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Margherita Russo*, Annalisa Caloffi^, Federica Rossi§,
Valentina Fiordelmondo*, Stefano Ghinoi*

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* University of Modena and Reggio Emilia
email: margherita.russo@unimore.it ; valentina.fiordelmondo@unimore.it;
stefano.ghinoi@unimore.it
^ Department of Economics and management
University of Padua, Italy
email: annalisa.caloffi@unipd.it
§ Department of Management
Birkbeck College, University of London, United Kingdom
email: f.rossi@bbk.ac.uk

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Margherita Russo*, Annalisa Caloffi^, Federica Rossi§,
Valentina Fiordelmondo*, Stefano Ghinoi*

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* Department of Economics Marco Biagi, University of Modena and Reggio Emilia, Italy, margherita.russo@unimore.it; valentina.fiordelmondo@unimore.it; stefano.ghinoi@unimore.it
^ Department of Economics and management, University of Padua, Italy, annalisa.caloffi@unipd.it
§ Department of Management, Birkbeck College, University of London, United Kingdom, f.rossi@bbk.ac.uk

Abstract

With the growing importance of innovation intermediaries, particularly in the policy context, a need has emerged for appropriate instruments to evaluate their performance. The identification of appropriate performance indicators, however, has proved to be problematic. First, indicators are likely to influence the behavior of innovation intermediaries, not always in a desirable manner. Second, commonly used indicators focus on the immediate results achieved by the intermediaries, often disregarding the permanent behavioral changes that they can stimulate in their innovation system. Instead, we argue that the latter are particularly important for the evaluation of innovation intermediaries, whose success should be measured in terms of their ability to enable other organizations to improve their innovation capabilities. By focusing on an innovation policy intervention implemented by the Italian region of Tuscany in the period 2007-2013, we discuss the advantages and limitations of the indicators that have been set up by the regional government in order to evaluate the performance of innovation poles, a particular type of innovation intermediary, and discuss some feasible avenues for their improvement.

Keywords: innovation policy; innovation intermediaries; innovation poles; evaluation; technology transfer policies

JEL codes: O25 Industrial Policy; O38 Technological Change: Government Policy; 30 Innovation; Research and Development; Technological Chang

Credits
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1. Introduction

Intermediary organizations that support firm-level and collaborative innovation, often called 'innovation intermediaries', have gained increasing prominence in knowledge-intensive economies (Howells, 2006; Lazaric et al, 2008). They provide a range of knowledge-intensive services that include, among others, technology foresight and technology scouting, research and development (R&D) partnership formation, technical assistance in R&D projects, dissemination and commercialization of results, and technology transfer.

Since innovation intermediaries can facilitate knowledge exchange among organizations with different languages, cultures, decision-making horizons, systems of incentives and objectives (Howells, 2006; Russo and Rossi, 2009; Caloffi et al, 2015), they can play a role in policies aimed at promoting innovation within local, regional and national systems (see e.g. Kauffeld-Monz and Fritsch, 2013). Examples of policy interventions that have funded organizations performing at least some innovation intermediary functions are the regional competitiveness poles in France, the Innovation Networks in Denmark, the Strategic Centres for Science, Technology and Innovation in Finland, the Catapult Centres in the UK (Russo et al. 2014). With the growing importance of innovation intermediaries, a need has emerged for appropriate instruments to evaluate their performance.

Often, policymakers define precise indicators for the ex-ante, ongoing and ex-post assessment of the activities carried out by innovation intermediaries. These indicators constitute an incentive system that alters the intermediaries' behavior: for example, they may induce the intermediaries to focus only on the requirements set by the policymakers, disregarding other objectives; or, given that indicators often focus on immediate outputs, intermediaries may be tempted to focus their efforts only on activities that produce immediate results and neglect activities that would yield results only over a longer time horizon.

By focusing on an innovation policy intervention implemented by the Italian region of Tuscany in 2007-2013, we discuss the indicators set up by the regional government in order to evaluate the performance of innovation poles (a particular type of innovation intermediary), and discuss some feasible avenues for improvement. Our focus is not simply on the immediate outputs of the intermediaries' activities, which would not have been achieved in their absence, but more importantly on the permanent behavioural changes (Georghiou, 1998; Hyvarinen and Rautiainen, 2007; Gok and Edler, 2012) that they have stimulated in the organizations they worked with: how they have helped organizations to change their way of innovating, rather than just how many services they have provided and how many firms they have supported.

The paper is organized as follows. Section 2 briefly introduces the main characteristics of the innovation poles implemented in Tuscany, and the performance indicators used by the policymaker. Section 3 discusses the limitations and implications of such indicators as perceived by the policies' beneficiaries, whose views we have collected through a combination of semi-structured interviews, an online survey and a focus group. Section 4 describes the instruments and indicators that most poles used for their self-evaluation. The concluding section 5, combining the evidence base with theoretical insights, proposes a more comprehensive approach to evaluation in order to better capture the actual impact of innovation intermediaries on their regional innovation system.

2. The policy programme and the assessment of the performance of innovation poles

During 2011-2014, Tuscany's regional government funded twelve 'innovation poles', innovation intermediaries whose aim was to provide a range of knowledge-intensive services - including technology scouting, support in the preparation of project proposals, matchmaking - in order to encourage technology transfer and stimulate the innovation capabilities of regional small and medium-sized enterprises (SMEs). The final goal of this policy was to strengthen the regional innovation system, which includes a large number of SMEs that have relatively few connections with universities and other regional research hubs.

This intervention unfolded in two phases. In a first phase, Tuscany's regional government identified a set of twelve key technologies/applications, and it promoted the creation of an innovation pole for each of these. Having set the objectives and operational rules for the the innovation poles, in 2010 the regional government launched a call for tender inviting organizations to submit proposals (individually or jointly) for the creation of twelve poles for a three-year period.

The 12 proposals selected for funding were each managed by a consortium, that included service providers, universities and firms. Overall, 49 different organizations were involved in the consortia managing the 12 innovation poles (some were involved in more than one pole), which, due to mergers and closures, dropped to 46 at the end of the three year period of the regional funding. Table 1 lists, for each innovation pole, its field (key technologies/applications), the number of managing organizations in the consortium and – since firms that intended to use an innovation pole's services would have to gain membership of that pole – the number of members at the start (30.6.2011) and end (30.6.2014) of the three year period. The poles received regional funds to carry out the following activities:

- marketing, to recruit new members to the pole, including scouting activities to encourage companies to demand knowledge-intensive services and to invest in innovation;
- participation in R&D projects at regional, national and European levels;
- management of the pole's open access infrastructures such as its laboratories;
- organization of knowledge transfer programmes, workshops and seminars to facilitate knowledge sharing and networking between members.

Table 1 Consortium leaders, consortium participants, pole members

Technpole (acronym)	Key technologies/applications	N. of consortium participants	N. members as of 30.06.2011	N. members as of 30.06.2014
OPTOSCANA	Optoelectronics for manufacturing and aerospace	2	67	92
INNOPAPER	Paper	1	89	139
OTIR 2020	Fashion (textiles, apparel, leather, shoes, jewellery)	7	223	501
VITA	Life science	8	41	158
PIETRE	Marble	4	52	122
PENTA	Shipbuilding and maritime technology	5	225	352
POLIS	Technologies for sustainable cities	8	228	643
NANOXM	Nanotechnologies	6	70	128
CENTO	Furniture and interior design	6	177	322
PIERRE	Renewable energies and energy saving technology	13	120	368
POLO12	Mechanics, particularly for automotive and transport	6	198	390
POLITER	ICT and robotics	13	195	697

Source: our elaborations using data provided by Tuscany's Regional government

Regional funding to the innovation poles was conditional upon their achievement of a set of minimum performance targets. The tender stated that innovation poles would be assigned to one of three possible 'bands' depending on how many members they had at the time of their launch. Different performance targets were set for the different bands. Targets were defined as minimum thresholds with respect to: number of scoutedcompanies, percentage increase in the number of member companies, number of services contracted and actually provided to firms, revenue. Table 2 shows, for each band, the minimum number of members required at the start of the period, and the performance targets to be achieved over the three years. The rightmost column indicates the maximum funding that poles could claim from the regional government, which would only be released upon achievement of all their performance targets. The funding was given in two installments, one (up to 70%, provided that a bank guarantee had been presented) over the course of the three years, and the remaining amount at the end of the period (once the achievement of the performance targets had been ascertained).

Table 2 The innovation poles' classification into bands: criteria, performance targets and maximum funding that could be claimed

	Criterion for allocation into bands:	Targets to be achieved within three years					Maximum funding that could be claimed fom the Regional government
		scouting of new companies	% increase in members	n. knowledge-intensive services			
	N. member companies (at launch)			contracted	provided	minimum revenue	
Band 1	> 160	160	50	80	40	500,000 €	800,000 €
Band 2	> 80	80	50	40	20	300,000 €	600,000 €
Band 3	> 40	40	50	20	10	150,000 €	400,000 €

Source: our elaborations using data provided by Tuscany's Regional government

Table 3 shows the band each pole belonged to, and the funding they were granted. Six poles were in band 1, with more than 160 members at the time of their launch, while two were in band 2 and four were in band 3. Within the maximum limit provided for each band, the funding that could be granted to each pole was based on the budget they presented to the Region upon approval of their application.

Table 3 Budgeted expenditure, maximum funding that could be claimed and funding actually granted, by innovation pole

Innovation pole	Band	Budgeted expenditure	Maxium funding that could be claimed from the Regional government	Granted funding
OPTOSCANA	**3**	505,056 €	400,000 €	280,000 €
INNOPAPER	**2**	757,543 €	600,000 €	420,000 €
OTIR 2020	**1**	1,007,000 €	800,000 €	560,000 €
VITA	**3**	595,000 €	400,000 €	280,000 €
PIETRE	**3**	-	-	-
PENTA	**1**	1,034,993 €	787,111 €	550,978 €
POLIS	**1**	1,007,000 €	800,000 €	560,000 €
NANOXM	**3**	503,500 €	400,000 €	280,000 €
CENTO	**1**	1,005,343 €	798,859 €	559,201 €
PIERRE	**2**	757,450 €	598,950 €	419,265 €
POLO12	**1**	1,007,000 €	764,391 €	535,074 €
POLITER	**1**	982,615 €	767,910 €	537,537 €

Note to table: Data are not available for the 'Pietre' innovation pole.
Source: our elaborations using data provided by Tuscany's Regional government

For each of the performance indicators listed in Table 2, Table 4 summarizes the targets and the results achieved by each innovation pole, ordered by band. It is evident that all poles had reached their performance targets by the end of the three years. Data (not reported here) show that some of them had already reached their targets three months after their launch.

Table 4 Performance targets and their achievement

Innovation pole	N. members	Scouting of new companies	Increase in member firms (above the minimum threshold for each band)	Services contracted	Services provided	Revenue
	n.	*n.*	*%*	*n.*	*n.*	€
Band 1			**Minimum targets**			
	160	**160**	**100%**	**80**	**40**	**500,000**
			Results achieved by 30.06.2014			
OTIR 2020	501	278	201	108	93	2,085,734
PENTA	352	236	122	133	100	752,514
POLIS	643	274	306	111	88	690,087
CENTO	322	190	106	132	115	979,696
POLO12	390	249	146	251	267	1,838,604
POLITER	697	286	336	194	191	2,408,017
Band 2			**Minimum targets**			
	80	**80**	**100%**	**40**	**20**	**300,000**
			Results achieved by 30.06.2014			
INNOPAPER	139	94	74	446	455	731,209
PIERRE	368	120	360	85	64	640,655
Band 3			**Minimum targets**			
	40	**40**	**100%**	**20**	**10**	**150,000**
			Results achieved by 30.06.2014			
OPTOSCANA	92	56	130	27	42	684,431
VITA	158	73	295	34	31	246,382
PIETRE*	122	81	202	18	18	1.487,107
NANOXM	128	44	155	43	25	531,845

**Forecasted as of* 30.06.2014
Source: our elaborations using data provided by the innovation poles

Even a quick glance at the poles' performance poles suggests that the indicators and targets set by the regional government might have created some incentives that were not entirely desirable. First, the fact that most poles had reached their targets very rapidly suggests that such targets were probably too low. Innovation poles may have quickly implemented actions aimed at achieving them, possibly regardless of whether such actions were appropriate at such an early stage. Second, since the poles' performance was evaluated only on the basis of the achievement of these targets, most of them stopped reporting (or even stopped systematically collecting) any information on the activities they had carried out after their targets had been achieved. Therefore, our knowledge about the poles' activities could be incomplete.

The lack of satisfaction with current indicators was shared by regional officers (particularly during the debate on the design of the new policy on technological districts) and by the innovation poles themselves. When asked whether the poles' performance could have been more effectively measured by different indicators, nine out of twelve of the managing consortia's leaders agreed. The indicators adopted by the regional government, in fact, collected quantitative information that was not sufficient to capture the actual activities performed by the poles and the role of their managing consortia in supporting the region's innovation system.

3. Limitations and implications of current indicators

Our analysis builds upon several data sources, which the authors assembled as part of a research team engaged in the analysis of the policy programme. First, the team collected secondary information either in the public domain (the poles' websites) or provided by Tuscany's regional government (the six-monthly activity reports submitted by each pole to the regional government). Second, 27 semi-structured interviews were carried out between March and May 2014, with representatives of the organizations managing the innovation poles, of some member companies and of local business associations, and with an employee of the regional government office managing this programme. These interviews, however, were not aimed primarily at exploring the limits and implications of the poles' performance evaluation process. Therefore, we supplemented them with two additional information sources, an online survey and a focus group[1]. The online survey aimed to capture the views of the poles' managing organizations on the monitoring and evaluation activities they had to comply with over the course of the three years. In particular, the managing organizations were asked to evaluate the effectiveness and efficiency of the indicators used by the regional government to assess the poles' performance, to explain whether each innovation pole had engaged in processes of self-assessment, and if so on the basis of what indicators and processes. Only 14 (30%) out of of the 46 managing organization responded to the survey, 12 of these being the consortium leaders for the 12 poles[2].

The focus group involved representatives from nine innovation poles, besides the research group.

The results of the survey and the focus group discussion highlighted four main critiques to indicators used for policy evaluation:

- some indicators were deemed unsuitable to evaluate the poles' performance in several key activities;
- some important activities were not measured and therefore not used for performance evaluation;
- the poles' sectoral and technological specificities were not accounted for;
- the performance evaluation system did not encourage the poles to collect data accurately and systematically, and it imposed too many administrative requirements on the poles and the users of the services they provided.

3.1. Inadequate indicators

As shown in Table 2, the performance targets, and the relative indicators to measure them, focused on two main activities: the scouting of new companies, aimed at recruiting new members, and the provision of knowledge-intensive services to poles' members. Through the online survey, the leaders of the managing consortia identified a number of limitations of the indicators used.

Concerning the provision of knowledge-intensive services, several poles claimed that the regional government had adopted a too narrow definition of what services could be included in the computation of the number of services contracted and actually provided, and of their revenue. In particular, any services that were purchased by the pole's members where the innovation pole operated as an interme-

[1] The first email inviting the managing organizations to take part in the survey was sent on March 27th, 2015, followed by two recalls sent to non-respondents only. The focus group was held in May 2015 in Florence.
[2] We focused our analysis on the 12 completed questionnaires received from the 12 consortium leaders.

diary rather than a direct service provider, were excluded. Several poles suggested that this intermediating activity should have been measured, since it was in line with the poles' general objective to increase the demand for knowledge-intensive services on the part of regional firms. In particular, some services had been provided by organizations that were members of the poles, but which were not part of their managing consortia: in this case, the poles effectively enabled connections between their members, promoting both demand and supply of knowledge-intensive services. Moreover, the services provided were not differentiated according to their quality and impact; for example, research provided as part of a large scale research project would have much greater 'knowledge content' than an ordinary prototyping service. Differentiating between services with different knowledge intensity would have allowed the policymaker to apply different weights to different services, and to better capture their different impacts.

Numerous remarks also concerned the approach used to evaluate the performance of scouting activities. The indicators only focused on the number of companies that were contacted and those that subsequently became members. However, evidence from the focus group suggests that 'scouting' included a complex set of activities[3], which required more sophisticated indicators. The consortium leaders suggested that these indicators not only should have been differentiated according to the different nature of the companies targeted in different sectors (a point to which we return later in this section), but they should have taken into account the scouting activities' medium-term impacts, focusing on the presence of follow-up activities after each initial contact (indicating that the contact had been productive). Examples of follow-up activities that could have been measured are: number of contracts that the scouted companies subsequently signed with the pole (or thanks to its intermediation); number of project proposals that the scouted companies subsequently presented together with the pole; whether the scouted companies had subsequently participated in workshops of other events organized by the pole; how many follow up meetings were scheduled with these companies.

3.2. Missing activities

To understand whether the poles had been effective in supporting innovation and technology transfer, further activities should have been taken into account. Our survey showed that eleven out of twelve poles performed activities beyond those measured by the indicators, in particular they engaged in (i) preparation of project proposals, (ii) networking and (iii) other initiatives.

Most poles provided support to companies in the preparation of project proposals to be submitted to public tenders (European, national, regional, etc.); however, they usually kept a record of this activity only if the proposal had subsequently been funded. Indicators that the consortium leaders suggested in order to measure

[3] The discussion highlighted that most innovation poles had structured their scouting activities in two main phases. In the first phase, the poles' objective was to attract members, in order to reach their performance targets. This phase often relied on approaching the managing organizations' pre-existing networks, mapping their potential members and recruiting them to the innovation pole. Once the target had been achieved, the poles launched a second phase in which the scouting activities were aimed at better understanding the needs of their members, to be met mainly through the provision of knowledge-intensive services. In this second phase, they moved on to arranging one-to-one meetings and circulating detailed questionnaires aimed at getting to know their member companies better, organizing large events aimed at informing other companies of the poles' activities, and setting up smaller scale events with selected companies aimed at supporting their innovation activities (thematic workshops, meetings with suppliers).

this activity include the number of project proposals submitted and the share of submitted applications that were successful.

The poles were very active in the organization of events aimed at promoting networking between their members, potential suppliers and research laboratories. Among these, the respondents mentioned matchmaking events, seminars, workshops, study visits, training events, attendance to fairs and exhibitions. The proposed indicators included the number of events organized, by type, and the number of companies that attended each type of event (possibly also as share of all member companies, and as share of companies present in that sector), as well as indicators capturing the follow-up activities to each event (further contacts, projects, etc.)

Consortium leaders also mentioned varied activities that were, to some extent, linked to the poles' intermediation activities: attraction of investment in the local area, replication of the technology transfer model in other regions, networking between public agencies and SMEs, participation in international collaborations and membership in national and European clusters as well as agreements with public agencies and trade and professional bodies. As we already noted in section 3.1, activities in which the poles played the role of intermediaries (rather than the role of direct service providers) were not considered in performance evaluation, but the poles viewed them as important components of their overall engagement.

3.3. Lack of sectoral/technological differentiation

A cross-cutting theme that emerged from the survey and the focus group, as well as from the initial interviews, is the need to account for the fact that each pole deals with very different sectors, where organizations differ in terms of size, research intensity, technologies, modes of innovation, nature, localization of the demand and of the value chain, relationships with clients, suppliers and competitors. Two consortium leaders explicitly stated the need to distinguish between poles that operate in traditional sectors and poles that operate in high tech sectors based on key enabling technologies. The issue of the specificities of individual poles has emerged several times both in the context of the general discussion of the most appropriate indicators for the poles' evaluation, and in the context of more specific themes like the evaluation of scouting activities. Here, it has been suggested that performance indicators shoud take into account the different characteristics of the scouted companies (such as size or specialization), the different characteristics of the sector to which they belong (such as the number of companies present in it), and the different characteristics of member organizations (such as turnover, employees, production units, etc.). No suggestion was advanced on what might be good metrics to assess those differences.

3.4. Inadequate data collection tools

To support the evaluation process, it would have been important to encourage the poles to systematically collect information on the activities they performed. For example, it would have been useful if each pole had collected in a relational database the details of the companies they contacted, or that they intended to contact, and of the outcomes of the scouting activities with these companies. Not only this would have supported monitoring and evaluation, but it would also have created a precious knowledge base for the regional government and the overall poles system. While some poles, in order to support their scouting activities, had systematically mapped the companies in their target sector, this exercise was limited to a

few poles, the information collected was very diverse, and so were the tools used (in some cases, data were collected only in paper form). The focus group participants suggested that greater coordination and sharing in the process of information collection within and between poles would have been useful. This could have been supported by a preliminary effort on the part of the policymaker to provide clear guidelines for the collection of information, clear information about which data would be used in the construction of indicators, and possibly some information collection tools such as pre-structured databases ready to be filled in. But, *ex ante*, the policymaker was not fully prepared to cope with the cascades of novelties emerging from the activities of the new innovation intermediaries they were funding.

At the same time, the focus group participants suggested that data collection instruments should be easy to use and avoid imposing a too heavy administrative burden on the poles and, more importantly, on the companies they dealt with. Some of the administrative requirements imposed by the regional government were, indeed, quite cumbersome[4].

4. The innovation poles' self-evaluation processes

Evidence from the online survey suggests that nine out of twelve innovation poles engaged in self-evaluation exercises based on richer sources of information than the set of indicators used by the policymaker, in order to better understand their own performance and to support their planning and strategy development. Of these nine, one pole used only qualitative information, one used only quantitative indicators, and the other seven used a combination of qualitative and quantitative information.

Concerning quantitative indicators, the survey respondents confirmed that they counted some important activities which were not included in the performance indicators used by the regional government: they counted events like seminars, focus groups, workshops aimed at sharing information with companies, and matchmaking events between companies and research centres; they also counted any further collaborations that were initiated as a consequence of the networking activity enabled by the pole. One innovation pole suggested that the number of interactions with organizations outside the region could indicate the pole's ability to expand the geographical scope of its activities. Some poles monitored the preparation of project proposals, including those that were unsuccessful, collecting information about the number of project applications that were submitted, the number of companies and research organizations involved in these project applications, as well as the amount of public funds that the organizations involved in these project applications (particularly companies) were able to accrue. Another variable that several survey respondents indicated as being very important is the participation in national and international clusters and in other international and national collaborations. While several poles used the number of such collaboration agreements as an indicator of their own performance, many warned that this information should be complemented by information about their actual effectiveness and about the follow-up activities realized.

[4] For example, in order to prove that they had reached the target number of scouted companies, the poles had to ask each company they interacted with to read and sign a report summarizing the scouting activity they were involved in.

Many poles also evaluated their own performance on the basis of qualitative information about: their members' degree of satistfaction, the members' ease of access to laboratories, the quality of the relationships that were created between companies and research organizations, the increase in visibility and in recognition of the poles' activities, the poles' impact on other sectors of the regional economy, the activities performed by the temporary managers and the outcomes of the matchmaking events.

Most poles suggested that these variables, both qualitative and quantitative, should have been taken into account in the performance evaluation process, in order to produce a more comprehensive overview of the poles' activities. Collecting qualitative information would also have allowed the poles and the policymaker to gain insight into the sectors' technological trends, would have facilitated technology foresight and the understanding of the poles' competitive positioning within and outside the region.

5. Conclusion: Towards a better approach to assessing the performance of innovation intermediaries

In order to comprehensively evaluate the poles' performance in light of their objectives to encourage technology transfer and stimulate the innovation capabilities of SMEs, ultimately strengthening the competitiveness of the region's innovation system, it would be important to adopt a broader perspective, beyond the immediate outputs of the poles' activities which were captured by the indicators adopted by the regional government. It is worth noting that, in Italy, other regions adopting innovation policies similar to Tuscany were using a similar set of indicators to assess performance of the innovation intermediaries. With regard to our empirical analysis on Tuscany, we observed that the poles' own criticism of the policymaker's approach to evaluation focused on the lack of attention for certain types of activities and for certain types of "follow-up" activities that generated medium-term outputs. But neither the policymaker nor the poles perceived the importance to capture the permanent behavioural changes (Georghiou, 1998; Hyvarinen and Rautiainen, 2007; Gok and Edler, 2012) that the poles stimulated in the organizations they engaged with: how they changed their way of innovating, rather than just how many more knowledge-intensive services they demanded. In order to capture these effects, the focus should have been on the *learning processes* that had been activated thanks to the programme, which might have led to changes in policies, structures and strategies, both for the poles themselves and for the organizations they engaged with.

On the one hand, it would have been useful to explore the skills and competences possessed by the poles themselves, and their evolution over time, to analyse how these changed, and whether any changes occurred in response to contingent events, or whether they resulted from a process of learning from experience. For this purpose, qualitative information could have been collected by asking the poles' managing organizations questions such as: What skills and competences did the poles (and their managing organizations) possess at the start of the programme? Did they change over time? If so, how? What processes stimulated these changes? Did the poles change their operations, their governance, their business strategies?

In our survey, the consortium leaders agreed that they had derived benefits from their involvement with one or more poles, not just in financial terms but also in terms of relationships, skills and visibility. Thanks to their involvement with the poles, they increased their number of relationships with companies, not only in their own sector of expertise but also in others. Their knowledge of these companies improved, allowing them to gain more detailed insight into the needs and weaknesses of these companies and of the sector overall. They also improved their technology transfer skills, allowing them to provide a broader range of services and giving them the ability to network with international partners. Finally, their visibility increased, allowing them to attract better quality human resources and enjoy higher reputation with companies and other potential partners.

On the other hand, it would have been important to also analyze the changes induced in the companies that engaged with the poles. An analysis of the evolution of their demand for knowledge-intensive services could have generated valuable information about the effectiveness of the policies and the ability of the poles to achieve the desired goals. An ongoing survey commissioned by Tuscany's regional government to the regional research agency IRPET is expoloring this domain by collecting information on a sample of companies members of the innovation poles, The focus is on questions such as: why did the company demand services from the pole rather than from competing providers (if they existed)? Did the nature of the services demanded change over time? Did the value of the services demanded change over time? Did the frequency with which services were demanded change over time?

Other useful information could have been collected about the changes in the members' networks of relationships as a consequence of their involvement with the poles; as well as about changes in their innovation activities, in terms of the nature and value of the research project proposals they submitted and for which they received funding, of the other types of collaborative projects they engaged in, of the nature and types of investments in innovation they made.

The following table summarizes the possible indicators for the general evaluation of innovation intermediaries' performance which have emerged from our discussions with the poles' managing organizations. We have categorized these indicators according to whether they capture the immediate outputs of the innovation intermediaries' activities (column A), the medium-term follow-on impacts of these actions (column B), or the long-term behavioural changes induced by the innovation intermediaries' activities (column C). The indicators are also categorized according to the type of activity they refer to, considering four types which reflect those introduced in section 2: (i) scouting of new companies, (ii) provision of knowledge-intensive services, (iii) preparation of project proposals, (iv) networking and (v) other initiatives.

Table 1. Proposed indicators to capture the poles' performance

Type of activity	A. Immediate outputs	B. Follow on impacts	C. Long term behavioural changes
Scouting of new companies	Number of companies scouted Share of large companies and of SMEs	Share of companies - that attended at least one event organized by the innovation intermediary (round tables, workshops, seminars etc.) - with which at least one follow-up meeting has taken place - with which at least one follow-up activity has been carried out Number and value of follow-up activities carried out with the companies involved in scouting, by type (types of follow-up activities can include: successful project applications, unsuccessful project applications, inter-organizational consortia, other projects)	Qualitative analysis - of the objectives of the innovation intermediary's scouting activities and whether they changed over time - of whether and how the scouting activities implemented by the innovation intermediary changed over time (types of activities, skills required, procedures and approaches used) - of what the innovation intermediary's managing organizations learned from their experience of the scouting - of what did scouted companies learn from their experience of the scouting
Provision of knowledge-intensive services	Number and value of knowledge-intensive services provided to member companies: - by any of the innovation intermediary's managing organizations - by other actors (intermediated by the innovation intermediary)	Number and value of knowledge-intensive services provided to: - companies by any of the innovation intermediary's managing organizations (by type of service and over time) - member companies by other actors (intermediated by the innovation intermediary), by type of service and over time	Qualitative analysis (questionnaire to member companies) to investigate why the companies have used that innovation intermediary Qualitative analysis - of what the innovation intermediary's managing organizations learned from their experience of providing knowledge-intensive services - of what did (a sample of) scouted companies learn from their experience of receiving knowledge-intensive services Analysis of the evolution in the services demanded, in terms of nature, value and frequency
Project proposals	Number and value of - project proposals (submitted and funded) presented to national tenders international tenders	Number and value of - project proposals (submitted and funded) presented by member companies with the support of the innovation intermediary	*Learning outcomes* Qualitative analysis of what - the innovation intermediary's managing organizations learned from their experience of supporting the preparation of project proposals - member companies learned from their experience of preparing project proposals with the support of the innovation intermediary

Tab. 6 follows

Type of activity	A. Immediate outputs	B. Follow on impacts	C. Long term behavioural changes
Networking	Member companies: -percentage increase - as a share of all companies in the targeted sector Number of events held, by type (matchmaking events, seminars, workshops, study tours, training events, etc.) Number of companies participating in events held, by type (matchmaking events, seminars, workshops, study tours, training events, etc.)	Share of member companies that - have demanded knowledge-intensive services (whether offered by the innovation intermediary's managing consortium or by others, but with the intermediation of the innovation pole) - have participated in events organized by the innovation intermediary - have activated collaborations with other member companies Number and value of follow-up activities jointly carried out by member companies (types of follow-up activities can include: successful project applications, unsuccessful project applications, inter-organizational consortia, other projects)	*Learning outcomes* Qualitative analysis of what - the innovation intermediary's managing organizations learned from their experience of organizing networking events - member companies learned from their experience of participating in events Changes in the networking activities of the member companies
Other initiatives	Description of the other initiatives carried out by the innovation intermediary (where possible, indicating number and value)	Description of the follow-up actions emerging from the other initiatives carried out by the innovation intermediary	*Learning processes* resulting from the other initiatives carried out by the innovation intermediary

Which of these indicators to use, and in what circumstances? In order to identify the appropriate approach to assess the performance of innovation intermediaries, it is important to distinguish between two conceptually different objectives that performance indicators could fulfill: (i) the evaluation of the public investment, and (ii) the evaluation of the performance of the innovation intermediary and of its sustainability.

Indicators used to support the allocation of public funds should privilege clarity, ease of construction and use: they should be few in number, simple, linked to the intermediaries' key activities, and they could be expressed in terms of minimum thresholds to be achieved. When evaluation processes are based exclusively upon indicators, particularly quantitative ones, there is always a risk that such indicators might be pursued for their own sake, rather than as instruments to achieve broader ojectives, and that targeting one's behaviour to these indicators might prevent or hamper the achievement of these broader objectives.[5] Therefore, indicators should have a direct link to one or more explicitly defined policy objectives, and their construction should always be accompanied by a reflection on what behavioural

[5] As we have stated earlier, simply using the number of members as a measure of performance might have lead poles to undertake actions aimed at recruiting the largest possible amount of members without sufficiently investing in the quality of these relationships. Or, measuring the performance of the pole on the basis of the overall revenue accrued through services provision might have encouraged the poles to adopt strategies aimed at maximising this variable (for example, providing many services of small value, or providing a few very expensive services to a few clients) but these strategies may not necessarily serve the broader objective to support innovation and competitiveness of the firms operating in the targeted sector.

incentives they might generate, in order to avoid the creation of incentives that are misaligned with the broader objectives that the policy intervention intends to serve. Based on the our empirical evidence, we argue that, in order to evaluate how public funds were used, the regional government could have adopted a broader range of indicators, including those on "immediate outputs" and "follow on impacts" reported in columns A and B of Table 6.

Indicators aimed at returning a comprehensive evaluation of the performance of the innovation intermediaries (to evaluate the extent to which they encourage technology transfer and stimulate the innovation capabilities of SMEs, ultimately strengthening the competitiveness of the region's innovation system) should be comprehensive, detailed and expressed in terms of actual indicator values and processes enhanced, in order to provide a full picture of their success and sustainability. These indicators should also include the mainly qualitative information proposed in column C of table 6 on "long term behavioural changes". Furthermore, self-evaluation should be encouraged, as it not only allows any organization to identify its strengths and weaknesses, and then to implement actions to address them, but also because the very act of engaging in self-assessment implies reflection on their objectives and instruments in the short and long term, which may not happen at all in the absence of this action. In the context of policies supporting innovation intermediaries, the self-evaluation process could be formalized as part of the evaluation of the project proposals that are candidate for funding: that is, applicants who propose to set up publicly funded innovation intermediaries should explain how they are going to carry out the self-evaluation of their activities and introduce the qualitative and quantitative indicators that will be used in this process, the tools that will support the evaluation, how these indicators would be compiled and updated, and the frequency with which the self-evaluation would be carried out. The suitability of self- evaluation to capture the relevant aspects of the structure's performance, would become part of the overall ex ante evaluation of the proposal in order to decide eligibility.

In the next steps of our research we will use some of the indicators discussed above to analyze the behavioral changes generated by the innovation poles.

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