaboration with the respective stakeholders without suggesting the need for a reorientation of current actions in relation to RIS3 implementation guidelines. In fact, if we let the analysis deepen to the level of individual departments, we can find many prominent examples of virtuous interaction between the three missions of a HEI and aspects of the

Regional Government's research and innovation policy. In particular, the case study done in the context of WP2 in early 2017 identified three prominent best practices at POLIMI, namely a Foundation for third mission and international cooperation projects, a business incubator to promote the take-up of R&D results and a thick network of institutional relations with other HEIs and public authorities. Other examples of good practice have been mentioned during the workshop with Heads of Department held last September, including:

- The Italian Chapter of the 'BuildingSmart' association, created by POLIMI in 2005 and still active today, which is heavily contributing to the digitization of the construction industry or built environment, in accordance to a logic that can now be named "Industry 4.0";

- The inter-departmental laboratories and the trans-departmental PhD bursaries, which have both been shaped in order to produce cross-disciplinary research able to address some of the objectives of RIS3;

- An open and ongoing experimentation of Master courses able to support specialisations in emerging fields of expertise.

1.4. Gaps, barriers, challenges

The keynote lecture by Prof Andrea Bonaccorsi held on July 4th highlighted a number of interesting aspects that – albeit of general interest – may also find application to the case of the Lombardy Region and POLIMI.

First of all, RIS3 should not be considered as a 'mechanical prioritization device', as it lacks the theoretical depth needed to take into account the political dimension of priority setting in research and innovation policies. It is more valuable for intelligence, sense-making, and narrative accountability purposes.

As a result, Universities that are generally considered as key actors of the RIS3 governance system, when it comes to implementation should not be restricted to providing 'inflows to a

pipeline' - rather acting as agents of change, sources of new ideas, providers of intellectual resources, critical thinkers and the like.

Therefore, considerations about 'impacts' should prevail over those on 'outputs', especially as far as RIS3 implementation is concerned, but not limited to that, as the discourse on HEI contributions to a community's socio-economic advance is far broader than what falls within the conceptual borders of any smart specialisation strategy.

Unfortunately, such characterization of the role of Universities as agents of change makes it even more complex to define and evaluate, as it calls for the formulation of a HEI's "impact agenda", to be assessed in its progress and achievements, based on reliable and possibly comparable evidence, which is largely missing at the moment. As a result, any structured effort of HEIs to clarify their impact generation approach, as seen from the perspective of regional or national policy makers, is prone to the twin risk of excessive expectations (if seen *ex ante*) and over-simplified interpretations (if seen *ex post*).

As a scientific contribution to solving the first corner of the problem (which evidence should we base HEI impact assessment on?), a joint research effort based on econometric analysis has been recently undertaken by Prof Bonaccorsi himself, together with a team of three academic members of the POLIMI School of Management. Using HEI census data from the ETER (European Tertiary Education Register) and combining it with other sources of HEI related information (databases of publications, citations and businesses), some "spillover effects" induced by the presence, intensity and quality of teaching and research facilities in the proximity of local businesses have been analysed. However, this econometric approach is just at its beginning and more experimentation needs to be done to draw lessons that can be generalized.

In relation to the second corner of the problem (whether an impact agenda exists and how it is perceived from outside the HEI) we have already mentioned that overall, Politecnico di Milano, with its various Departments and original initiatives (see end of section 1.3 above) is extremely well positioned in the Lombardy innovation system and this makes it quite hard to identify new areas for improvement.

However and paradoxically, this latent sense of "appeasement" that our talks to the Heads of Department have revealed may jeopardize, in the medium to long run, the capacity of our University to play an adaptive role to the new challenges that the evolution of the policy scenario brings to the forefront, including the emergence of new areas for education and vocational training, the need to ensure a smooth translation of R&D results into successful market solutions, and a perceived risk of "bureaucratization" of the existing Technological Clusters.

1.5. Identified opportunities for further/future involvement of the HEI

The recent experience of most POLIMI departments shows a wide range of successful initiatives covering all the three missions of a HEI. In that regard, an opportunity to gain further visibility and strategic relevance in the RIS3 implementation comes from the fact that the individual results of these initiatives – new courses, new international collaborations, new forms of presence in the local environment – are typically very positive, but lack both an adequate dissemination and a connection to the "broad picture" of a strategic, long term alignment of POLIMI to the RIS3 implementation process.

We take this as matter of reflection, since it may result into a weakness, when competing in an international context that requires building a communication strategy in line with the rhetoric and keywords of current policy frameworks.

1.6. Future Implementation of the RIS3

During 2017 a notable evolution of the Regional approach to R&D and innovation has been the implementation of a new bill passed in November 2016 and that has promoted the emergence of strategic partnerships between public and private stakeholders on research topics and priorities of direct interest and relevance for the resolution of societal challenges.

The new law 29 of 2016 entitled "Lombardia è Ricerca", in particular, aims to enhance the relationship between HEIs and their socio-economic context through establishing a number of coordination instruments:

- The first instrument is a "Forum for Research and Innovation", endowed with consultative, propositional and informative functions. The Forum is made up of 10 highly qualified experts in the fields of natural, social and human sciences, who are selected via an international call for candidatures. The Forum plays two important roles: on the one hand, it acts as an antenna with respect to societal changes, seizing new challenges and anticipating emerging needs to enable the provision of timely responses; on the other hand, it helps transfer to the broad community the main outputs of current research, spreading its knowledge and making citizens aware of some new, general-interest topics that require broader sharing;

- The second instrument is a new Inter-Axes Directorship of the Regional Government that has received the mandate of drawing up a three-year strategic Programme for Research, Innovation and Technology Transfer. The Programme, once approved by the Regional Council, will give more certainty and increase the accountability to the whole innovation system of the actions to be undertaken, the resources needed and available, as well as the expected results on such strategic areas as digital infrastructures, tax incentives for private R&D and investments, and the financial allocations to support research and innovation.

- In addition, the law introduces an Open Data policy framework, aiming to identify and give access to the datasets owned or managed by all actors of regional public administration for a potential exploitation by researchers and innovators and/or to provide citizens with the best services and tools that can enhance the quality of their lives.

During the workshop held on May 10th, the representative of the Regional government who was hosting the event made an explicit invitation to all stakeholders to contribute with their ideas to the formation of the three-year Programme. Also to that purpose, an online Open Innovation platform has been set up and is run by the Region with the technical support of Finlombarda SpA.

In the latest (2017) revision of the RIS3, shared for comments with the R&D and innovation stakeholders, the Lombardy Government shows particular attention to the need of better identifying and characterizing the emerging industries that are considered strategic for the evolution of the region: another round of implementation of the Entrepreneurial Discovery principles. The focus will therefore be set on how to help regional research and innovation actors seize the opportunities offered from new markets and take significant positions in the global value chains. This will be realised with the support of a permanent observatory in collaboration with Unioncamere Lombardia and the S3Lab initiative. In turn, the Region is expected to confirm its engagement in periodically translating the emerging research and innovation priorities into specific work programmes and calls that will guide the actors operating in each thematic domain and promote the delivery of concrete outputs, capable of reducing the burden of the societal challenges identified in association with each theme.

1.7. Conclusions

The HEI-RIS3 interaction scenario depicted in this report, which is applicable not only to POLIMI but the whole academic community of Lombardy, starts from high level of reciprocal acknowledgement and convergence of aims and efforts, which however bring with them a number of risks.

The latter are mostly related to: 1) the fragmentation of second and third mission initiatives at the level of individual Departments, rather than involving the University as a monolithic entity, 2) the co-presence of HEIs and Regional Technological Clusters in the RIS3 system of governance, with the former usually being represented in the managing board of the latter, but also acting autonomously in the interaction with the enterprise system and the Regional government, which makes it difficult to define and monitor the status of reciprocal collaboration and coordination; 3) the problematic evaluation of a "HEI impact agenda", given the paucity of comparable data and the immature state of emerging quantitative assessment methods, 4) a general difficulty in disseminating and appropriately 'advertising'

the ongoing initiatives (and success stories) by regional HEIs or HEI Departments using the appropriate rhetoric and keywords of RIS3, which complicates their appreciation and stock taking, and 5) a latent sense of "appeasement" detectd in the top management of the most active University Departments, which may paradoxically jeopardise, in the medium to long run, the capacity of the HEI to adapt to the new challenges that the constant evolution of the policy scenario will bring to the forefront.

Facing these trends and to anticipate some of them, it would be appropriate to undertake an experimental initiative under the coordination of the Academic Senate, to explore new ways of enhancing the strategic orientation and level of alignment of POLIMI to the RIS3 of the Lombardy Region.

However, the success of this initiative is prevented by the high degree of fragmentation of both the internal structure of departments and the external policy environment (showing a considerably high number of RIS3 priority areas and subareas, not all of which are relevant for the thematic contents of the three missions of Politecnico di Milano).

We will take the opportunity of the upcoming discussion on POLIMI Action Plan in the context of Thinking Smart WP4 to refine the above considerations and explore possible alternative solutions to the issues outlined.

Annex A.

Lombardy RIS3 Priority Areas and Regional Technological Clusters

RIS3 Priority Areas (*)	Regional Technological Clusters (**)
Aerospace	Aerospace
Agri-food	Agri-food
Green industry	Green chemistry Energy
Creative and cultural industries	
Health industries	Life sciences Technologies for living environments
Advanced manufacturing	Smart factory
Sustainable mobility	Mobility
Smart Cities (cross cutting priority)	Technologies for Smart Communities

(*) Source: Lombardy Region, Smart Specialisation Strategy, 2013

(**) Source: Lombardy Region, Official Listing of Technological Clusters, 2016