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Report: Innovation systems and Policies in the Adriatic Region – a benchmarking analysis

Output of WP5 – activities 5.4 and 5.5

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1. Introduction: the heterogeneity of Adriatic countries and the need for innovation policy

Despite being very close geographically, the eight countries of the Adriatic region show very different characteristics between them. These can be detected at different levels: mostly economically, socially, culturally and politically. These differences have been accumulated over the centuries, although in some periods of history almost all the countries were under the same government. Especially during the 20th century, divergences across the eight countries have increased. As the 20th century is the most relevant period of history for technological innovation, it is not strange to also find this heterogeneity in the research and innovation activities in the area.

In order to tackle, and reduce, existing technological gaps, at the beginning of the 21st century the need for coordinated policies in this area has become evident. Indeed, policies are a means to favour, or at least to try to obtain, the catching-up of the latecomers in the area (the whole EU or the Adriatic Region, as in our case). If we think about innovation in the EU, we can recall a long list of instruments aimed at making EU countries closer in terms of their behaviour and achievements. However, these instruments have not always proved to be efficient. This is mainly due to the fact that innovation is a complex concept. As recently stated in a report by the European Commission (Madelin, 2016), “complexity, chaos and non-linearity have been seen since the 1970s the defining features of our age. But still our advanced societies find it hard to make robust policy for a complex innovation system”. We could add that, comparing today’s world to that of the 1970s, the geo-political landscape has



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completely changed. If we look at the Adriatic Region, we no longer find Yugoslavia as a key and unique player; moreover, the role of technological innovation in the area has changed its characteristics since then.

In other words, if in the 1970s a few key actors mostly drove research and innovation, with the State being a major player, today, a wider concept of innovation has been adopted. Innovation is seen as a widespread phenomenon, taking place in large and small organisations, and even during the start-up phase, which often takes place outside the boundaries of large firms. As a natural consequence, areas where economic development has been slow, or even stopped, in this changing phase are now suffering more than the rest of the world. This is the case for the Adriatic Region. As stated by Radosevic (2014), with regards to the Western Balkans (therefore a sub-set of the whole Adriatic Region), these countries are characterised by very low levels of R&D investments and by a low demand for technology. The former being a typical problem since ever (R&D remains the top input for innovation), while the latter is a crucial issue in times of open innovation. To understand these limitations, Radosevic says, “the biggest obstacles are irrelevant policy models and hence there is need for much better knowledge innovation and growth area of the Western Balkans policymakers and businessmen”. In his view, top policies should support:

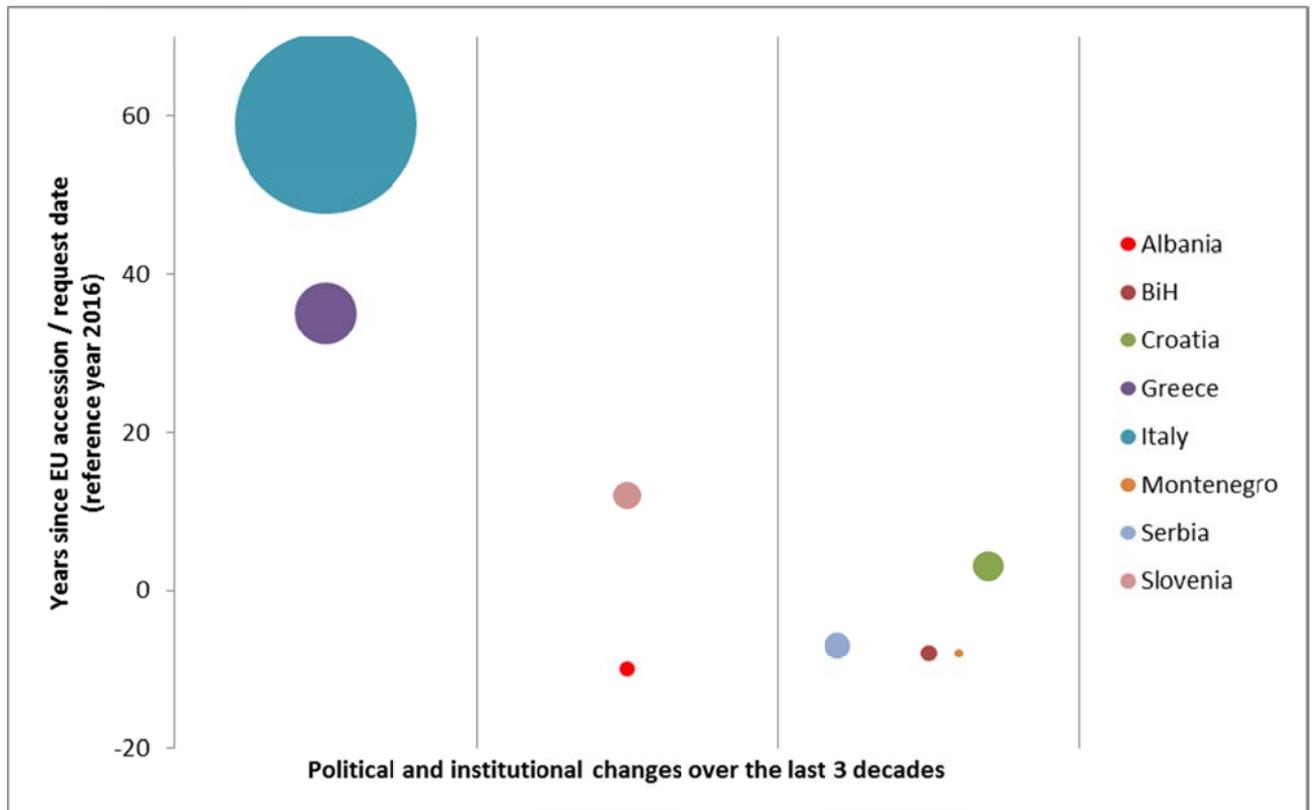
- Upgrading from production to technology capability;
- Integrate FDI and innovation policy;
- Continue but limit the scope of R&D commercialisation.

However, these types of policy suggestions mostly concern the latecomer countries of the Adriatic Region, not the region as a whole. In general, when devising policy strategy, structural differences between regions and countries must be considered in depth to identify policies and institutions appropriate for the different stages of economic growth that are sensitive to the local conditions (Aghion & Festrè, 2016; Gerschenkron, 1962; North, 1991).

In fact, we should not forget that the Adriatic Region includes four EU Member States and a country, Italy, with a long tradition of top R&D performers and advanced training in research and innovation. The heterogeneity highlighted before is reflected precisely in these figures:

the area is home to several top global R&D performers (European Commission, 2015b), although they almost all belong to Italy; the area includes a substantial number of higher education institutions, but only a few cases are top research universities and, again, they almost all belong to the top country in the area. Moreover, while innovative SMEs appear throughout the entire area, their absolute numbers are not comparable on both sides of the Adriatic Sea. In the PACINNO project, we have tried to measure these meso-economic indicators in a comparative way¹. However, to synthesize this heterogeneity from a macro-economic point of view, we provide a graphic visualisation in figure 1.

Figure 1 – Main dimensions of heterogeneity in the Adriatic region



In figure 1, three main dimensions of heterogeneity are considered: the size of the bubbles represents the total GDP (in year 2013) of the eight Adriatic countries; the x axis reports the number of political and institutional changes occurred over the last 30 years (ranging from 0

¹ The main output on this comparability can be found at: <http://www.adriaticinnovationmap.eu>



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to 2, where 1 and 2 characterises countries that have faced the shift from planned to market economy and/or years of war); the y axis reports the years from entrance in the European Union (previously EEC) or the years from the start of the procedure of accession, for non-Member States. Figure 1 shows how different the eight countries are. These differences go well beyond the stage of economic growth and are related to the complex history of Adriatic countries. Even if this synthetic graph could be slightly simplifying such a complex situation, we can single out a few dimensions that can have an immediate impact on innovation policy strategies, chosen by single countries. The first dimension is the drastic change of rules (institutions) governing economic and social life of countries switching from a communist to a market regime. Among many other important changes, this meant also the dismantling of existing public research system and of (big) public companies in strategic economic sectors, in few cases R&D performers. The second dimension is the process of nation and State building that took a long time span to reach a political system able to set policy priorities and to set-up an appropriate public administration. That is, a State able to manage key difficulties arising when implementing policies (e.g. the continuity of innovation policies, as mentioned also in the following pages). A third dimension is the position of single countries with respect to EU accession. This dimension has immediate implications on the possibility and ability to access to European funds, but also identifies different stages of EU innovation policy strategies. These help explaining the quality of innovation policies in each country, that are systematically influenced by the strategic orientation prevailing in different periods of time. As we can see in figure 1, several Adriatic countries faced major political and institutional changes in the recent past. Only Italy and Greece have had a different historical background, over the last years. Furthermore, Italy is also characterized by a completely different economic situation, as also represented by the size of GDP. However, also these countries have been severely affected by the recent economic crisis. Also Italy is currently making some institutional changes to foster innovation, in particular to make easier the birth and growth of spin-offs and start-ups (see the Italian section in annex on this topic). As regards Greece, instead, it must be taken into account the fact that policies are strongly pushed towards structural reforms, as a result of the conditionality of loans from EU.



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Therefore, policies in the Adriatic Region have to deal with heterogeneity and need to provide a comprehensive and comparable answer to it. Over recent years, some attempts for convergence in research and innovation activities in the area have been implemented. This has been driven mostly by the requirements for EU admission, or for having access to EU funding instruments such as the IPA Adriatic or the Horizon 2020 programmes, and by the fact that Slovenia and Croatia have entered the EU. More recently, the implementation of the EU Strategy for the Adriatic and Ionian Region (EUSAIR) can be considered the outcome of previous work in the area. Such macro-regional strategy (together with those regarding the Danube, the Baltic sea and the Alpine regions) are crucial today for the development, on the one hand, of national and regional level policies, and on the other hand, for the direct support of projects involving partners from more than one country in the area.

When dealing with research and innovation policies, however, there is another difficulty to consider. The abovementioned complexity of innovation leads to both positive and negative implications, at the same time, for an area like the Adriatic one. On the positive side, the existence of many different policy tools, developed all over the world or in other EU countries, gives a wide range of solutions that can be adapted to the single situations in the area. On the negative side, such an adaptation is not a straightforward activity. Thus, a critical point for the adoption of innovation policies in the Adriatic Region is the identification of the most appropriate benchmark. Trying to copy policy instruments developed in very advanced innovation areas of the EU (e.g., in Scandinavian countries) might lead to failures simply because of the wrong benchmark. Again, a deeper comparison of innovation indicators is an essential step to avoid this type of mistake.

Also, selecting appropriate benchmarks is becoming very difficult. This is not only because policy tools are increasing, but also because innovation policy mixes are increasingly converging. As reported in Veugelers (2015), there is “a relative homogeneity of policy mixes in EU countries, despite the fairly wide and stable differences in their innovation capacities”. In other words, if all countries adopt the same innovation policy mix, it is difficult for



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latecomer countries, as many in the Adriatic Region are, to find and select an appropriate policy for their situation.

Now for the PACINNO project specificity: the analysis has mostly aimed at the comparability of innovation across Adriatic countries, dealing with innovation indicators to assess this comparability. Of course, besides comparability, the indicators were also aiming at highlighting the specific endowments of each Adriatic country. The same concept applies here for comparing innovation policies, especially taking into account the Adriatic Region as a whole. That is, the joint analysis of EU Member States and non-Member States, of lesser and greater industrialised areas and of higher and lower innovation capacities. This is in line with the EUSAIR and distinguishes our project from other studies mostly targeting the Western Balkan countries, and eventually their cooperation in innovation with some EU Member States (e.g., in the WBC-Inco project).

In the following part of this report, we present the current situation in terms of research and innovation policies implemented in the Adriatic Region, at both the national and, in few cases, the sub-national level. After introducing a novel taxonomy for mapping innovation policies, we give an overview of those adopted in the area. We then report some best practices identified within the PACINNO project. We conclude with selected innovation policy recommendations for the Adriatic Region.

2. A novel taxonomy for innovation policies in the Adriatic Region

In order to identify and classify research and innovation policies conducted in the Adriatic Region, a first activity in the PACINNO project has been the search for an adequate taxonomy of these policies. This activity has been conducted mainly using desk research and has targeted European Commission documents in the first instance.

The first taxonomy used is the one put forward by the European Commission in the report “Lessons from a Decade of Innovation Policy” (see figure 2). It is characterised by a very operative distinction of policies. The main policy objectives are identified as follows:

- Enhancement of skills for innovation;
- Support to investment in technology and research;
- Enhancement of innovation competencies of firms;
- Linkages within the innovation systems;
- Framework conditions for innovation.

Figure 2 – Innovation Policy taxonomy included in European Commission’s “Lessons from a Decade of Innovation Policy” (extract)

Appendix C Typology of policy instruments

Innovation system element and policy objective	Policy instrument	Description
Policies enhancing skills for innovation	Support to human resources for R&D	Measures that support the development of human resources for research such as doctoral grants to support research in a specific field or encourage the involvement of a specific group in research, support to further professionalization of research staff, post-doc programmes, supporting researchers to participate in international networks, etc.
	Innovation related skills education	Support to developing innovation and entrepreneurship skills of researchers, business managers, students, support to vocational training with an innovation/research dimension, support to innovation management trainings of staff in enterprises/universities.
Policies to support investment in research and technologies	Competitive funding of research (e.g. universities and public research organisations)	Competitive grants provided to academic research institutions, universities, and public and private non-profit research institutions. The focus is on conducting basic research projects or research projects addressing a societal challenge and less on involving companies or industry.
	Direct business R&D support	Competitive grants provided to enterprises to engage them in pre-competitive, industrial research.
	R&D infrastructure	Support to the development of national research infrastructures (both general or tied to a specific programme) and to ESFRI - European Strategy for Research Infrastructure plans
	Centres of Excellence	A centre of excellence is a structure where research and technology development (RTD) is performed of world standard, in terms of measurable scientific production (including training) and/or technological innovation. (Erawatch, 2007)
Policies to enhance innovation competencies of firms	Direct business innovation support	A direct support to enterprises encouraging them to conduct innovation projects supporting product development, commercialisation, marketing, services innovation, innovation management, industrial design, support to investment readiness; to acquire modern machinery, equipment, know-how, promotion of internationalisation. The support is given to the company directly.
	Support to start-ups	Support provided to the creation and early development phase of innovative enterprises, including spin-offs from large firms and venture cup type competitions.
	Innovation networks and platforms	Support that is fostering networking of enterprises, the development of business associations, and support to setting up innovation platforms of businesses, universities, and research institutions.
	Innovation support services	Support to innovation intermediaries or for the creation of innovation advisory structures, organisations who then provide support to enterprises such as advisory services, hands-on trainings and networking events, internationalisation etc.
	Innovation	This instrument refers to putting in place specific innovation

These categories, in any case, are not perfectly balanced. This happens because the evolution of taxonomies, and consequently of policy instruments, follows almost directly the evolution

of economic research in the topic. The result is that, if in some cases they include one or two instruments, in some others (especially linkages) they include a wide range of tools. For example, linkages policies include very different tools such as collaborative projects (on R&D that might also be included in another category), technology transfer, clusters and science parks, mobility of researchers, and so on. This wide set of tools has been considered problematic for the analysis of the Adriatic Region. It would have meant putting very different tools in the same category that have been adopted in countries with different innovation characteristics.

In addition, the categorisation of policy tools by their 'objective' has been considered to be inadequate for the Adriatic Region as they can be misleading when looking at a heterogeneous area. As will be shown in the rest of this report, policies have been categorised according to their 'content'; in other words, 'R&D' has been preferred as a category, as it has a common and worldwide definition. While the taxonomy by the EC, which was probably set-up with experiences from advanced countries, is somehow ambiguous in some definitions.

A second relevant taxonomy is the one presented by Edler and Georghiou (2007; see figure 3). This taxonomy presents several categories of policies and each one has a clear reference to the policy tool to be adopted. However, the macro-categorisation of these policies distinguishes between demand-side and supply-side measures. This distinction, in the case of the Adriatic Region, can be difficult to apply, as in some countries it is very difficult to assess it².

In fact, in some countries (especially Albania and Montenegro) very few innovation policies have been identified and they are also quite broad in scope. For instance, policies regarding technology transfer or the development of incubator and science parks in Montenegro are included in very wide national strategies (Strategy For Scientific-Research Activity of

² One of the reasons why demand side policies are rarely detected in the geographic area under scrutiny (with the notable exception of Italy) is linked to the fact they have been put in place only recently in the more advanced countries (OECD, 2011a) and to the fact that, to be successfully implemented, they need relevant efforts in terms of public finance and of efficiency of the administrative apparatus.

Montenegro 2008-2016; Regional Development Strategy of Montenegro 2014-2020). Since the main aim in PACINNO has been the *comparability* of the eight countries, the Edler-Georghiou taxonomy has been considered too complex for such an objective.

Figure 3 – Innovation policy taxonomy in Edler and Georghiou, 2007

J. Edler, L. Georghiou / *Research Policy* 36 (2007) 949–963

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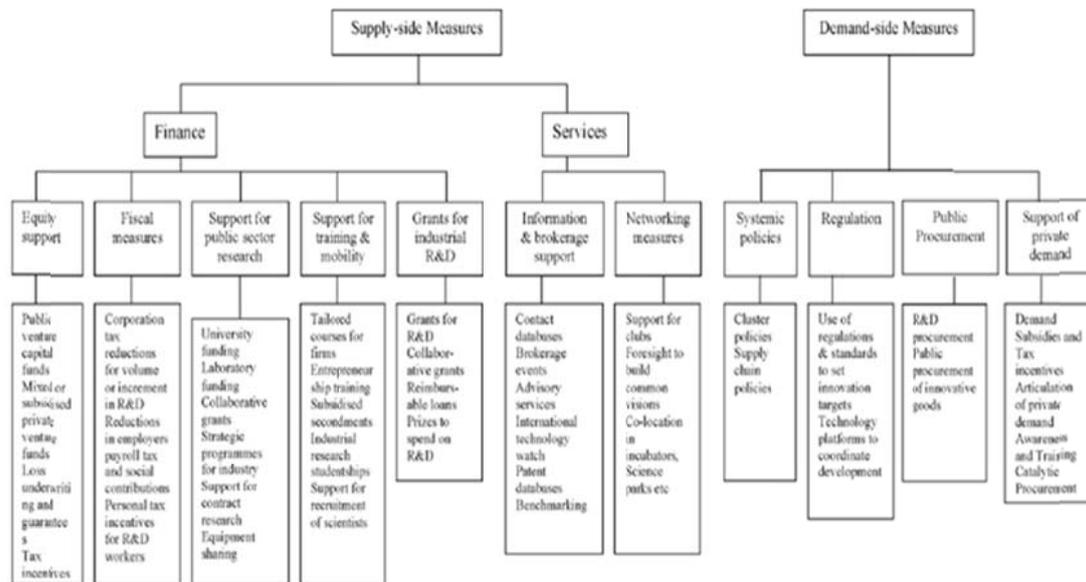


Plate 1. Taxonomy of innovation policy tools.

In terms of list of policies, the TrendChart list has also been considered. The ERAWATCH/TrendChart is an inventory of policy tools launched in EU countries since the 1990s, and it includes the start/end date, the typology and the budget set for them. A recent work by Veugelers (2015) has provided an extensive, albeit descriptive, analysis on innovation policies in the EU. It shows that, although 28 policy tools are listed in the TrendChart, only six of them receive at least 5% of the total budget. In other words, ancillary policy instruments can be many, but the most relevant ones account for 70% of the total budget and are limited to the following ones:

- Funding for specific public research programmes;
- Funding for public-private collaboration;
- Financial instruments (loans);



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- Direct business innovation support;
- Direct business R&D support;
- Tax incentives.

Again, it is relevant to mention that all these taxonomies have been developed looking at the most advanced countries, especially in the EU. Scholars usually refer to the best practices conducted in Scandinavian countries or in Germany and France. However, these are not always fully transferrable to a peculiar and heterogeneous area such as the Adriatic Region. Therefore, using some insights from the above-mentioned taxonomies, an expert group set-up in the PACINNO project has agreed to develop a novel taxonomy characterised by two main features:

- A comprehensive and simple grouping of policies;
- The applicability of the taxonomy to all eight countries.

Indeed, existing taxonomies present some limitations precisely because they do not define properly the 'borders' of policies; they are also sometimes ambiguous with regards to the categories to be included in it. Therefore, the PACINNO strategy has been to identify few macro-areas that can be identified in all countries. Some macro-areas have been immediately identified: this is the case of R&D and of linkages policies. For the other ones, instead of using the EC's categories of skills or competencies of firms, a slightly different categorisation has been opted for.

Another crucial point has been the distinction of direct vs. indirect support policies. The former being represented by all policies directly helping (mainly via monetary support) the innovation actors in the territory; the latter being characterised by the improvement in the infrastructures, but also of the competitiveness conditions for these actors. With this distinction, governmental grants are considered direct support, while both tax credit and infrastructure setting-up is indirect support. The rationale is that direct support takes place whenever an actor is already involved in innovation (e.g., because it has applied for a project funding); indirect support takes place to favour the innovation conditions in the area. The

PACINNO expert group has started from the observation that one of the most relevant policies, that is R&D tax credit, which is also relevant in the top EU countries, was usually kept separate from other policies. However, it is not the *content* of the R&D tax credit that makes it different from other policies, e.g., from an R&D grant. In fact, in both cases, the expected effect is an increase in the amount of R&D efforts of actors. The difference resides in the way this R&D increase is pushed: precisely, a direct vs. indirect support, as put forward in our taxonomy.

In addition, it clearly emerged that the tax credit policy could be not present in all countries, but that some kind of R&D policy was implemented everywhere. Therefore, it has been decided to split the policy description into two blocks:

- On the one hand, the *content* of the policies has been identified:
 - R&D
 - Human resources;
 - Collaboration;
 - Innovation capabilities.
- On the other hand, the *types of support* have been singled out:
 - Direct;
 - indirect.

In order to better clarify the content of these categories, we give some examples.

R&D: The direct support category includes R&D grants, subsidies and all monetary support going from central/local governments to R&D performers. Indirect support of R&D concerns tax credit and all other fiscal incentives to R&D performers.

Human resources: The direct support category includes grants and other policies to directly support the development of Human Resources; while indirect support for human resources regards bank loans to students, tax incentives to lifelong learning (also for researchers) and similar tools.



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In the Collaboration category we have included all policies favouring collaboration in research and innovation, including technology transfer ones, again, distinguishing whether this support was direct or indirect.

Finally, the Innovation capabilities categories, both direct and indirect, concern all policies regarding embodied technological change, purchase of machinery and standard regulations or intellectual property rights. Direct support is considered key in this category and it is coincident with the definition provided in the European Commission (2013): “a direct support to enterprises encouraging them to conduct innovation projects supporting product development, commercialisation, marketing, services innovation, innovation management, industrial design, support to investment readiness; to acquire modern machinery, equipment, know-how, promotion of internationalisation”.

In the next section, we will start with the description of all policies identified in our analysis on the Adriatic Region. As a methodological remark, we recall that two main tools have been used to perform this activity:

- Desk research, mostly reviewing the existing scientific and policy documents from each of the eight PACINNO countries;
- Interviews with experts, conducted in all eight PACINNO countries³.

3. An overview of research and innovation policies in the Adriatic Region

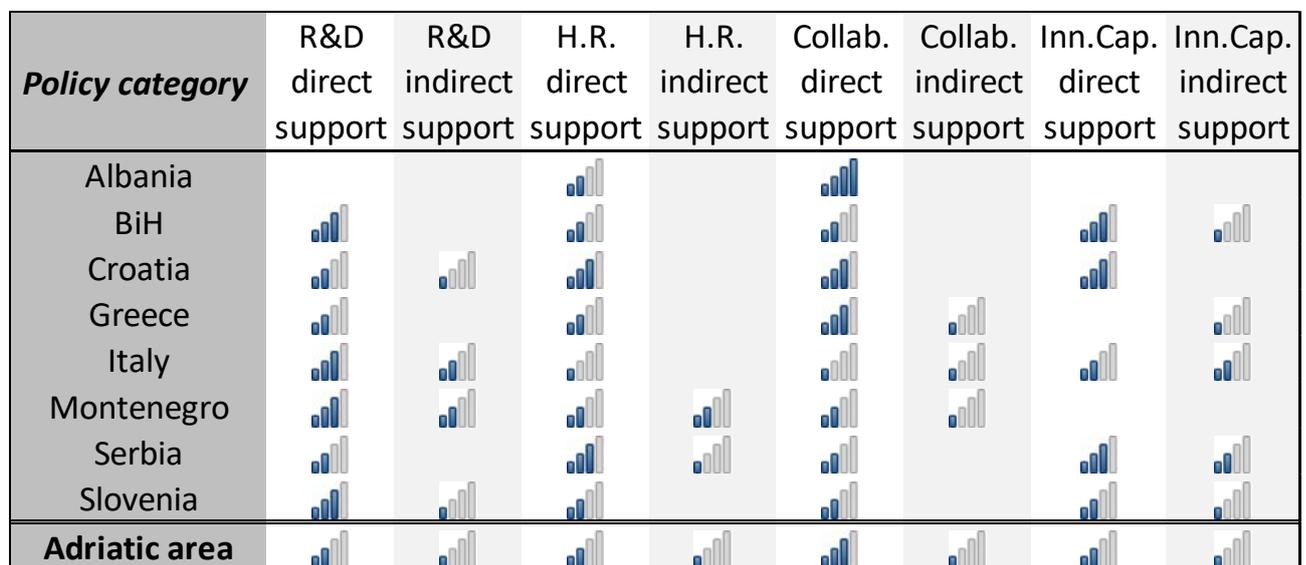
The main advantage of having developed a simple and comprehensive taxonomy of research and innovation policies is that a direct comparison of the eight Adriatic countries is now possible. As mentioned before, the relevant heterogeneity within the area made the comparison quite complex: how can policy tools considered for advanced countries be used within a set of both advanced and latecomer countries? Nevertheless, desk research performed on the eight Adriatic innovation systems, together with expert interviews, has confirmed that the four pillars of our novel taxonomy are relevant in all Adriatic countries. R&D is relevant, although is often too limited (especially in some non-Member States); Human resources and

³ For further details on these interviews, see the annex.

Innovation capabilities indicators are improving in the whole area; policies for Collaboration have largely been used in the area, often favoured by international programs set in place by the EU (e.g., Interreg, FP7).

Keeping this in mind, in figure 4 we present an overview of the distribution of policies across the categories identified, based on the number of policies that have been implemented in recent years and/or are active at the moment, in each country⁴. Figure 4 gives a comprehensive insight on the quality structure of innovation policies for the whole Adriatic region.

Figure 4 – Distribution of innovation policies in the Adriatic region (*)



⁴ We avoid using the absolute values or budget shares for each policy category for two main reasons.

On one hand, the ‘size’ of each policy can strongly vary across countries; consequently, the use of absolute value is not directly informative. On the other hand, the use of budget shares has been precluded, it being impossible to gather complete information on the budget for all countries. Moreover we should observe that the use of budget share could be partially misleading. Think for instance of two very different countries such as Italy and Montenegro having approximately the same share (25%) of direct support R&D policies. In both cases, a quarter of their policies are focused on supporting R&D performers; however, the same share reflects two completely different situations. The amount of money needed to support top R&D performers in Italy is necessarily higher than that needed to help small firms trying to improve their innovative performances in Montenegro. Moreover, for technical and administrative reasons, some countries replicate the same policy with two or more distinct tools. Although this is not always the case, some level of duplication might happen. Vice versa, in other countries (such as Italy), the complexity of the legislative system implies that the same law might include distinct articles about policy tools that we classified in two or more different categories. In this way, some countries might have a relative underestimation for some policies. In the light of these difficulties, we decided to simply represent which policies are more recurrent in each country in figure 4.



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()Bars reflect the intensity of the intervention in terms of the number of policy actions: recurrences accounting for more than 50% of the total are represented by four bars; recurrences accounting for up to 50% by three bars; those up to 33% by three bars; and those up to 16% by one bar.*

We can read the figure starting from the overall distribution of innovation policies in the Adriatic Region (last row). The most recurrent policy category is that of direct support to collaboration in innovation. This is not surprising if we think that the general idea is that of supporting the linkages of less developed areas with more advanced innovation performers. The Adriatic Region is the target of many EU policies aimed at developing cross-border and transnational cooperation (and the PACINNO project is itself an example of this). Therefore, national policies also reflect this type of policy tool. Furthermore, as private innovation investments are very limited in many countries, direct collaboration policies aim at enhancing private-public partnerships in almost the whole area. Finally, it must be noted that the accession of Slovenia and Croatia to the EU, as well as the inclusion of the other Western Balkan countries in EU innovation programmes, have been coincident with the increasing focus on cross-border collaboration tools. This might be another explanation for their strong interest in this type of policies.

The other policy instruments in the area follow a very precise rule: direct support measures are more frequent than indirect ones. This result is not a surprise as the indirect support can be considered as a peculiarity of most advanced regions; the R&D tax credit, for instance, works far better where high R&D expenditures already exist and the extra expenditure is more easily expected. Similarly, in more advanced areas, we can expect that human resources also increase their skills with indirect measures (e.g., loans for studying), while in poorer areas more direct support is needed to bring more students into higher education or to continuous training and lifelong learning. The same concept applies for collaboration; the PACINNO project has shown, for instance, that while Technology Transfer Offices (TTOs) already exist in more advanced countries such as Italy they just need additional support to be connected to each other. In other countries, TTOs have to be established from scratch and this is impossible without direct support from governments.



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We can then look at the single country cases. As said before, we are not comparing countries on the single policy tools, but we can see how distributions change throughout the area. Comparing the distributions, we have, in fact, a confirmation of the heterogeneity of the Adriatic region.

In Albania, direct support measures are apparently the only ones that exist and they target human resources and collaboration. Given the limited profile of Albanian R&D investors, this result is also expected. Furthermore, in Bosnia and Herzegovina direct measures are more recurrent than indirect ones; however, in this case the main target is R&D, which is probably to enable a catching-up process in a country where R&D expenditures are still very low. More generally, Bosnia and Herzegovina, along with Croatia and Greece, shows a balanced situation with policy tools in all categories. The most notable exception occurs in Greece, which only has indirect Innovation capabilities policies.

Looking at the largest country in the area, Italy, we can notice a different situation. R&D measures are the most important ones and they are achieved more through direct than with indirect tools. In the other categories, rather, direct and indirect measures are more balanced. Innovation capabilities policies are the second most important: this is not surprising, given the advanced industrial and technological structure of Italy.

Montenegro, on the other hand, has the highest use of indirect measures. However, given the latecomer profile of this country, the categorisation of policies has been more difficult than in other cases.

To conclude with Serbia and Slovenia, in both cases, and in the overall area, direct measures are more frequent than indirect ones. Serbian policies are, however, more focused on human resources and Innovation capabilities, while Slovenian ones mostly target R&D.

Both desk research and expert interviews have allowed us to gain useful insights on innovation policies in the Adriatic Region. Beside the identification of existing policies, as

shown here above, using these methods the PACINNO team has been able to identify three main topics that can be considered pivotal in the innovation development of the area. In particular, all Adriatic countries share these topics, although the single situations can be slightly different. We mean that these three key points represent areas of potential common intervention in the area (e.g., under a common strategy such as the EUSAIR). Other topics that emerged in the interviews are really country-specific and are not mentioned in this section. To give just a couple of country-specific topics, it could be that policies for the growth of start-ups are particularly intensive in Slovenia, or that support to top global R&D performers is almost exclusively a matter for Italy.

We recall the three main common topics in the rest of this section.

3.1 The critical mass of innovation competencies

The first key issue identified when dealing with innovation policies in the Adriatic Region is the persisting lack of adequate competencies. We can, generally, speak of being above or below a certain critical mass of innovation competences. However, it is never easy to identify what that means for each single country. As a general rule, we can say that:

- For non-EU Member States, and also partially for Croatia and Greece, being below a critical mass means having a poor industrial and technological structure. Innovation investments are very limited and this affects both public and private sectors.
- For Italy and Slovenia, and also partially for Serbia, the concept is more complex. Being below a critical mass more often means there is a lack of coordination in innovation activities.

To give an example, in the first case we can find firms that do not invest in R&D or that have a very limited share of turnover devoted to innovation. In the second case, we can find firms that invest in R&D and innovation but which do not have the appropriate advantages from these efforts; for instance, they might cooperate in R&D without being able to exploit partners' knowledge.



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Given such a distinction, it is evident that innovation policies have to target different objectives. We focus on the first case, the ‘absolute low level’ of innovation competences, by mentioning some of the concepts that have been recurrent in the expert interviews.

An expert from Albania has stated that the Albanian “scientific community needs to be re-designed and the government needs to shift its orientation and program it in terms of a knowledge-based society that relies on science and education and employs these as powerful instruments. It follows from this that more resources need to be allocated to science and research and the whole infrastructure needs to be reconsidered. The specific policies will be inefficient unless radical improvement of the above is designed and enabled”. The expert has highlighted that the Albanian scientific community is in great need of restructuring and support.

Experts from Montenegro have underlined the strong lack of knowledge and experience in innovation in their country. This goes together with a general difficulty of the overall industrial structure, characterised by low levels of productivity and competitiveness.

The situation in Bosnia and Herzegovina is relatively more complex. Relying on both desk research and expert interviews, the PACINNO analysis has shown that the Federal Ministry for Education and Science allocates the largest portion of public funding on research activities in Bosnia and Herzegovina, with no reference to any policy document. More than four fifths of this amount is distributed directly to public universities and public research organisations in the form of support to R&D activities. Experts have also noted that the Ministry is both understaffed and is lacking competences to distribute these funds appropriately, which seem a reasonable argument in favour of increasing support to R&D. In other words, limited innovation competences also reflect the limits of policymakers and their approach in sustaining the national innovation system.

Although innovation competencies have improved in Croatia in recent years, a Croatian expert has highlighted some key problems in the country. These are: the lack of innovation



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capacity due to the structure of the economy, lack of political will, lack of strategic planning and coordination between relevant actors, and the mismatch between the educational system and the requirements of the labour market. In addition, he mentioned that, “The state administration is dealing with a lot of paperwork and bureaucracy instead of proactively doing politics. There are too many procedures for simple things” and that “there is significant resistance to change in the academic and scientific community and we did not manage to break that”.

More generally, and this also concerns Italy, Serbia and Slovenia, there is a perception among the interviewed experts that the budget set for innovation in the Adriatic Region is still too limited. Although budget constraints are obvious in times of crisis, there is almost unanimous consensus on the fact that Adriatic countries should put more money into innovation, whatever the specific policy measure chosen.

Of course, as already stated, when dealing with very heterogeneous countries, not only in terms of innovation efforts but also simply for population or GDP, the reference to a unique critical mass threshold could be misleading. Therefore, we suggest that a continuous and comprehensive mapping of research and innovation competencies in the area should be developed. In PACINNO, we have implemented mapping in WP5 (see again footnote 1) that could be extended over the years, as well as in terms of available indicators. Until now, in fact, a lack of statistics on research and innovation in the whole Adriatic Region has been evident. A limited knowledge of innovation in the area might lead to wrong policy decisions.

Furthermore, we suggest breaking this critical mass into two dimensions: a quantitative and a qualitative one. In other words, it has to be clear that while most advanced countries in the area (e.g., Italy or Slovenia) have to launch policies to increase the quality of innovation competencies (while also keeping their quantity high), other countries (e.g., Albania or Montenegro) primarily need to put all their efforts into the quantitative increase of these competencies. Quantity and quality are not alternative *per se* but, in times of limited resources, smart policies should be able to target the right dimension in the right place.



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Moreover, in this policy area, it becomes of critical importance to connect innovation policies to the wider set of industrial (sectoral and regional) policies aimed at exploiting the specific comparative advantage of each country or region (Pianta & Zanfei, 2016; Cimoli et al., 2015; Bianchi & Labory, 2011), favouring innovation diffusion and catching up.

In order to do so, and as a last suggestion on this ‘critical mass’ point, it is relevant to identify the actors for each policy, giving specific roles. A governmental body at a higher level should coordinate who is doing what, for instance, giving the responsibilities for education policy to the Ministry of Education and those on R&D policy to the Ministry of Research. Although this might appear obvious and common sense, after interviewing experts, we can underline that, for cultural reasons, in the Adriatic Region there are often cases of overlapping responsibilities and conflicting or duplicating activities.

3.2 The collaboration in research and innovation

A second key topic is that of collaboration. It is a crucial point, especially because the majority of Adriatic countries are latecomers in research and innovation. Moreover, the largest country, Italy, shows lower innovation performances in comparison to its potential, considering its industrial structure (see European Commission, 2015a.). As also confirmed in the overview given in figure 4, policies for collaboration are active in all Adriatic countries and account for the largest share overall intervention.

Regarding collaboration, it is important to distinguish between intra-country and inter-countries (or international collaboration).

As regards intra-country collaboration, all countries have specific tools. To give just some examples:

- All countries, including Albania and Montenegro, have put policies in place for developing clusters and incubators aimed at connecting small firms and start-ups in the country;
- Since 2007, Bosnia and Herzegovina has launched competitive grants to support scientific cooperation;



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- Croatia has developed several programmes for the collaboration of national scientists (and also of Croatian scientists abroad), such as the Research Cooperability Program and the Connectivity programme, as well as several ones for public-private collaboration in science and innovation (e.g., the RAZUM or IRCRO programmes).

Among the different policy tools to foster collaboration, a primary role is played by TTOs. This policy area has been extensively addressed within the PACINNO project, especially via the establishment of new TTOs and the signature of an international agreement, as an instrument to facilitate the networking activity among them⁵.

Technology transfer policies have been frequently used in all the analyzed countries. In particular:

- In the 2009-2015 period, a section of Albania's National Strategy on Science, Technology and Innovation has strongly focused on TTOs as a means of enabling Albanian universities to successfully participate in EU research projects;
- In 2015, the Croatian Business Innovation Agency (BICRO) launched a EUR 1.5 million programme to support national TTOs;
- Since 2014, Montenegro has a programme for knowledge transfer between higher education, research and industry (mostly SMEs) sectors;
- Since 2010, Serbia has a programme on Integral and Interdisciplinary Research, whose aim is to enhance knowledge and technology transfer, as well as the application of R&D results in industry;
- Finally, in Slovenia, there are several programmes regarding technology transfer; the oldest is a programme on subsidies for technology centres/parks, which has been running between 2007 and 2014 (Programme of Measures to Promote Entrepreneurship and Competitiveness, 2007).

When dealing with international collaboration it is worth mentioning the crucial distinction between intra-Adriatic collaboration (where the PACINNO project is an example) and extra-

⁵ More information on this at www.pacinnno.eu



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Adriatic collaboration. These two levels meet when dealing with EU macro-regional strategies (that is the EUSAIR in the case of Adriatic and Ionian areas). In fact, the strength of intra-Adriatic collaboration is directly proportional to the ability of the Adriatic countries to set-up R&D and innovation collaboration with third areas.

3.3 The continuity of research and innovation policies

In both desk research and interviews with experts, a third critical issue has emerged. In many cases, good innovation policies have been undertaken for limited periods of time or with intermittence. This lack of continuity in innovation policies is a problem for almost all countries, although it may take different forms. In some cases, a policy has been completely abandoned; in other ones, the policy focus was changing, leading potential beneficiaries to lose all the expertise developed on that policy tool. This is especially true for SMEs, which form the bulk of companies in the Adriatic Region. Since the cost for understanding and applying for a policy instrument is very high in their case, a perceived lack of continuity in terms of policies implies that SMEs do not even try to learn how to apply them. The consequence is a dramatically limited use of policies by those needing them most.

As said previously, in the PACINNO expert interviews this concept has emerged several times, although with different emphasis. Here, below, we report the most relevant statements regarding this issue in the single countries.

An expert from Albania stated, “unfortunately, each time there has been a political rotation, the prioritisations of the relevant and responsible institutions for innovation and R&D have been changed. Thus, policies have been successful enough in identifying the obstacles, but this has not been the same as successfully overcoming them”. In other words, continuously changing the priority for policies is seen as an obstacle to innovation and, at the same time, the main reason for which other obstacles are also not removed.

Experts from Bosnia and Herzegovina agreed that innovation-funding schemes are usually designed to support beneficiaries for one year, that is, short term and small-scale projects with



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limited impact on research and innovation systems. This is mostly due to the limited funding capabilities of institutions. However, notable differences exist in terms of efficient policy design between the different entities. It is worthwhile noticing that in Bosnia and Herzegovina policy is designed to follow a horizontal approach, that is all sectors and thematic fields are treated equally.

Moreover, in the case of Croatia, experts have stated that many problems are connected to the lack of continuity and patience in the policy cycle. Whenever many changes occur, for example changes of government, and there is no adequate structure in the political and economic relationships among organisations in the country, then the effectiveness of policies is severely damaged.

In the case of Italy, an expert stressed the continuity problem with specific regard to an innovation policy tool, that is R&D tax credit. Over the recent years, in Italy, there have been several different measures, often changing year by year: “in 2007, the government experimented first with a general policy based on tax credits allocated through the ‘click day’, a selection process that awarded funds to firms in the order that the electronic requests arrived for 2008 and 2009. In 2010, tax credits were not available. They were reintroduced in 2011 by the Monti government, which launched tax credit schemes for businesses financing research projects in partnership with universities or public research. [...] At the end of 2013, the government reintroduced a general tax credit scheme based on incremental expenditures” (Nascia & La Placa, 2016). After other amendments, only in 2015, the current version of this scheme has been defined.

The aim of the Italian Ministry of Economic Development, today, is to set up a policy on R&D tax credit that can act for several years in the same way. In fact, firms need certainty that the tool is working for many years in the same way; otherwise, they do not change their R&D propensity because they fear that the increase in R&D will not be supported in successive years by the same tax scheme.



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An expert from Serbia also stated that political changes in Serbia influence the execution of the programmes or change the objectives. For instance, in the past, the Ministry of Science and the Ministry of Education were separated; after the merging of the two in 2011, some of the programmes were changed and the budget was cut.

As a corollary to this lack of continuity, we recall that changes in the political systems, or in governments, should not affect innovation policies. Both private and public actors in research and innovation should know that, despite a change in the government, innovation policies continue with more or less the same frameworks. Currently, instead, many policies are strongly dependent on the political scenario in all Adriatic countries. Implicitly, then, these changes in policies and policymakers do not allow good evaluation of policies themselves to be developed.

3.4 The governance of innovation policies

Before concluding this review, a few notes on the problem of governing innovation policies are worth mentioning. In the recent past, the innovation policies at the European level have been greatly focused on regions (Serravalli, 2009; Laranja et al., 2008) as the appropriate level of governance for setting and implementing a wide set of innovation policies⁶. Now, the new tendency is towards an increased role of nation States. The existence of these contradictory forces, acting toward centralisation or decentralisation, emerged clearly during the field research. In fact, in some countries, NUTS2 regions ask for more autonomy in setting the policies. Both in Italy and Greece, there are fears that the regional level, which is gaining more and more importance with the Smart Specialisation Strategy, does not always have enough autonomy in setting objectives and, even more, in developing policy tools. In Italy, for instance, the weight recently given to R&D tax credit, reasonably managed at the central level, tends to counter the power of regions in setting the policy agenda.

⁶ This strategy was a straightforward effect of the economic research on the field that highlighted, almost unanimously (although starting from different theoretical and empirical approaches), the importance of the local and regional dimensions to spur innovation growth.



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Also in the case of Greece, interviewed experts argue that “a tendency towards decentralisation is a positive step, since there would make easier communication and cross-control between actors and policy makers. In this direction, further decentralisation to more local authorities should be encouraged”.

In some other countries, it is the structure of the country itself that implies a strong decentralisation force, although this increases the complexity of the innovation system. It is worth mentioning the case of Bosnia and Herzegovina. As reported by one expert, a “strong political commitment is necessary for both the adoption and the implementation of policy measures other than the current narrow support to international innovation cooperation. Moreover, integrated innovation strategy at the state level may be ineffective given the decentralised governance structure, including the highly decentralised regulatory and financing structure between the two entities, and limited funding at the state level. What seems necessary instead, is to harmonise and synchronise the existing strategies between the state and entity levels, the process which seems fully absent”. These remarks call for the need to jointly define the set of policy instruments that best fit with the specific economic conditions of latecomer countries, together with the optimal allocation of each policy instrument to the appropriate level (local, regional, national) of government (OECD, 2011b).

4. Best practices of policies in the Adriatic region

A critical point for the adoption of innovation policies in the Adriatic Region is the identification of the most appropriate benchmark. In this regard, trying to copy policy instruments developed in countries with very different socio-economic conditions can lead to failure. On the contrary, the imitation of best practices already adopted and, in some cases, established in the same environment, is more of a guarantee for the successful improvement of each Adriatic country’s innovation.

As highlighted in the majority of the interviews conducted with innovation experts within the PACINNO project, the policy model applied in these countries is based on best practices across the EU. While a ‘one size fits all’ approach does not exist, successful policies within the Adriatic Region can still be adapted in countries with similar conditions. In this regard we



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can refer to BICRO (innovation agency), which has been a success story in Croatia. The initiative is based on greater recognition for the role of entrepreneur and having an entrepreneurial model: for a long time, in fact, the innovation system in the country had been focused on institutions and public organisations and entrepreneurship was not addressed. BICRO was an agency that implemented three programmes for innovation and the transfer of scientific knowledge to the economy. Key intervention areas of BICRO were related to: IP protection and evaluation, demonstration of technical feasibility and the construction of functional prototypes. In particular, proof of concept (POC) measures from BICRO has emerged as a best practice. The POC measure has worked providing money for testing concepts. Both SMEs and academics were eligible, and it is considered very successful as many projects were funded. In the first steps, there were patent applications followed by the development of new products. It is worth noting that this has also been implemented in other countries, notably in Serbia and Albania.

The Technology Innovation Award is an example of best practice in Serbia that has also gained international recognition, in particular receiving participants from other Balkan countries. After ten years of being in practice, the contest is receiving international participants. It has been so successful that the results are broadcasted on television. In a similar vein, open competition call for best innovation has also been a success story in Bosnia and Herzegovina. Furthermore, the best practice in Bosnia and Herzegovina includes allocation of competitive grants for: the organisation of innovation related events (innovation fairs, manifestations, promotion); undertaking innovation related research, experimental research; undertaking innovation related testing, prototype development, technical documentation development, patenting activities.

Examples of good practices in the case of Slovenia are the tenders for creation of innovative companies, tenders for R&D projects in companies, tenders for creation and expansion of development departments in companies and tenders for joint development-technological centres.

In the case of Greece, EXCELLENCE II is regarded as a best practice. This aim of this action is: to direct aid and support of excellent scientific efforts in Greece, in all scientific and research fields , strengthening of research undertaken at the initiative of the researcher



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(investigator driven research) and rewarding proposals of innovative character, emphasizing the quality rather than the research area in which the current proposal falls.

In the case of Italy, the 'innovative start-ups' tool has been highlighted as a best practice, especially because it has launched a novel modality to support firms. Innovative start-ups are defined as firms that are: established for no longer than 48 months; reside or be subject to taxation in Italy; turnover lower than 5 million € (around 6.4 million \$); it does not distribute profits; its core business consists of innovative goods or services of significant technological value; it does not originate from a merger, demerger or divestment process; and 15% of its costs are related to R&D, or at least one third of the team is made up of people who either hold a PhD or are PhD candidates at an Italian or foreign university or have conducted research for at least three years or at least two thirds of the team is made up of people holding a Master's degree, OR it is the owner or the licensee of a patent or a registered software.

In methodological terms, within the Italian Ministry of Economic Development (MISE) and with partners, a method has been developed that can be replicated in the future for further policies. This means, for instance, a method for setting the values/thresholds for funding innovative start-ups, which derived from various feedback from the territory/industry (mainly through consultations between central and regional policymakers). However, one of the most important policy initiatives consists in two different strategies: (a) an the extensive communication in Italy and abroad, in order to attract more innovative companies, in particular SMEs; and, maybe more importantly, (b) the creation a new institutional environment for firms registered as innovative SMEs or innovative start-ups. In practice, the innovative start-ups tool is related to a wide range of support measures which is related to: significant cuts in red tape procedures; tailor made labour law and incentives for funding & investment.

The facilitated procedures are brought into practice through: possible online registration through self-certification; no fees due to Chambers of Commerce for the registration of any kind of document; flexible corporate management tools; and zero tax regime for companies suffering systematic losses.

Regarding the labour law one can refer to: flexible labour contracts applicable for the whole start-up's life cycle; variable pay depending on the start-up's performance; workers &



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consultants can be paid with stock options & work for equity (taxable as capital gain); and 35% tax credit on all costs for hiring highly-qualified personnel.

Incentives for funding & investment include: robust tax relief on investments into start-ups' equity by angel investors, VC and corporates; start-ups can raise money through equity crowdfunding online portals (1st tailor-made law on an international level); and free, fast-track public guarantee on bank loans, covering 80% of the lent sum.

The identified tools in each country refer to very specific situations in the area. However, a more general pattern of best practices can be identified with regards to the type of instruments considered best practice in the majority of the countries. While our taxonomy has included various categories, what has emerged in the majority of the countries is the success of both direct and indirect support for R&D, as well as the collaboration category. This is not surprising, for at least two reasons: although we live in times of open innovation, R&D is still the most relevant input for firms' innovativeness, thus attracting the attention and the efforts of policymakers all around the world; it is not by chance that R&D tax credit measures exist in both very advanced and emerging countries for, having a high heterogeneity of actors, the most effective way to push all of them is to favour their collaboration, in a broad sense. What is interesting, however, is the lack of clear best practices in other categories across other countries. Both education and innovation capabilities appear to receive attention in terms of the number of policies (see again figure 4), but it is more difficult to find best practices among these categories. On the one hand, best practices in the case of innovative competences can be difficult to identify, especially in latecomer countries; on the other hand, human resources policies can be considered more 'traditional', thus difficultly being considered as best practice.

However, some exceptions do exist. In particular, support provided for the establishment of science parks is regarded as a best practice in several countries. For example, Corallia, a cluster focused on microelectronics in Greece, has been considered as highly successful in expert interviews carried out in Greece. The model of organizing the Scientific parks as a part of the University, is another best practice in Serbia such as the example of University of Novi



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Sad; or, the example of Inđiji, which has attracted foreign companies by giving them infrastructure (land). Overall, these parks have grown and support the local economy of Serbia. In a similar direction, the case of Technopolis, the first innovative Entrepreneurship Centre in Montenegro, established with the help of international funds, is regarded as a success story. This has been due to the great interest shown in it, especially from the young and very well educated part of society and because it is seen as a significant opportunity in developing an innovation and entrepreneurial environment in the coming years. In sum, proclamation of the three business zones on the Capital Territory represents a major step forward in encouraging the development of entrepreneurship and reducing unemployment in Montenegro. This has been encouraged by policy that promotes the development of business zones in the region.

Another exception is Albania, that the issue of a best practice has a more recent nature and is related to involving a wide range of organizations in the implementation of a cross cutting strategy: “Digital Agenda of Albania 2015-2020”. The overall vision had been to create a knowledge-based society through: the consolidation of digital infrastructure in the whole territory of the Republic of Albania; improvement of the quality of online public services and increase of governance transparency. This strategy focuses on introducing innovation and massive use of ICT in public services such as health, education, environment, agriculture, tourism, culture, energy, transportation, etc. Currently, the pre-university education is undergoing a digitalization process; digital infrastructure in the health sector is being improved as well as e-services in this sector. There are also initiatives foreseen for innovation and ICT development for the SMEs. Furthermore, initiatives are taken to increase of transparency and improvement of public administration services according to the “Open Government Partnership” and e-Governance (both in central and local level) etc. The involvement of a wide range of actors for a single aim, is the reason that the Albanian informants regard this as a best practice.

5. Concluding remarks: innovation policy recommendations for the Adriatic Region

We can consider the three main topics of Section 3 as the most appropriate, albeit wide, areas of policy interventions for the Adriatic Region. The development of a critical mass of



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research and innovation competences, the enhancement of intra and extra-regional collaboration, and the continuity of these policies are, however, too generic to be policy recommendations in themselves. In this last section, we propose some examples on how to develop policy tools within this framework.

We start with collaboration. While in each country, excluding Italy, collaboration can be sustained by some similarities across organisations; in extra-regional collaboration a clear decision has to be taken in advance. Policy tools should clearly address which type of organisations are the target. For instance, the Managerial-Business Skills Development Programme (MBSDr), developed within the PACINNO project, clearly aimed at bridging business and academic worlds by providing training in marketing, business environment, finance, intellectual property, negotiation and design thinking to scientists and prospective managers in R&D academic and profit-oriented institutions in the Adriatic Region. Similarly, policies fostering on collaboration among TTOs in the region, or the development and sustaining of incubators and clusters in the region, are clear examples of very targeted policies.

Of course, attracting interested, potential, foreign partners to the investment in research and innovation in the area is a key choice. However, the analysis conducted in the PACINNO project showed that foreign firms are only particularly interested if a critical mass of innovation competences already exists. Therefore, public policies should primarily aim at improving education, academic research or innovative skills in the region. Among policy tools to achieve such an objective, we can mention either the funding of specific actors (e.g., innovative start-ups or SMEs, as recently done in Italy) or even more the funding of specific innovative needs (e.g. in projects). Policymakers should be able to distinguish, not only between types of organisations (small vs. large, young vs. established, high-tech vs. low-tech, and so on), but also between the type of innovation they are looking for, i.e., technological, process vs. product, organisational or marketing innovations. Each type of innovation should also have been clear from the first stages of an organisation's life: the one-size-fits-all



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approach could be dangerous, especially if young and small firms aim at being global players from the start of their venture.

Again, on the critical mass issue, it is important to highlight that all Adriatic countries are characterised by strong rates of brain drain. Innovation policies should target this problem but, again, we believe that the only fruitful strategy is to improve the conditions of researchers and innovators in the region. Then we come to the problem as to how to sustain these conditions. We believe that a unique strategy for the whole region could be dangerous. Some countries (e.g., Italy) are at a stage when they mostly need indirect support for their organisations; typically, the R&D tax credit tool has to be given continuity in its current development and eventually be extended. On the contrary, other countries in the region mostly need direct support, in terms of money, to develop infrastructures and education, in order to achieve the minimum critical mass discussed above. In both cases (more and less advanced countries), the improvement in research and innovation competences requires a higher intervention of venture capital (VC) in the region.

This point brings us to our very last conclusion. We began this report talking about the heterogeneity of Adriatic countries. The PACINNO project outputs have confirmed and measured the diversities to be taken into consideration: size and GDP of single countries, geopolitical changes occurring in the last few decades, differences in the economic and industrial structures of these countries, and differences in institutions, governments and public organisations in charge of developing innovation policies. All these diversities can be faced only with an overall coordinated strategy. However, the lack of coordination in research and innovation strategies in the Adriatic Region is evident. For instance, the ambitious goals currently existing in the EUSAIR are not easily linked to the Smart Specialisation Strategy that each country, at the sub-national level, should develop. Such a contradiction has to be faced urgently, in order to make national policies coherent with each other.

A solution, or at least a partial one, can be found in other past experiences of policymaking. In many cases, in fact, innovation policies in the Adriatic Region do not have the right benchmark. The best policies developed in the EU might be, paradoxically, more difficult to



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achieve than those of very distant (geographically and politically) countries, for instance in Asia or Latin America. Policymakers should look for policy tools from across a wider perspective. For the latecomer countries and regions, in particular, innovation policies need to be placed in the wider context of policies for growth, such as industrial policies and, more generally, in policies favouring the process of catching up and (where possible) leapfrogging.

For the more advanced countries/regions, if moving the knowledge frontier remains one of the central targets of any policy strategy, the process of change involving the whole of society will greatly benefit from policies targeting innovation diffusion and the reduction of system's inertia. Looking into the future, it seems important for all countries to open the basket of policy tools directed towards innovation inclusion (von Hippel, 2005). However, more analysis is needed to link the overview of innovation policies in the area with possible solutions developed worldwide.

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Annex – Country details

Albania

Background

Starting from a very low level of income in the 90's, the time in which the communist regime broke down and Albania started a process towards an open market economy, Albania has become a middle middle-income country. Before the global financial crisis, Albania was one of the fastest-growing economies in Europe, while after 2008 the average growth has been halved and macroeconomic imbalances in the public and external sectors emerged. At present, the recovery seems to be under way but until now economic activity has not reached the before-crisis level. In the previous years, Albania has made a strong effort to develop a market economy and to establish an efficient administrative structure and a democratic State. Since 2014, Albania is on the track to access the European Union.

Looking at the main features of the Albanian innovation system we can single out three distinguishing positive aspects: Students participating in tertiary education; Public funding of R&D, protecting investors and ease of starting business. The last two indicators are related to the changing regulatory environment (institutions), that is one of the central focus of countries evolving from very different policy regimes to market economies.

The map of innovation policies, shows a limited intervention, centred in particular in two fields: R&D support and collaboration. On one hand, the role of Public R&D can be considered one of the first steps for building an innovation system, on the other hand, collaboration intra and inter-country can help in overcoming the limits of each actor.

Overview of policies

Looking inside the basket of policies implemented in the country, we can identify two main documents at the basis of the innovation strategy adopted:

The National Strategy for Science, Technology and Innovation 2009 – 201', which aims to rebuild the public Science system and determine an increase in R&D. As highlighted by one of the interviewees: "one of the main objectives in the national strategy is the restructuring of the scientific community. It is about a decade now that a reform was imposed to the scientific



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institutions, shifting from the previous pattern of the scientific institutes under the Academy of Sciences (most Balkan Academies of Science still have their scientific institutes), to an Academy torn of its institutes, but responsible for policy-making and representing national science at national and international level.”

The Strategic Programme for Innovation and Technology Development of SMEs for 2011–2016 is targeting two types of beneficiaries: first, companies and in particular SMEs, with policies to support clusters; second, students and universities.

Moreover, it is worth noting the relevant intervention in the fields of Cyber security and E-Government based on National Security Strategy 2014-2020. The Albanian Government and the administrative structures seems deeply involved in the cyber security project which is part of Investment Program of the Albanian Government on ICT. The main documents where the Policy Paper on Cyber Security 2015-2017 is based on are: Digital Agenda of Albania (2014-2020), National Security Strategy (NSS) and Cyber security Strategy of the European Union: an Open, Safe and Secure Cyberspace.

Finally, following the decision of the Council of Ministers in 2006, the Albanian Copyright organization has been established. The object of its activity is to supervise and monitor the observance of author’s right and other related rights.

Actors

The actors in charge of defining and implementing the innovation policies are essentially the administrative branches of the State: Ministry of Economy(previously Trade and Energy-METE-); The Ministry of Education and Sports (previously Ministry of Education and Science). The Government of Albania is also involved during the budget defining on respective innovation approaches.

These administrative structures are complemented by the Albanian Science Academy, the Council of Higher Education and Science as well as the newly established Agency for Research, Technology and Innovation.

The Academy of Sciences is just part of the scientific community. However it is the main scientific institution and the national body responsible for policy-making in the area of scientific research. The Academy of science has a wide range of objectives: collaboration



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with research and higher education institutes; carrying research in various fields; introducing new initiatives or areas of research, in view of the current needs of the country; providing assistance and expertise to state institutions and government, concerning solutions to crucial issues for the development of the country; developing policies for the highest levels of research, broader interdisciplinary spectre and competitive environment; providing expertise to policy-making bodies; enhancing and supporting research in fundamental as well as applied sciences, to adapt and apply new technologies in the economic structures and processes, and to develop new products and services; developing research relating to the sustainable development and the rational efficient use of natural resources; proposing new areas of research so as to serve the needs and demands for the social economic development of the country; making efforts for a better understanding and public awareness of sciences and research.

In the pursuit of these aims, the Academy is accompanied by the Agency for Research, Technology and Innovation which is in charge of the actions and strategies concerning the link between science, innovation and the market. Overall, the agency responsible for the implementation of programs and projects of national priority.

Policy formulation and models

Mostly, the main policy recommendations have been based on best EU practices. As far as Academy of science is concerned, the Bulgarian Academy of Sciences has been used as a model. In general, the international scientific networks, such as ICSU, IAP etc, provide assistance and models of policies, directions priorities.

Monitoring, coordination and perspectives

All stakeholders from the public and private sectors are consulted in order to draft the policy and assistance is provided also by the European Union experts through TAIEX.

Restructuring of the science system has been a main aim and the new strategy is being finalised. The previous period marked serious problems and lack of achievement. One serious issue that the Academy of Science is considering is the merit-based assessment of research. Further, outputs and values shall have to be evaluated on more reliable basis.



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One big issue for the national policies in research and innovation is the insufficient partnership and networking. This was so obvious in the applications for the FP7. The lack of the merit-based evaluation of research continues to be a serious barrier. In addition, the legal framework for the financial management in the public scientific institutions is being examined and re-evaluated. It has been identified as narrow and not flexible enough to provide for European programs framework of financial management rules and provisions.



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Bosnia and Herzegovina

By Sabina Silajdzic

Methodological remarks

This report aims to assess the Innovation policy mix in Bosnia and Herzegovina, with focus on the assessment of the existing legal and institutional framework, governance structure and innovation policy mix. This report is prepared under the framework of Paccino project – a Platform for trans-Academic Cooperation in Innovation- under research activity ‘Identification and evaluation of innovation policies in the Adriatic Region’. It summarizes the main findings of the qualitative research on innovation policy mix in Bosnia and Herzegovina. The main findings reflect data and information gathered through literature review and in-depth interviews with key policy stakeholders i.e. government officials responsible for S&T policy in Bosnia and Herzegovina (BiH). All of the expert interviewees were initially identified on the basis of internet search, that is based on the review of government representatives responsible for S&T policy formulation, and then selected for interviews based on recommendation from the network of researchers and/or international experts who conducted previous/ongoing research on innovation policy and S&T policy in BiH.

More specifically, the aim of the qualitative research was to evaluate innovation policy in BiH, while also attempting to identify key policy challenges, policy perspectives and best practice(s), (if any) and assess the potential for their transfer to other countries. For this purpose, the semi-structured interviews were conducted with policy makers and key experts on innovation policy in BiH. The interviews were structured to assess key policy aspects including (i) legal and institutional setting, (ii) policy formulation and governance, (iii) policy evaluation and monitoring, (iv) policy perspectives and challenges, (v) best practices examples. The 5 sections cover a wide range of questions and issues that were addressed and discussed in detail. The principal questions include questions relating to the critical



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assessment of the existing legal framework (e.g. laws, coverage and compliances); assessment of policy formulation processes and responsible institutions (e.g. validation and assessment of key strategic documents; identification of key institutions and innovation actors); assessment of institutional capacity and governance structure (e.g. organisational, knowledge & funding capabilities of responsible government bodies; the role of research, academic, and intermediary institutions); assessment of policy programmes and specific policy instruments as well as policy program impact analysis. Specific reference was given to identification of policy priorities and key barriers to reach boarder impact on the existing research system.

General Policy

1.1. Policy background

During socialist period, S&T and technological progress in Bosnia and Herzegovina was considered as an essential 'productive force' underpinning successful transformation of the economy and industrial progress. Investments in R&D amounted to 1% of GDP in 1990; thus GERD amounted to 1.45% of GDP in the 1985-1989 period (*EI (1991) cited from Silajdzic, 2012a*), compared to an estimated less than 0.3 percent in recent years. At that period, not only was state spending on research higher than today, but also strong industrial institutes existed in the aeronautics, energy, metalworking, machine tool, automotive, steel, defence, electronics and agri-food industries. R&D system consisted of 66 R&D institutes and 22 Scientific Research laboratories (extra mural, independent research institutes) closely linked to industries (Silajdzic, 2009:2011). R&D investments presented a main source of industrial innovation.

In 1995, the Dayton Peace Agreement established BiH as a sovereign state, with complex and decentralized administrative structure dividing the country into two entities, as main administrative units, The Federation of BiH entity further divided into ten cantonal government units, and Republic of Srpska entity, along with very limited competences at the state level. In the aftermath of the Dayton Peace Accord, the BiH economy was faced with massive physical devastation of its productive capacity, devastated human & physical capital,



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broken and lost market linkages, broken collaborative- supply-chain linkages, dis-economies of scale as lay in market fragmentation, and overall bleak industry revitalisation opportunities. Policies of industrial and corporate restructuring relied on privatisation of state(socially) owned capital, as a supreme solution to boost market efficiency and promote private sector growth. None the less, privatisation in BiH has been generally characterised by low investment interest, limited economic impact and massive policy failures. In the course of transition, technology related issues have been largely neglected, mirrored in a ‘hands-off’ approach to industrial restructuring and re-industrialisation. The ‘lesser fare’ doctrine wrongly perceived as systematic withdrawal of state from all economic activities including support to innovation. In line with this ideology, restructuring and/ or revitalisation of National System of Innovation (NSI) or R&D Systems was not considered important. Precisely, S&T and innovation generally perceived as a liability and unnecessary burden:

- a) no general purpose funding of scientific and R&D related institutions
- b) no S&T and innovation policy, only until relatively recently
- c) pre-war institutional infrastructure ‘abandoned’

This has been accompanied with missing industrial policy in the early years of transition reforms, as well as deficient industrial policy in recent times. As a consequences, BiH economy soon became to be characterised by massive ‘Erosion of NSI’ and persistent de-industrialisation throughout the transition period driven by deprived technological upgrading opportunities of its industries, with modest signs of industry revitalisation (Silajdzic & Hashi, 2011; Kaminski and Ng, 2010). The eroded NSI were prominent in closure of research organisations and prominent research institutes, ‘disappearance’ of industrial R&D function and innovation activity, lost partnership and innovation linkages (pre-war), low demand for innovation and limited revival of research cooperation (Silajdzic & Mehic, 2014; OECD 2013). Past empirical research has identified severe consequences of eroded NSI, including estimated severe negative impact on enterprises’ competitiveness (Silajdzic 2011:2014), bleak prospect for technological upgrading and ‘catching up’ (Halilbasic, 2012; Silajdzic, 2012b). All in all BiH economy is characterized by a ‘wedge’ that is technological and structural in its very nature, explaining diverging trade patterns and poor technological performance of



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industries, with specialisation in traditional low-tech industries, and restructuring away from industries with higher value-added. In view of these, strong policy measures are needed to reverse these trends.

Following the dissolution of Yugoslavia and conflict related adverse developments, the structural reforms and the overall approach to transition of BiH economy left the country with the lost relatively good position in terms of science and research infrastructure, with the significant gap between industry and science presenting a major challenge in rebuilding the science and research system.

1.2. Innovation Policy overview

1.2.1 Policy formulation and governance

Innovation policy is relatively a new phenomena in BiH. First innovation programmes have been adopted only in 2007, most of which are ongoing. The new institutional and policy structure is only emerging. As a matter of fact, BiH is in the process of establishing a new NSI-research and science system(s) and science and innovation policy. It has recently developed its basic legal framework to support science and research. A big step forward in terms of basic legal provisions at the state level present the adoption of *the Framework Law on Higher Education (2007)*, *Framework law on Scientific Research Activities* and *the Coordination of Internal and International Scientific Co-operation in BiH Science (2009)*, and *the Law on intellectual property rights (2009)*.

Main documents and policies concerning R&D activities and SMEs include:

“Strategy of Science Development in Bosnia and Herzegovina 2010 – 2015”

‘Strategy for the development of Science and Technology in RS 2012-2016’

“Strategy of Science Development in the FBiH”?? (drafted in 2011 not adopted yet)

- *State level policy*

The adoption of Strategy for the Development of Science in BiH – 2010-2015, that is currently being revised has clearly identified the roles and responsibilities of key innovation



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actors at the state, entity and canton levels. The S&T policy is entirely under the competences of entity level governments, following the decentralized state constituency.

The state level competences reflect policy coordination and support to international cooperation. Support to innovation and research activities is managed through narrow financial support activities and administered by Ministry of Civil Affairs (MoCA) at the state level. The funding activities are principally related to enable and support access to EC, COST and EUREKA projects.

Authorities at the state level have only limited responsibilities and no competences over policy formulation and implementation at the entity level. There are no effective coordination and cooperation mechanisms in place among different levels of government that are necessary to ensure effective implementation of the strategy at the state level. Hence state level innovation policy programmes are not fully in line with the objectives and priorities set out in the document apart from support to international collaboration. Given this, it is almost impossible to assess policy impact and its effectiveness on the state level, other than consider the policy impact on research collaboration activities. The current strategy revision process needs to address these issues of governance and coordination in more detail, or simply focus on providing systematic support to international research collaboration, and abandon S&T strategy at the state level. Yet, the ongoing revision of the strategy document aims at providing systematic support to linking science and industry. However, the strong political commitment is necessary for both adoption and the implementation of policy measures other than current narrow support to international innovation cooperation. Moreover, integrated innovation strategy at the state level may be ineffective given the decentralized governance structure, including the highly decentralized regulatory and financing structure between the two entities, and limited funding at the state level. What seems necessary instead, is to harmonize and synchronize the existing strategies between the state and entity levels, the process which seems fully absent according to interview results.



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- *Policy in RS*

Parallel with this process of formulating and revising innovation strategy at the state level, the strategy for S&T has been developed in the RS (2012-2016). The strategy focuses on both promotion of scientific research and applied research as well as on innovation in a more general sense. Unlike other strategic documents, this document identifies the sectors of strategic importance to RS, and clearly sets thematic research priorities (i.e. *agriculture & food, new materials, ICT, medicine and health, energy and energy efficiency, environment & ecology*). In the course of interview, we cast some doubts on the existing innovative and research capacity in RS and real innovative potential for the selected sectors i.e. medicine and health, new materials, but were convinced that research priority areas have been carefully selected also upon considering existing research capacity, real innovative and economic growth potential in RS. This is the only policy designed specifically to target individual sectors, although the funding schemes do in principle cover a broad range of priority areas, or assure some flexibility in funding research activities.

The strategic document has been carefully prepared and based on wider consultation with major stakeholders involved in innovation activity as well as on the results of firm level survey, and needs assessment of innovation actors. Upon careful selection of criteria, the strategy has identified key priority areas to support innovation and research and these include (though not limited to) assessment of industry/sector competitiveness potential, existing knowledge and research capabilities linked to the specific sector, assessment of sector's wider socio-economic impact.

Recent Innovation policy programmes in RS are developed in accordance with the document and administered by the Ministry of Science and Technology RS.⁷ Although systematic support to business R&D and innovation collaboration are not clearly envisaged by funding instruments, the criteria applied for selection stimulate innovation collaboration between firms and universities or wider research organization. Moreover, unlike other governing institutions in BiH, the Ministry of Science and Technology (MoST) RS attempts to assure

⁷ The detailed description of these policy programmes and funding instruments is given in the Innovation policy mix document.



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high quality research by applying rigorous academic standards. Overall, unlike other government bodies, the MoST RS is highly concerned about policy effectiveness and policy impact. The efficiency of policy design in RS has created good prerequisites for some limited activities that may have an impact on large number of existing SMEs' and their innovative/imitative capabilities. Moreover, the staff is continuously engaged in evaluation and revision of policy design, by searching for best practices, creative thinking and integrating feedback from beneficiaries'. The total funding allocated to support science and research activities in RS is rather limited and it amounts to about 443 000 EUR (actual expenditures), with limited funding available per research project (max EUR 20 000 – 25 000). The interviewers agree that current dispersion of funds inhibits more effective use of applied measures. In view of this, the staff has engaged in concentrated efforts to support large scale research project. Although SMEs cannot directly apply for these funds, they are highly encouraged to collaborate with academia and research institutions. The fact that SMEs have limited knowledge and research capacity OECD, et al. (2012), (also frequently noted by interviewees) is an argument worth considering when thinking about policy effectiveness.

New strategic documents are currently under preparation in RS. For example, the new strategy for higher educations is currently under preparation, and activities linking SME strategy with science strategy are also underway. The strategy aims at integrating higher education with S&T strategy. This may hopefully present a good step forward in terms of developing an integrated innovation strategy in RS, and linking university innovative efforts with industry needs, and SMEs.

- *Policy in FBiH*

The situation in FBiH is rather bleak. The S&T strategy for FBiH was prepared back in 2011 but was never officially adopted due to lack of political commitment to support research and innovation on a larger scale as envisaged by the document. The new S&T strategy is under preparation for FBiH (2016-2026). Given this, the current funding support and innovation policy measures are not inline with any strategic document and research priority areas remain



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unidentified in FBiH. Innovation policy programmes are targeted to support scientific research and skills development principally among public higher education institutions.

The irony is that the largest share of public funding that goes to support research activities in BiH, is allocated by Federal Ministry for Education and Science with no reference to any policy document (some 1.3 million EUR). Thus, more than 4/5 of this amount is distributed directly to public universities and public research organization in the form of an ongoing support to R&D activities. The policy makers have rightly noted that the ministry is both understaffed and is lacking competences to distribute these funds appropriately, which seem a reasonable argument in favour of an on-going support to R&D. Although, general purpose funding of research organisations and HEIs is needed, or is ultimate priority, some criteria that would call for university-industry collaboration would be preferable, especially considering limited/eroded research capability of HEIs and limited financial resources available. A simple selection of research priority areas and preference given to applied research or research with commercialization potential would be beneficial.

Instead, these funds are administered by public Universities (HEI) through internal competition calls, without considering the wider use and impact of funding research activities. Given the linear pattern of funds distribution, individual faculties receive about 9 000 EUR for financing their research and other research activities per annum. The individual university budget is too small to have an impact on national research system. Put simply the largest individual public funding support is allocated almost exclusively for the purposes of scientific and basic research with no reference to applied research or research thematic fields, and no visible links between HEI and industry. Hence, the limited R&D funds available to individual faculties inhibit quality research. The decentralized pattern of funds distribution and dispersion of funds within individual Universities not only prevent excellence in research and innovation by academia, but hinder the development of larger scale research capacity among public research organisations and HEI, and within areas with significant growth potentials. Given the limited financing available and per project grants, the reallocation of funds is merely oriented toward financing human capital and skills development and general support



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to science and research activities, and much less financial resources is allocated on scientific research.

- *Policy coherence and governance*

It is important to note, that there are no demand side policy measures applied in BiH in terms of providing tax incentives for investors in R&D activities or through stimulating innovation by procurement policy measures. At the top of it, the acquisition/import of technology or research equipment is not exempt from custom or VAT duties unless it is financed by international donor community. The latter exemption poses the only existing incentive to research and innovation in the country.

Likewise worrying is the fact that an integrative strategy to support innovation and technological upgrading is not existent in the country either at the entity, let alone the state level. The notable exception to this, present recent efforts by RS government officials to coordinate SME, Higher education and S&T strategies. Strategies are being drafted independently and with no reference to the importance of policy coherence between, for instance, the Strategies for SME development and the Strategies for S&T. Coherence between these strategies and applied policy measures are crucial for promoting SME development, particularly if considering the limited financial resources available to spur SME growth. The running funding schemes attempt to follow targeted activities defined in the strategies, with visible division between ministries competence lines in terms S&T strategies are mostly designed to target non-profit science & research organisations, while SMEs strategy funding schemes present the only support measures to private companies (with the exception of MoCA that provides financial support to BiH firms to participate in COST and EUREKA projects).

- *Funding*

As of 2014 Agency for Statistics of BiH reports on science, technology and innovation activities, according to the international standards set out by the OECD i.e. Frascati manual. According to the first statistical release GERD in BiH amount to 70.4 million KM (35 mill



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EUR) which is equivalent to 0.38% of GDP. This figure seems significantly higher compared to the earlier estimates of GERD.⁸ Gross expenditures on research and development (GERD) in BiH have been estimated at 0.1 percent (*OECD, 2013*). Estimates are usually quoted between 0.1 -0.14% (Europe, 2011). This level of spending is significantly lower compared to pre-war level and significantly below the EU-27 or even SEE averages (1.85 and 0.46 %, respectively). GERD are inconsistent with the country's national income, and represent only 0.04 % of GDP per capita

The new official statistics also provides data on the actual government expenditures on R&D in BiH for the year 2014. According to these official data the level of expenditures is much below the earlier estimates, with total actual government expenditures amounting to only 13.8 million KM (less than 7 million EUR), that is about 0.07% of GDP. Hence, the share of government expenditures going to business sector is less than 2%, equivalent to 118 000 KM (59 000 EUR) (Agency for Statistics of BiH, 2015). Moreover, R&D spending in BiH is heavily concentrated toward basic (over 84%) as opposed to applied research (*ASBiH, 2015; OECD STI, 2011*). Notwithstanding this, the results of this survey, show the strikingly low amount of actual public expenditures on innovation and research. The total public funding of research and innovation activities for 2015 is estimated at EUR 900 000, following the detailed assessment of the innovation policy programmes of the three ministries involved and allocation of financial support for targeted activities. The breakdown of total expenditures by institutions allocated to research and innovation support is provided in Innovation policy mix table for BiH. If we compare the BiH Agency for Statistics recorded actual government expenditures on R&D as per 2015, and the figures observed by this report the official statistic records present much higher level of funding (seven times higher), principally due to the fact

⁸ However, there seems to be a serious problem with these data in terms of their reliability. Huge discrepancies are noted between the data on actual government expenditures on R&D equivalent to **13.8 million KM** in the Government budget outlays for R&D, 2014-2015, and the data on sources of financial funds spent on R&D reported in GERD statistical release. The latter report clearly indicates that the central, entity and other levels of government financed R&D activities in the amount of **31.7 million KM**. No doubt these financial resources need be budgeted before they are transferred to R&D beneficiaries. For this reason we cast some doubts in terms of how reliable the GERD indices actually are, since they seem overestimated, at least in the context of government financing if compared to actual government expenditures on R&D.



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that they also integrate government funding of research activities undertaken by HEI from all level of governments.

According to the same source, the business R&D expenditures are recorded to be 13.7 million KM, equivalent to about 0.07% of GDP, and financed almost exclusively by internal sources of funding i.e. 88% of expenditures. Industrial R&D expenditures barely exist. (*Silajdzic, 2011; OECD, 2013*). There are no exact figures estimating recent Industrial R&D activities (data), although we can consider the R&D expenditures by engineering and technology sector as a good proxy indicating poor presence of industrial R&D activity in BiH. Total R&D expenditures by this sector amount to only 4.5 million EUR which is hardly worth mentioning (ASBiH, 2105).

No doubt, with this level of funding, and especially considering the limited government expenditures on R&D and government support to business R&D, one can hardly expect re-establishment of national-system of innovation, which seems prerequisite for successfully adapting, applying and diffusing technology and know-how. Needless to say, building NSI is a long term and multifaceted process, determined by complex, interrelated and interdependent forms of knowledge, capabilities and collaboration networks of different stakeholders involved. However, financial resources are needed to effectively support creation of know-how and technology growth of business enterprises. Sufficient funding support is a necessary precondition for innovation and successful catching-up process by the business enterprise sector. Increasing the overall level of funding innovation activities across all levels of government and integrating private sector into the existing R&D system has been stressed as key priority by interviewers.

2. Policy structure and governance

2.1 The role of Government

The governance of innovation policy in BiH is designed in accordance with the highly decentralised state structure and its complex constituency. As noted earlier, three ministries are effectively responsible for S&T policy design and its implementation:



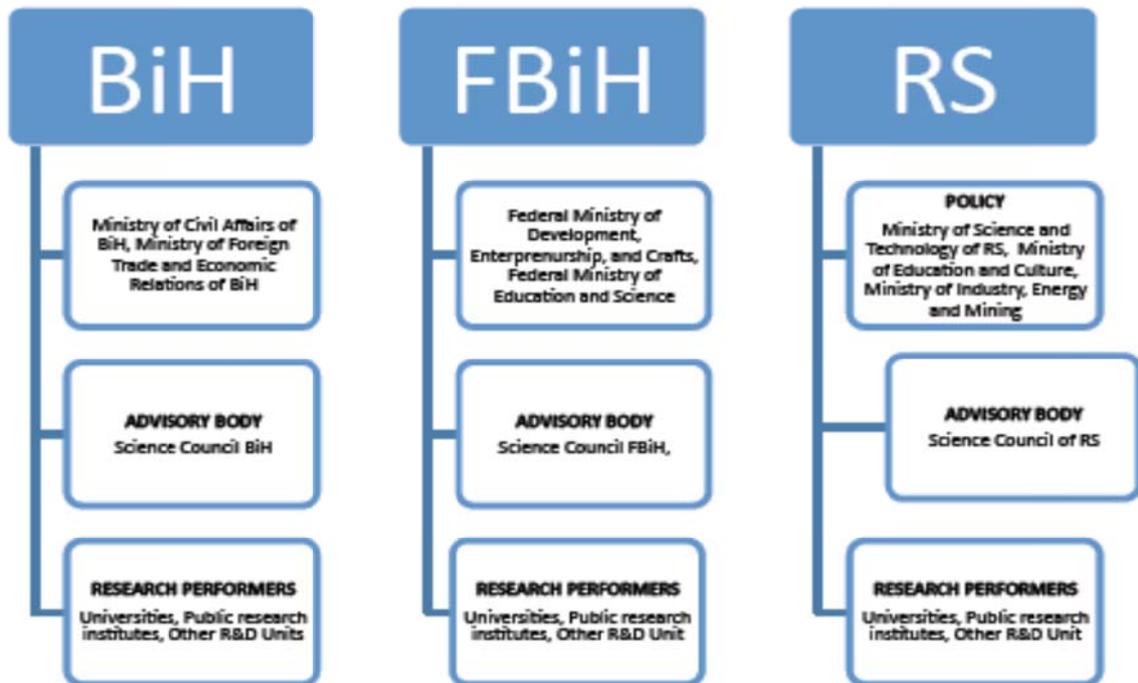
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- MoCA at the state level, Ministry of Science and Technology in RS, and the Federal Ministry of education and science in FBiH

Innovation policy is drafted, funded and administered by the relevant ministries. In principle policy makers act as funding organisations, and these two functions are not separated following the best practices. This is truly problematic considering the limited competences and capabilities of the ministries to adequately address and evaluate innovation and research proposals, and especially considering the needed flexibility related to the updating and modifying research projects. Although government officials lack specific technical expertise and knowledge needed to implement and provide technical assistance to project proposals under implementation, they engage technical expertise to facilitate the project support effectively. Still more targeted interventions by experts may be welcome in the course of implementation of research projects. While, the problem of lack of competences is bypassed by special commissions, and/or steering committees for evaluation and monitoring that is comprised of government officials and S&T experts in the field, the problem of mitigating the risks associated with research project outcomes along the different phases of project implementation remain an open issue. Engagement of technical expertise and technical assistance to assist and evaluate project proposals and its implementation remains a necessary precondition for successful selection and implementation of innovation support programs even of running small scale funding schemes. This is much less of an issue in RS as opposed to federation entity and state level. However, generally the share of private sector in funding programs is extremely low across all levels of government.

The policy design and formulation is supported by the recently established Science Councils (See chart below). Science councils advise on the preparation of policy support and the annual programs for scientific research; make propositions and take initiatives on strengthening the innovation system at the state level, comment on the innovation programs, undertake external and internal evaluations of research activities. Limited expertise on diverse and complex issues related to industrial innovation.



Source: (OECD, 2011)

Strengthening the capacity Science councils has been stressed as an important priority by most government representatives. However, science councils may be weak instruments to advise on/develop coherent and strategic measures for innovation and technology targeted investments in BiH, given their heterogeneous scientific profile and diverse/dispersed interests among academic workers in different fields. It is not surprising, then that currently Science Councils have not played any significant role in developing systematic research and innovation support programs.

2.2 The role of inter-mediary actors

The role of intermediary actors in strategic support to innovation and technology is missing. The current governance and research system structure is weak as it effectively has no intermediary actors responsible and performing targeted and large scale innovation and technology investments. Recent efforts to establish science and technology parks, and promote cluster initiatives at all levels of government present a good step forward (e.g. Innovation Centres Banja Luka, Technology parks in number of micro-regions across the



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country). However, the institutional setup is weak and not functioning properly, due to lack of sufficient and systematic funding, lack of competences and expertise etc. Several measures in support for SMEs, science and/ or technology parks, incubators and innovative clusters have been put in place at different levels in recent years, like small grants but these measures remain ineffective in establishing the proper structures and work of these institutions, and prompting systematic linkages with universities, business and industry. General roles/activities of these institutions include; support to start-up firms; Promotes cooperation between business and universities; integration of different socio-economic and political actors, technical capacity building and consultancy. Most of these institutions are only emerging, and generally face financial resource, human capability and technical capacity constraints and organizational challenges.

The National S&T Strategy also proposed the establishment of a technology parks across different branches and across the entire country. For instance the technology park in Sarajevo with a focus on information technologies, electronics, mechatronics and bio-medicine; technology park in Tuzla with a focus on chemicals, IT and energy; technology park in Mostar focusing on processing of coloured metals, agri-business, energy efficiency/renewable energy; technology park in Banja Luka with a focus on electronics; and technology park in Zenica dedicated to new materials, metal and wood processing (Ergarac, 2014). These strategy measures have not yet been translated into effective policy actions.

The impact of all these efforts is rather weak. The real challenge in BiH is the technological upgrading of existing industries and across number of sectors with viable economic potential. Whether cluster initiatives and technology parks of the kind proposed can be sustainable remains an open question. The sustainability of most of the incubators and technology parks strongly depends on the character of support these institutions may get from the government.



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2.3 The role of R&D and academic organisations

Most of public research infrastructure is inherited from the past (i.e. old system) and persist to be mainly located within public universities. However, the institutions have been through a severe 'erosion' of research capabilities in the course of transition reforms, principally due to the lack of funding opportunities and human capital erosion. Eventually, nowadays many research-oriented institutions seek to exist. The 'surviving' institutes operate in a 'vacuum', with limited material and technical capacities necessary to undertake research activities, and with no systematic links with gov't and industries. None of these institutions has access to permanent funds in the form of general purpose funding, and experts rarely engaged in research either basic or applied, but rather operate on the basis of short term consultancy projects/services.

Public universities & Research laboratories/institutes:

- within public universities (i.e. 8 public universities include 2 in RS and 6 in FBiH and related scientific research institutes include 11 in RS and 20 in FBiH)
- other scientific research institutes include 4 within private universities in RS and 10 research institutes in FBiH registered as private legal entities)

2.4 The role of business enterprises: company profile

According to official statistics number of employees engaged in R&D by private sector amounts to only 373 persons altogether, and total R&D expenditures by private sector amount to only EUR 6.8 millions. Although there is limited R&D function, firms do engage in innovative activities. Below, we consider more closely some survey data, reflecting on R&D activity in a more general context by business enterprises in BiH:

1. RS Pilot Survey (1200)- R&D expenditures 0.3 % of sales for small-size; 0.63 % of income for medium-size enterprise (MoSTRS,2012)
2. OECD(2013) Enterprise Survey (150) – 86% firms do engage in innovative activities in the agri-food sector
3. Silajdzic (2011:2014) Manufacturing Enterprise surveys (300):
 - *Percentage of firms with formal R&D: 9%; Innovation active firms: 78 %*
 - *R&D/innovation expenditure, % of sales 0.24, about RS survey result!*
 - *Patents registered abroad, ratio 0 (only 3 firms in the sample)*
 - *Patents registered domestically, ratio 0 (only 2 firms in the sample)*
 - *New products, % of sales 18.45 (max value 19.31)*
 - *New processes, % of sales 18.40 (max value 24.09)*
 - *S&Tl: Employment in MHT&HT estimated at below 11%; S&E staff 2.4% (average skills ratio)*

Given the level of knowledge and overall capacity of firms, it is worthwhile noticing that innovative efforts mostly relate to the absorption of existing and rather ‘readily’ available/adaptive technologies (Silajdzic, 2011). Recent innovation efforts rarely incorporate new technical/technological solutions that are ‘content’ and ‘context’ specific (Silajdzic, 2011:2014). Why is this important? The development of adaptive/imitative capabilities is necessary for mastering existing technologies and closing of the technological gap. These, however, require systematic gov’t support with targeted R&D investments, general funding of R&D activities and the creation of preconditions to support innovations in business enterprise sector. Investments in new technology and innovation are characterized by risks, indivisibilities and ‘learning to learn’, and are associated with considerable market failures. The innovation success is often dependant/conditioned on the complex interface of different actors (e.g. co-ordination failures), that require incentive structures in place to institutionalize innovation and research collaboration. Firms lack internal funds to finance R&D activities, let alone transition economy enterprises.



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Limited supply-side capacity i.e. technical expertise within business enterprises, limited cooperation and innovation collaboration, accompanied with small research grants hinders the potential for more effective use of innovation support measures. In the light of the foregoing discussion it is important to emphasize that integrated approach to technological upgrading and innovation is necessary as development of imitative capabilities by firms and technology absorption requires integrated support for specific thematic areas and or industry specific needs. Even development of imitative capabilities related to the adoption of the old technologies demands investments in innovation. This is because technology transfer is not a process of sole imitation. On the contrary it is the cumulative and path dependant process of acquiring knowledge and capabilities as a necessary precondition for mastering and adopting technology. As such it requires investments in absorptive capabilities, through continuous investments in R&D, or engagement in diverse forms of R&D activities, research and knowledge cooperation. Given the overwhelming market failures associated with funding sources for innovation and technology activities, there is a need to raise awareness that accumulation and upgrading of imitative capabilities requires systematic support that is often content, industry and context specific. Considering current innovation programs technological upgrading and innovation as such is not appropriately targeted by present funding schemes, as well as support to technology and innovation is not coordinated across different ministries i.e. SME ministry and S&T ministry, Ministry for industry and mining.

3. Innovation policy mix

Overall, innovation policy in BiH is mainly generic in character, focusing mainly on scientific research, with the notable exception of RS that envisages support to specific thematic areas and support to applied research and technology commercialization activities. Notwithstanding this, given the limited financial resources and low awareness among policy makers innovation in broader sense is not recognized in policy documents. Overall, innovation policy at different levels of government reflects a rather narrow perception of innovation with absent systemic support to enhancing innovative capabilities of network of innovation actors. Thus innovation programs and funding schemes at the state and FBiH level place no reference to innovation policy impact on industries, business competitiveness and overall socio-economic benefits.



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Further, across all levels of government innovation funding schemes are designed to support a one year, that is a short term and small scale projects with the limited impact on research and innovation system. This is mostly due to limited funding capabilities of these institutions. However, notable differences exist in terms of efficient policy design between the two entities. It is worthwhile noticing that FBiH policy is designed to follow horizontal approach i.e. all sectors and thematic fields are treated equally, and designed mainly to support scientific research and researchers skills development at public HEIs, the innovation policy mix in RS covers much broader range of activities including innovation, research commercialization and technological upgrading. Hence, unlike FBiH or state level, funding schemes are based on clear and careful selection of criteria including the evaluation of socio-economic impact and innovation collaboration.

Financing of research and innovation activities is based on research grants as form of funding, and these are the only instruments available to support research and innovation activity. Most of financial support instruments include competitive grants for innovators, competitive grants for funding basic and applied research, acquisition of basic research equipment etc (for detailed description of policy instruments please refer to innovation policy mix table). Rather small size of the grants inhibits significant impact on research capacity or of innovation itself. SMEs are generally not eligible for funding, but are however in the case of RS encouraged to participate directly but through cooperation with research institutes or academic organization.

Innovation support funding is principally allocated via competition-based research grants and administered by: *the Ministry of Civil Affairs- at the State level* , *the Ministry of Science and Technology of RS* , *the Ministry of Education and Science of FBiH*

Most common policy instruments include:

- Competitive grants for conducting basic research, applied research and experimental development

- Competitive grants for supporting young and gifted scholars in their science and research activity



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Competitive grants for publishing scientific and research publications and journals
Competitive grants for participation in international scientific conferences and development of scientific cooperation; Competitive grants for acquisition of research equipment

Direct grants for support of scientific and professional associations

Competitive grants for the organisation of scientific events

Competitive grants for innovators

Projects for development of new technologies

Project for development of ICT

All in all, recent innovation policy mix does not recognize that innovative capabilities at the firm and institutional level evolve through complex interaction between them reflecting a systematic learning pattern and gradual accumulation of knowledge. Although government officials responsible for innovation policy are generally aware of lack of systematic support to innovation being a major weakness (i.e. officials from the responsible ministry in RS), they rightly point that limited financial resources on the government side, and missing proper institutional and governance structures on the other inhibit effective policy design. This is primarily why innovation policy and envisaged support measures are mostly designed to target individual actors and their specific, short term research and innovation activity, with no systemic support to research collaboration. Whatever the reason and no matter how reasonable or justified the cause of persistent policy failures might be, as long as firms and innovations actors perform research activities in isolation we could hardly expect that these activities may have a significant impact on national research system or industry level technological and innovative capabilities. Needless to say, that the overwhelming market failures associated with investments in research and innovation including finances, coordination failures, risks and indivisibilities, learning to learn innovation policy, call for an integrated approach and policy governance. Accumulating technological and innovative capabilities is determined by a multifaceted, interrelated and interdependent interplay between various actors i.e. business and industry, research institutions, academia, the processes in which government funding and policy support plays a key and decisive role. This is key



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policy challenge BiH is about to face, if it aims at strengthening its national (entity) research capabilities, but more importantly the imitative capabilities of firms and industries, and embark on the course of technological catching up and industrial restructuring.

Summary of key findings

Innovation support programmes are relatively recently developed and include financial instruments for financing *'scientific and research activities'* at the State and Entity levels. However, research policy in BiH is mainly generic in character:

- a) Innovation support programmes are not designed for specific thematic areas (FBiH), although in RS they are defined with reference to research priority areas and the socio-economic impact (RS).
- b) The main policy measures including financial instruments for financing are not targeted for either fields of science and/or type of research
- c) There is a lack of systematic and effective evaluation of the research supporting programmes – ex-post evaluation with poorly/generically defined evaluation criteria
- d) Poor implementation capability and technical assistance facility, administered by the relevant State/entity ministry
- e) Poor evidence on the effectiveness of innovation policy and its socio-economic impact. Poor financing is considered a major weakness.

4. Concluding remarks: policy perspectives and challenges

- The IP and innovation related governance structure is not appropriate – the current institutional setting is inadequate for both effective policy formulation and implementation. This problem is especially pronounced in FBiH given its complex administrative structure.
- More specifically, the institutional setting in place reveals critical weaknesses:
 - i) the underdeveloped institutional framework (e.g. there are no independent-sustainable technology and R&D related institutions in place, eroded human capabilities and limited



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technical capacity of existing institutions, poor or no links with industrial enterprises – general purpose R&D funding is a prerequisite);

ii) the limited capacities of existing governance structures, especially those related to skills and knowledge needed for effective IP formulation, implementation and monitoring.

- National priorities in R&D need be clearly defined, including:

- (i) policy on structural and institutional transformation of R&D systems;

- (ii) prerequisites for development of cooperation on R&D between higher education and the business sector defined

- (iii) Developed capacity to promote international cooperation and integration into European Research Area

Overall, the effective innovation policy requires not only a significant funding capabilities (which BiH lacks) but necessitates a systematic approach to a:

- first, understanding growth in terms of knowledge on the determinants of economic growth from both macroeconomic, and industry and firm level analysis, as inputs to industrial and science and innovation policy
- second, identifying barriers to technological upgrading and innovation in a specific country & industry content, as inputs to industrial and science and innovation policy
- third, a need to identify major challenges facing policy formulation that would be growth enhancing in a specific country (BiH) and industry context, including policy instruments to effectively promote industrial restructuring and dynamics, technological change and growth, regional integration and industrial cooperation International competition.



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Croatia

1) Methodology

The research team conducted altogether eight interviews in the period from 29th June till 5th of October 2015.

The respondents were selected using the reference-based method which assumes approaching the key respondents based on their specific position and knowledge on the subject. In addition, the snowball (or chain sampling) method was used, by asking the respondents to identify other relevant respondents for further research, and then selecting them based on their relevance. They were contacted first by e-mail and then by phone call in order to define the details on the interview and answer some additional questions if there were any.

The respondents were divided into four groups: Entrepreneurs, Policy makers, Academics and Intermediaries. A detailed description is provided in Table 1.

Table 1 Detailed description of respondents (1)

Name	Years of professional experience	Reason of contacting	Means of identification	Interview location
Respondent 1	22	Extensive knowledge on the subject	Recommendation	Respondent's office
Respondent 2	7	Position within the policy making structure	Project associate	Respondent's office
Respondent 3	8	Position within the policy making structure	Internet search and recommendation	Respondent's office
Respondent 4	10	Extensive knowledge on the subject	Recommendation	Respondent's office
Respondent 5	8	Knowledge and experience both as an academic and as an entrepreneur	Recommendation	Respondent's office
Respondent 6	7	Extensive knowledge on the subject	Recommendation	Respondent's office
Respondent 7	10	Position within the policy making structure	Recommendation	Respondent's office
Respondent 8	18	Reputation and vast experience as an entrepreneur	Recommendation	Respondent's office

Table 2 Detailed description of the respondents (2)

Name	Type of organisation	Position	Category	Interview date	Duration (in minutes)
Respondent 2	Ministry	Head of Sector	Policy Maker	29.6.2015	85
Respondent 1	Research institute	Researcher	Academic	29.6.2015	75
Respondent 3	Ministry	Minister's assistant	Policy Maker	27.8.2015	70
Respondent 6	University	Researcher	Intermediary	16.9.2015	45
Respondent 5	Consulting company	Consultant	Intermediary	4.9.2015	60
Respondent 4	Institute	Researcher	Academic	27.8.2015	50
Respondent 8	Private company	Owner of the company, investor	Entrepreneur	5.10.2015	30
Respondent 7	Ministry	Head of sector	Policy Maker	16.9.2015	40
				Overall duration	455
				Average duration	56,875

The interviews were conducted face to face and both parties signed the consent form containing the information about the interview structure and confidentiality provisions. The anonymity was ensured also by coding of respondents' names in all interview-related materials.

The overall duration of the interviews was 455 minutes, with an average of 56.8 minutes per interview. Two project members were always present at the interview, one responsible for guiding the interview and the other for taking notes and making sure every subject from the

interview guide was covered. The interviews were audio recorded and written summaries were extracted from the recordings as a basis for data analysis.

2) Interviews summary

Respondent No. 1

She states the main problem of Croatian National Innovation System (CNIS) was that the entrepreneur was missing from the system, and that the focus on the individual itself has been lost in the CNIS concept, although the intentions (goals) were well structured. She claims that there are no missing actors, but the existing actors significantly block the implementation of innovation. Entrepreneurs do not want to deal with scientific organizations – this is why some policies have failed. She elaborated 4 categories of innovation policies that exist in Croatia:

1. Science & industry collaboration
2. Innovation in enterprises
3. Financial instruments/Financial aid
4. Fundamental science

As the best practice she mentions Proof of Concept (POC) implemented by BICRO (main governmental innovation agency).

Respondent No. 2

She states there are no innovation policies, but one innovation policy (there is a difference between policies and measures and/or instruments). „*What is missing in CNIS is a correct educational system – we are conditioned in schools not to be innovative or creative.*” She also points to the issue of funding resources: “*Resources that have been allocated are not sufficient; EU membership should help in that term, the need for bigger integration of innovation policy and actors*” and the issue of the policy formulation and implementation process: “*The barriers in Croatia are that the process usually stops at the legitimization or implementation phase or if implemented, ends with the monitoring phase.*” She mentions the



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2013 measure for commercialization of innovation implemented by the Ministry of Entrepreneurship and Crafts as the best practice example.

Respondent No. 3

He states the main issues: lack of innovation capacity due to the structure of the economy, lack of political will, lack of strategic plan and coordination between relevant actors, the mismatch between the educational system and the requirements of the labour market. In addition he mentions: *“The state administration is dealing with a lot of paperwork and bureaucracy instead of proactively doing politics. There are too many procedures for simple things...”* and *“...there is significant resistance to change in the academic and scientific community and we did not manage to break that.”* He mentions BICRO (innovation agency) as a role model for the Western Balkan countries, mentioning Serbia as one of the countries that implemented their agency on the basis of the Croatian best practice.

Respondent No. 4

He states the main issues in CNIS: lack of technological politics and cohesiveness, lack of long term planning and a conceptual picture, lack of policy culture, and lack of responsibility of the relevant actors. He mentions the best practice in tax incentives, but that the effects have stayed on a small scale.

Respondent No. 5

He identifies the issue of allocation of funds: *“The logic of financing a large set of projects versus financing a couple of projects that could be potentially significant in further development are two different strategies.”* He also identifies the lack of institutional continuity and inability to maintain the right talents as well as a gap in the innovation funding pipeline: *“The measures did not cover all the necessary steps and there was a pattern that some of the companies received some financing in one phase but then were left with no support in the next phase.”* He also points out the lack of capabilities and human resources necessary to implement changes. He points to the lack of funding and systemicity. He mentions POC measure from BICRO innovation agency as the best practice.

Respondent No. 6

She identifies state administration as a main obstacle in CNIS, mainly pointing to the lack of coordination and cooperation between the Ministries when developing and implementing policies. She claims that the actors are inefficient and that the approach they are using is not based on the quality and systematic analysis of relevant data. Considering the best practices, she mentions POC (BICRO) and the IPA Science and Innovation Investment Fund (SIIF) fund. Regarding the actors in CNIS, she thinks that small firms (the majority of the economy) generally are not given a chance to represent their views and interests. As obstacles (threats), she mentions globalization, bad demographic situation in the country, brain drain and lack of political will for change.

Respondent No. 7

She mentions the implemented policies (measures) are not well adjusted to the local conditions. She also points out the low innovation capacity of the Croatian economy. Additional obstacles that are identified are: lack of coordination, underfinanced programs, lack of strategic approach, and lack of the political will to make innovation strategy a priority. Regarding best practices, she mentions POC measure from BICRO agency. She identifies a crucial role of the EU as a monitoring and controlling factor, able to influence the successful implementation of policies.

Respondent No. 8

Two main obstacles are identified: bureaucratic processes that hinder investment and slow and inefficient legal system, as well as major inconsistency in court decisions. He finds that the innovation support measures are made in such a way that entrepreneurs are required to adjust to the calls, and they are supposed to support their activities. He refers to foreign models of support to the entrepreneurial/start-up environment that could be implemented in Croatia, but there is a lack of trust between the government and the Croatian entrepreneurs. He mentions that innovation measures in Croatia are not automated and standardized but provided on a case-by case basis.



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Greece

Looking at the Greek economy, it is evident that Greek GDP is far from the pre-crisis level, per capita national income is still decreasing notwithstanding a significant decrease in population. Tax and benefit reforms have improved the budget position, but the burden of adjustment has been uneven and public debt is still very high.

In this situation, it is difficult to say that there is room for strategic innovation policies. In this regard, we have to take into account the fact that policies are strongly pushed towards structural reforms, as a result of the conditionality of loans from EU. Innovation policies have to be placed inside the basket of supply side policies aimed at fostering productivity and the financial resources are to be found in a large measure by looking at European funds. This is probably why the measures synthesized in the policy maps are so closely resembling the structure of European calls.

Looking at the main features of the Greek innovation system we can see three distinguishing (positive) aspects: Students participating in tertiary education; Public funding of R&D, and cooperation that shows an index higher than the EU average.

Looking at the map of innovation policies, we see a very broad range of interventions, which seem to replicate the complete structure of EU interventions, namely: Research & Development; Networking/Collaboration/Cooperation; Human Resource Development; Knowledge Transfer and Business Financing.

The Universities are also pushed to develop an active technology transfer, which includes: researchers, research groups, technology transfer, internships, SME/University cooperation, cross country university collaboration.

After 2013, an important shift towards a more decentralized setting and implementing innovation policies has been put in place. During the period 2007-2013 the periphery did not exist as an entity, and any programs that were performed on such a level were not coordinated by a central authority such as the periphery. This is the first phase of the planning and is aimed at targeting smart specialization. The main targets are linked to the specificities of the regional economy of Island:, targeting: Fish farming; Gastronomy; Marine tourism; Thematic tourism; Creative economy; Pilot actions in health; Agrifood; and Green technologies.



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The actors inside the Greek innovation system are various and go behind the central structures of the State. The main actors are: ministries, chambers of commerce and business, educational and research institutes, cultural organizations. There has been extensive consultations and think tanks to plan beneficial strategic directions. It is worth mentioning that in recent times a prominent role in setting and managing innovation policies has been attributed to the regional administration.

Moreover, a significant role is played by Universities actively engaged in the Technology Transfer. The beneficiaries of those policies are many and include: researchers, research groups, technology transfer, internships, SME/University cooperation, cross country university collaboration.

Summary of innovation interviews

As part of the interviews with key representatives the following authorities and key persons were contacted. The summary of answers provided is presented in the questions bellow.

1. The Ministry of Regional Development and Competitiveness;
2. The General Secretariat of Research and Technology;
3. The Operational unit of the Ministry of Economy - Competitiveness and Entrepreneurship;
4. The Coordination, Management, and Implementation Authority.

Background and overview of policies

1. Describe your role and the role of your institution in the process of innovation policy planning, adoption, execution and/or evaluation in our country.

All four respondents identified themselves as responsible for planning and executing innovation policies at the respective level of their jurisdiction.

2. Which main policies (that are within your organisation's authority or with which you are acquainted with) have been adopted and/or planned in the period between 2007 and present to support R&D, innovation and entrepreneurship?



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All respondents answered that adopted and planned initiatives are mainly in line with the European Union's plans and goals and are in their majority formulated at a higher strategic level.

3. Can these policies be broken down into categories (e.g. fiscal policies, grants for researchers, support measures for SMEs/other specific types of organisations)? If yes, which categories?

Research & Development

Networking/Collaboration/Cooperation

Human Resource Development

Knowledge Transfer

Business Financing

4. If yes, which are the specific measures/instruments that distinguish one category from the others? (e.g. fiscal policies are based on tax credit incentives; grants imply the existence of a good education environment; etc.). Ask the interviewee whether there are online documents available that are showing a "scheme" of each policy or group of policies; or any other source where we could create such a scheme by ourselves.

Several documents were provided from the different respondents that were then used to develop the list of innovation policies.

Actors

5. Which actors have been responsible for the adoption and implementation of these policies and what have been their roles in the process?

Ministries, chambers of commerce and business, educational and research institutes, cultural organizations, and companies.

6. To what extent have these actors been effective in identifying the main obstacles to be overcome and actions to overcome them?

According to respondents 1, 2, and 3 there is little communication with the actual actors and their effectiveness in overcoming obstacles identified. Hence, not much information is available on how they tackle with them. Respondent 4 on the other hand states that in many occasions actors want to alter the structure of the policies, yet, there are few means of

communicating these demands and making any significant changes. Once an innovation policy has been formulated there are very few feedback mechanisms and little can be done to change them or modify them.

7. To what extent have these actors been successful in enabling innovation / to what extent have their blocked progress / innovation?

Again respondents 1, 2, and 3 stated that they had a long distance from actual beneficiaries of innovation policies therefore were unable of evaluating the effectiveness of policies in enabling innovation. One problem in this respect is a lack of well-defined measurements to be able to compare them. Respondent 4 on the other hand stated the lack of engagement of businesses which are a very important actor in the innovation process. This is largely due to the belief that innovation policies and especially non-fiscal ones restrict agility.

8. Are in your opinion any of the actors missing in the process of policy planning and implementation?

All respondents answered that businesses are not that eager in participating, while respondent 4 stressed that many local organizations and communities tend to be difficult to attract.

Policy formulation and problems

9. How are the objectives of the policies defined and measures and target values set?

All respondents argued that measures and target values are very seldom set and are in most cases just a declaration of work packages and deliverables.

10. Did any theoretical or best practice models inspire your initiatives (if applicable)?

Almost all innovation policies are instructed by the European Union therefore there is little room for including best practices.

11. What do you think about the definition of the objectives, measures and target values of the existing policies?

All respondents stated that this is probably the most important issue at least for Greece since there is no prediction of the impact of each innovation policy and therefore no accurate way to measure the extent to which objectives have been met.

12. In general terms, do specific problems arise in each category of policy, leading to the failure of the policy? How are these problems addressed in particular policies? (e.g.

for accessing R&D tax credit measures, some firms declare activities that are not exactly research based).

All respondents answered that coordination and collaboration are the most usual issues that occur especially in innovation policies that require joint effort by more than two partners. In addition there is little flexibility in the circumstance that one actor does not do his part.

Monitoring and coordination

13. What arrangements have been put in place to monitor the progress towards the policy objectives and target values, ensure feedback, and take corrective actions, if necessary?

All respondents agreed that the only method that currently exists is tracking if deliverables and milestones have been met through reports produced. Feedback and corrective actions have few methods of been traced back.

14. What is your assessment of the particular policy measures: have they achieved the aims? On which basis do you state so (e.g. for the existence of specific outputs: new patents, new publications etc.).

All respondents unanimously agreed that although innovation policies may reach stated goal there is no sustainability of outcomes. In addition the statistics agency gathers data that are not that beneficial for evaluating the impact that innovation policies may have.

15. Have the different policies and policy measures been coordinated with other programmes (e.g. EU Structural Funds, national programmes, inter-regional programmes)? How and by whom?

All respondents agreed that policies are in their majority coordinated with other programs such as European funds of various categories.

Perspectives

16. Based on your experience, what are the top challenges for the area of innovation policy in this country?

All respondents pointed out that there is a great lack of trust towards effectiveness of innovation policies and actors are therefore very hesitant to invest any significant time or resources.

17. What are the main trends in this country concerning innovation policy system (centralisation vs. decentralisation, planned initiatives)?

Respondents said that although the innovation policy system is predominantly centralized, there is a trend towards decentralization with the peripheries now playing a very important role in developing innovation policies, yet this is still at a very early stage.

18. How should in your opinion successful support for innovation be organised (organisational level, actors, form of cooperation, measures)?

Respondents argued that a tendency towards decentralization was a positive step since there would be easier control and more communication between actors and policy makers. In this direction further decentralization to more local authorities should be encouraged.



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Italy

Authors: Claudio Cozza (first part); Saveria Capellari and Antonio Salera (second part)

In Italy, main responsible for Research policy is the Ministry of University and Research (MIUR), while Innovation policies in a broader sense are managed by the Ministry of Economic Development (MISE). We report here some insights of the interview we had with a representative of MISE.

On-going policies managed by the Ministry and discussed during the interview (also broken down by typology) are about: purchase of new instrumental goods by companies; horizontal tax credit for R&D; innovation policies tailored for specific actors.

Discussion: innovation policies managed by the Ministry can be considered a sub-category of “competition policies”. The first main typology regards the sustain to firms that want to purchase new and innovative instrumental goods. This policy is being undertaken with two different tools: one slightly more direct (Nuova Sabatini law, which recalls an old policy by the same Ministry) and a more indirect one (Guidi-Padoan, with a 15% tax credit for new machineries; software is excluded by this policy). These policies, however, rely on the joint action of different entities: the Ministry of Economic Development, but also the Ministry of Economics and Finance and Bank of Italy, as credit guarantees are always needed for using these policies. The only entity that does not enter into these policies (but rather on education and R&D grants’ ones) is the Ministry of Research and University.

The second main typology is R&D tax credit. Over the last years, in Italy there have been several tools, often changing year by year. The aim of the Ministry, today, is to set-up a policy on R&D tax credit that can act for several years in the same way. In fact, firms need certainty that the tool is working for many years in the same way, otherwise they do not change their R&D propensity (because they fear that the increase in R&D is not supported, in the successive years, by the same tax scheme). The main requirement for the current R&D tax credit is the incremental amount of R&D as compared to the 2012-2014 period: on this amount, the tax credit is applied. This policy aims to “copy” the French best practice. In fact,



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there are some specific “additional requirements” (e.g. the investment in highly skilled workers) that might allow for the request of additional tax credit.

A third typology is the so called “patent box”. At the moment of the interview (July 2015), this tax credit on Intellectual Property Rights (patents, trademarks etc.) is still under discussion in the Italian Parliament, but it is expected to become law soon. It is however a tool mainly targeting large firms.

Then there is a great work on-going at the Ministry of “rationalisation” of existing micro-interventions. In the past, in fact, in Italy many “small tools” were implemented, that are now more and more substituted by a unique strategy. The closing of these small tools has allowed to “save” more than 1 billion euro, that have now been moved to other tools. In general, these new tools regards strategic projects, with: a longer term (around 36 months), higher amount of investment (between 5 and 40 million euro) and compulsory collaboration in innovation (e.g. with Public Research Organisations). Two key topics for these investments are the Digital Agenda and the Sustainable Industry. These projects might be funded with direct sustain, but there are limitations coming from the EU regulation on State aid to be taken into consideration.

The last category of policies implemented by the Ministry regards specific actors. In 2012, it has been launched the first policy supporting start-ups. Currently, innovative start-ups have to be not listed, with certain turnover thresholds, with at least 15% of their turnover invested in R&D or 1/3 of personnel as R&D personnel, or having a patent. The tools in favour of innovative start-ups range from administrative simplification to tax incentives. After the success of this first tool, a new one is now targeting Innovative SMEs. In other words, today in Italy 2 different registers exist: one of innovative start-ups and one of innovative SMEs, with similar but different requirements. The second register (innovative SMEs) is meant for continuing the support of innovative start-ups after their first 4-5 years.

A minor note: the concept of “R&D personnel”, especially for start-ups and SMEs, needs to be extended; as the traditional one regards more the larger and established R&D performers.

Policy formulation and problems. In order to define policy measure, main sources are: theoretical literature; examples from other countries; discussion with firms on the territory.



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Existing policies are well defined, the direction is correct; there is only a problem of limited resources (budget). It is particularly good the selection of specific actors; positive feedbacks have come from these actors (especially start-ups). The main problem in the implementation regards the fact that firms do not know well policy measures: road-shows and promotion of policy tools are needed (and in fact have started). Another known problem (since ever...) is that some tools – although simplified – are still a bit complicated for smaller firms.

Monitoring and coordination. In general, monitoring is compulsory for all activities. There are, anyway, different modalities: it can be performed internally or created an *ad hoc* committee. It depends on the tool. Given the novelty of many policy measures discussed in this interview, the assessment is quite anecdotic, not really objective (e.g. on start-ups feedback). At the moment policy tools are covered by National funds, although it is expected a higher synergy with EU funds in the future.

Perspectives. The top challenge is to assess even better the existing measures. For instance, linking tax credit with the performance and productivity of firms. The main trends focus on the synergy with EU programmes; for instance, several discussions are on-going with Italian regions for the Smart Specialisation Strategies. The aim is that all actors go in the same direction, developing a real “innovation system”. Linked to this, actors should be better develop their communication. Strategies should be defined together, for instance both on who has to be funded, but also on who has to fund whom. There is still a lot of confusion among Italian actors (ministries).

In Italy, also the **sub-national (regional) level** is crucial for Innovation Policies. For this reason, we include here below a focus on one Italian Region (namely the Friuli Venezia Giulia Region).

European funds made available for Medium and small firms of the territory:

The case of Friuli Venezia Giulia Region



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A long tradition in innovation policies

The region FVG is one of the five Italian regions with Sardinia, Sicily, Trentino-Alto Adige/Südtirol, Aosta Valley which enjoy a special degree of autonomy⁹ from the State and have the privilege of legislative power. The innovation policies have a long tradition. The first Law was approved at the end of 70' (L. n. 47 1978) established in the Trieste area the first science Park in Italy (Area Science Park), as to attract innovative firms and to promote the formal and informal exchange between companies and science. In fact immediately after one of the most important research infrastructures – the Synchrotrone- Elettra was established inside the park. During the following years the park actively engaged in technological transfer activities in the whole region, and starting from the .. also outside of it when recognized as a Public Research Organizations at national level¹⁰.

In the following years were approved several acts aimed directly or indirectly at boosting RDI activities: from these acts emerges clearly that the concepts of innovation, technology transfer, research etc. are meant as real sub-objectives that the regional policy promote, in all areas of socio-economic activities, from welfare to big industry. (Some examples are laws n. 19/2004 and no. 17/2008; Law no. 14/2010 art. 16: Regional Law 12/2002 art. 53A).

Then in the 2005 the Law 26 was approved. This Law was a turning point as it aimed at rationalizing the sector of public incentives towards innovation in different economic sectors covering many public actions previously carried on and regulated by Laws oriented towards specific sectors of economic activity (agriculture, manufacturing, services). A multitude of existing, sectoral acts have been repealed with the a comprehensive act whose rules were aligned and based on the EU Structural Funds model.

The latter are an important asset in the Regional Strategy on Innovation, at least for two reasons: first of all because of the higher resources to finance new policies; secondly because of the model of policy making they adopt. Since in the Docup 2000-2006 we can find single

⁹Article 116 of the *Italian Constitution*, acknowledging their powers in relation to legislation, administration and finance

¹⁰The mission wasn't without difficulties, mainly because the regional territory as a whole was far from being on the technological frontier. During its life the Area Park Consortium experimented different strategies, following the policy implications arising from the studies an innovation, being able to become in several cases an example of best practices at European level(www.area.ts.it; Taylor et.al.2009).



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policy lines linked with the innovation topic. But it is especially in the next round, the 2007-2013 programme, that RDI policies become the main policy driver, being a specific axes and collecting half of EU resources.

As mentioned before, the EU policy making model influenced the local policy making process, Focus on Regional Law 26/2005

With the adoption of Law 10 November 2005, n. 26 (hereafter Regional Law 26/2005), "General innovation, scientific research and technological development", the region sought to strengthen and qualify its action to make the Friuli Venezia Giulia an area strongly oriented towards innovation by systematizing and streamlining efforts that had previously been supported through several uncoordinated actions and characterized by sectorial logics.

The legislative measure is aimed at ensuring the social and economic development of the regional community, promoting an innovation policy based on cooperation among firms, research centers, universities, civil society, in order to foster the transfer of knowledge with a more active and effective link between all those actors; moreover the law aims at promoting the dissemination at all levels of the culture of innovation.

The architectural design of the regulatory environment is characterized by a high degree of complexity terms of organization: the law provides the establishment of a 3 years strategic plan - the regional program for the promotion and development of innovation, research and transfer of technological skills - that defines the different courses of action in terms of policy.

Each intervention, which is established directly from an article of the law, is therefore declined in general terms in the Strategic Programme and, finally, is translated in its operational aspects through specific regulations. The measures are managed by individual departments of the Administration competent for regional matters.

In addition, the law provides for the establishment of some technical bodies, composed of independent and external parties, to which they are assigned specific functions of policy, coordination, monitoring, evaluation and consultation spanning across the board, the different areas intervention. In particular, the law establishes:

- The Standing Conference for Innovation (Article 4) with supervision duties;
- The Evaluation Committee (Article 5), consisting of five experts, with three goals as monitoring the status of implementation of the program, the mid-term review in order to

propose changes to the program and the impact assessment the law on the competitiveness of the regional system;

- the Technical Advisory Committee for the economic policies (Article 15), to support policy tools design for the main sectors like industry, handicraft, commerce, tourism and services.

The main evidence of years of programming on research and innovation is summarized in Table 1: From 2000 to 2014 more than 5200 applications for RDI grants were submitted by public and private institutions in the several channels opened by the different laws. Net of withdrawals and waivers, the FVG Region has funded more than 2800 projects, for a total expenditure of over 440 million euro.

Table 1

LAW/ Programme	Projects				
	Submitted	Allowed contribution	to Waivers and revocations	Fineanced	Total
Docup Ob.2 2000-2006	630	245	12	233	49440
FESR 2007-2013	709	425	81	344	62285
RL 11/2003	188	41	1	40	5997
RL 12/2002	466	358	43	315	21905
RL 14/2010	8	5	0	5	1156
RL 17/2008	189	30	1	29	6962
RL 19/2004	113	38	0	38	3548
RL 26/2005	1899	1304	201	1103	184279
RL 47/1978	986	830	125	705	97578
PSR 2007-2013	8	8	0	8	440
Research in Health System	27	27	0	27	5260
Others	17	12	0	12	3718
Total	5240	3323	464	2859	442545

Source: Regione Autonoma Friuli-Venezia Giulia Valutazione unitaria sull'attuazione delle politiche connesse al sistema della ricerca e dell'innovazione Fondazione G. Brodolini, 2014

The average cost distribution of the projects reveals substantial heterogeneity in the nature of the projects financed. The more expensive are project initiatives financed by LR 14/2010, 17/2008 from the LR and the Docup 2000-2006, since they exceed the threshold of 200.000 EUR (net revocations and cancellations). In line with the overall average is the average



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contribution granted through the Instrument of LR 26/2005, while the minimum is likely to face the LR 19/2004, LR 12/2002 and especially for the RDP 2007-2013 (respectively, 93.400, 69.500 and 55.0000 EUR).

These policies contributed to the positioning of the Friuli Venezia Giulia among the Italian regions identified as local leaders in the 2003 European Innovation Scoreboard.

Rules evolution and the effect on the demand side

Does the evolution of the local policies towards the EU structural funds standards have an impact on the demand side of contributions?

Some may say that the overlap in terms of rules between Structural funds and Regional funds should have reduced the administrative costs of those firms that have had already participate to a EU tender, while increasing the learning costs for those firms that were used to apply only to the old local and sectoral channels. By comparing the beneficiaries of EU structural funds and beneficiaries of contributions by LR. 26/2005 we should be able to give a qualitative answer to the question.

First of all, if we consider both industry and craftsmanship sectors, we count 318 beneficiaries of EU funds (who concluded their project) while 535 were the firms obtaining contributions by applying to the local 26/2005 program.

240 companies (40% of the total number of firms that had access to public contributions) participated in both tenders; this definitely reveals a "tradition" effect: companies exploit economies of scale in terms of learning costs and capture an important share of public resources. We can even think at this share as a underestimate, considering that firms can have easily changed their legal status between 2008 and 2012. However, the fact that 60% of beneficiaries have not participated at both auctions means that, in general, the dual channel simply had the effect of widening the audience of beneficiaries. If we look at the distribution of beneficiaries by business sector, we note that among the three groups there are differences in composition that, discounting for the typical manufacturing vocation of the regional production structure, indicates a broad diversification of the type of companies that innovate.

Looking at the sectoral composition of beneficiaries, more than 70% of the companies belong to the manufacturing sector (57 different sub-sectors, varying from IT to work clothing to chicken rearing to mechanics); 20% of firms plays in the field of ICT.

Among the firms who participate to EU Structural Fund tenders only, the share of manufacturing companies drop to 53% (44 sub-sectors represented); professional activities jump to 10%.

If we look at those firms that used the regional contribution channel, 63% were from the manufacture sector (54 different sub-sectors) while 25% of firms belongs to professional (B2B) services sector.

All in all, 613 different beneficiaries out of 853 (71%) representing 181 different subsectors , can be seen as a good measure of dispersion.

Sector	Both Fesr and Lr 26/2005 (%)	Fesr only (%)	Lr 26/2005 only (%)
Manufacture	70	53	64
Professional Services	5	19	25
ICT	17	5	-
Buildings	3	-	5
Others	6	23	5
Total	100	100	100

Source: Our elaboration from Regione FVG data

The FVG region has been able to leverage the experience of EU funds for, on the one hand, leveling a system of rules and procedures that had developed autonomously sector by sector, and which over the years had created a heterogeneous policy mix; On the other hand it had widen the audience of applicants, pushing firms to invest in innovation.



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Montenegro

In absolute terms, twelve policies have been reported for Montenegro. The main actors providing support related to innovation policies are: Ministry of Science of Montenegro followed by Ministry of Education of Montenegro.

Of the identified policies, the majority (25%) which is above the average for the Adriatic area (22%) are related to Direct support of R&D. Such policies, are underlying the broader “Strategy For Scientific-Research Activity Of Montenegro (2008-2016)”.

When it comes to supports directed exclusively to the SMEs, they are under the collaboration category. More specific, one can refer to: “the establishment of a regional business center with business incubator in the northeast of Montenegro” and “Cluster development and support”.

Overall, It is evident that Montenegro is totally lacking policies that are related to innovation capabilities (both direct and indirect) and this is lower than the Adriatic average. This is interesting, as on average providing direct support through the Adriatic region has a rather high average.

Interviews with experts

Two interviews have been conducted in Montenegro. One interview is related to the innovation policy at the national level; the second interview has emphasize on policies related to improving the business environment and providing supports to the entrepreneurs in the capital city region (regional level).

Background and overview of policies

The policy framework in the field of innovation in Montenegro is in the process of preparation. Ministry of Science has the main role in establishing national innovation policy system. In accordance with to the Programme of Accession of Montenegro to the EU 2014-2018, Ministry of Science together with Ministry of Economy prepared Draft version of the Law on innovation activity which was adopted at the government session and now is in parliamentary procedure. The development of Innovation Strategy is planned for 2016 (Q III).



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The improvement of the general business environment in Podgorica (regional level) is the responsibility of the Bureau for economic cooperation and assistance of business community. In addition to consulting and logistic roles, it is trying to improve the business environment in the capital city which would further stimulate growth in the number of entrepreneurs. Also, intensive informing of interested parties about the procedures and the conditions to be fulfilled for the approval of the loan with the Secretariat for Development of Entrepreneurship and Investment Development Fund.

The main policies are as following.

At the national level:

- ✓ Providing support to R&D and innovation activities based on the Law on scientific research activity and Amendments to the Strategy for scientific research activity of Montenegro (2012-2016), through national and international programmes. However, separate innovation policy framework is in preparation.
- ✓ Support to innovation activities and entrepreneurship, provided by the Ministry of Economy through the Strategy for Development of Small and Medium Sized Enterprises 2011-2015.

Current policies (implemented by the Ministry of Science) contains concrete recommendations for each specific topic and strategic development framework with 3 strategic goals in order to develop national scientific community and to contribute to the overall social development:

- Development of scientific research community;
- Strengthening the multilateral, regional and bilateral cooperation and
- Cooperation of the scientific research community with economy.

The Action Plan for implementation of these goals provides an overview of the priority thematic tasks, measures for their achievement and indicators that will serve to monitor the implementation.

There are a variety of supporting instruments, depending on the specific task and sources of finance. Policy documents of the Ministry of Science are public and could be find on the official web page of the Ministry: <http://www.mna.gov.me>.

A the regional level of Podgorica:

- ✓ Strategic Development Plan of the Capital City 2007-2012;
- ✓ Decision on establishing of business zones in the capital Podgorica and incentives for the higher employment;
- ✓ Amendments to reimbursement decisions for communal equipping.

These are mainly, fiscal policy measures, support measures for SMEs. In more details these include:

1. Provision of land for a period of up to 30 years - free of charge
2. The release of the obligation to pay compensation for urban construction land under the condition that the investor at his own expense carry out utility outfitting locations, in accordance with the Decision on fees for urban construction land;
3. The release of the obligation to pay the annual fee for use of municipal roads in the area business for 5 years;
4. Exemption from payment of property tax for 5 years, in accordance with the Decision on Property Tax.

The decision on establishing the business zones in the capital Podgorica and incentives for the higher employment - this decision is offering following financial incentives to enterprises that carry out activities in the business area:

Actors

Government of Montenegro adopts specific policies. Ministry of Science is in charge for the preparation and implementation of policies in the area of R&D. As for the policy framework in the area of innovation (which is in preparation) both Ministry of Science and Ministry of Economy will be in charge (for the preparation and implementation). In sum, Ministry of Science gives main inputs and recommendations for the specific issues and topics related to R&D and innovations while the Ministry of Economy gives support in part related to the entrepreneurship.

However, in order to create appropriate and stabile community which will be able to use future national and EU funds dedicated to innovation projects and due to the fact that there



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has not yet been any concrete innovation policy framework, various actors have been trying to support all relevant subjects to the maximum of their capacity. In order to support innovations, several actions were implemented up to this date such as: the first CoE in Montenegro - BIO-ICT established (HERIC); Establishment of the Innovative-Entrepreneurial center “Technopolis”; Financing of grant R&D projects (HERIC); Co-financing of EUREKA projects; IPA grant scheme projects (II-III Q 2016). In sum, All relevant actors are included in the process of policy planning and preparation.

At the regional level, the Secretariat for Entrepreneurship Development, Department of Planning, Spatial Planning and Environmental Protection, Bureau for Economic Co-operation and assistance business community, the Property Administration, the Agency for Construction and Development of Podgorica, Department Manager of the Capital are the main actors involved in this process.

Secretariat for development of entrepreneurship and the Bureau for Economic Cooperation and assistance of the business community on a daily basis in direct communication with entrepreneurs, with whom perceive all the barriers they face in their daily operations, and work together to try to remove barriers at state and local levels in order to improve business ambiance, while all other local government services in the field of their competence provide effective suggestions.

The establishment of effective local government and system that on the one hand promoted the communication of city bodies and citizens, and on the other side of the city bodies and entrepreneurs, has contributed to a more efficient reallocation of resources of local government that is focused on creating affirmative entrepreneurial environment. The first positive changes were particularly observed in the speed of implementation of certain procedures, which until now were considered significant business barriers. While all actors participate actively and equally in the planning, a faster reaction of state authorities is regarded necessary.

Policy formulation and problems

Policy in the field of science and research is harmonized with the Lisbon Treaty (The Treaty on the Functioning of the European Union). Acquis, goals, guidelines and priorities of the EU



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in this field were accepted (entered into force on 15 November 2012). The priority activity of Montenegro in this field is related to the integration of Montenegrin research community into the European Research Area – ERA, as well as its further inclusion into international science programmes. Objectives and measures of the national policies are set in accordance with EU policies and recommendations as well as with national priorities.

Having in mind the importance of the entrepreneurial infrastructure, and its influence on the economy performance, the implementation of some of the measures for the developing a quality entrepreneurial ambience, has taken place. Therefore, strategies that led to establishing the first Innovation-entrepreneurial center “Tehnopolis” has been established. Furthermore, through the support of the international funds the first Center of excellence has been established in Montenegro.

Overall, the mentioned elements which are part of existing policies are defined in accordance with recommendation of the European Commission. After provisionally closing the Chapter 25 “Science and Research” within process of the negotiations to the accession to the EU, Montenegro accepted all obligations and recommendations in order to improve existing R&D system and to create new policy framework to support innovation. In this respect existing policies required further improvement and establishment of additional ones.

At the regional level, the increase in the number of newly established business entities on the territory of the Capital and investment growth are the main indicators for the success of the measures adopted. Encouraged by policies that promotes the development of business zones in the region, the idea of adopting them was stimulated.

Due to the fact that certain adopted policies already are giving positive results, it can be concluded that they have been made in a proper manner, especially if we take into account all factors.

The biggest problem, up to this date has been to gather the financial funds that start-up companies are missing. Due to this lack, through the measures that are under the jurisdiction of capital city we have tried to compensate this problem with the adopted incentives. Also in communication with other state bodies, primarily the Investment and Development Fund we are working to defining possible credit lines, which will enable increasing the number of successful start-up companies.



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Monitoring and coordination

At the national level, monitoring is provided by regularly reports which Ministry of Science prepared and submits to the Government and European Commission. Overall, the Planned actions and measures are mostly achieved. Implementation is continuously monitored so realization of defined tasks or further improvements are much easier.

All departments of local government are in direct contact for coordinating all activities, further in communication with investors, they are taking all the steps necessary for the solving emerging problems. Overall, the growing interest for investment in the business zones and investment growth are indicators that the right policies were developed.

The decision on establishing the business zones on the Capital Territory was adopted on the basis of the Regulation on business zones, and investors in the field of business zones and outside them, in addition to incentives from the Decision, can use exemptions that are defined by the Regulation on encouraging direct investment.

Perspectives

Since the innovation policy framework in Montenegro is under preparation, challenges would be in defining appropriate guidelines for support to innovations as well as to achieve good results from the implementation of defined measures and actions. Furthermore, lack of knowledge and experience and the low level of productivity and competitiveness are regarded as the top challenges for the area of innovation policy in the country.

Main trends regarding the innovation policy are oriented towards achieving modern standards and norms, so to have the ambience that will enhance the entrepreneurial spirit and innovative ideas. The growing involvement of stakeholders followed by partial decentralization, is another element.

Regarding successful support for innovation, it is very important to engage as many as it is possible key factors in order to establish a good ambience for the innovation and creativity, especially of the youngsters. Therefore, the strive is to involve all the key actors, from the



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policy makers, education and entrepreneurial representatives in order to enhance them into the this important process. Further, the establishment of the new model, which will provide the required non-financial support to newly established and existing enterprises according to their needs and level of development, particularly at the local or regional level is critical.

Serbia

With a population of around 7 million of inhabitants, Serbia is the third most populated country in the Adriatic region. It has passed through dramatic institutional and political changes, over the last decades. Following the end of the war there has been a spur of economic growth. However, the impact of the international financial crisis and numerous rounds of elections have seriously hit the economy. In general, in 2016 the economy shows a good rate of growth but the level of GDP is far from the pre-crisis level.

Serbia's economic potential remains till now unrealized due to a delayed economic transition and to the difficulties in the process of State and institution building. One of the most critical points is that the population is decreasing very rapidly. However, looking at the PACINNO innovation system maps we can single out some positive aspects:

- High percentage of Innovative SMEs
- High Public funding of R&D
- a relatively good performance in internal and external cooperation.

The mapping of innovation policies shows an important role of the State, but also interesting decentralized actions in particular concerning technological transfer. The policy intervention seem to be well organized (strategic orientation, long term perspective) and defined by the central State.

The idea clearly emerges from interviews with experts. They underlined two fundamental laws that seem to set the regulatory framework for Scientific and Research activities and for innovative activities:

- Law on Scientific and Research Activities (Science Law, 110/2005, 50/2006, 18/2010);
- Law on Innovative Activities (110/2005, 18/2010, 55/2013).

As regards decentralization, an interesting example is the case of Voivodina. One interviewee has stated: "Voivodina adopts strategies e.g. to develop of business incubators in Voivodina; the Provincial Government is responsible for delivery and implementation of different priority programs". However it is worth noting that the "the project cycle is synchronized with



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projects by the Ministry of education, science and technological Development” and it seem to be an almost perfect coordination between local authorities and central government.

Looking at the results of innovation policies the results differ from sector to sector, the best one being the ICT (as pointed out by one expert). The ICT sector is really innovative (with export of services in USA-DMS Schneider, RTRK – car electronics, gaming companies): these companies employ over 300 ICT professionals in the Voivodina ICT cluster.

As regards technology transfer, the Science and Technology Park Zvezdara (NTP-Zvezdara) is aimed at attracting innovative technology and development companies and create conditions for economic development.

Another expert has stated that “we should create the conditions for the establishment and development of a large number of spin-off companies through Business-Technology Incubator of Technical Faculties Belgrade. In this way, conditions will be created for employment of young highly educated people and for the return of our experts from abroad, which means that they stay in the country” or “an extraordinary opportunity to motivate our young researchers and teachers to turn their research results into potentially interesting products for domestic and foreign markets”. In the next 3 years we expect to have in the NTP – Zvezdara: 80 technology / development enterprises, more than 30 new, start-up companies and up to 1,000 employees, educated young people.

Speaking of missing actors in the innovation system of Serbia it was pointed out the need to take into consideration the industry’s major players, defining a closer connection and coordination between innovation and investors.



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Slovenia

In absolute terms, 46 policies have been reported for Slovenia. The main actors providing support related to innovation policies are: “Ministry of Higher Education, Science and Technology” and “Ministry of Economic development and Technology”.

Of the identified policies, the majority (30%) which is much above the average for the Adriatic area (22%) are related to Direct support of R&D.

Overall, it is evident that Slovenia is totally lacking policies that are related to indirect support for human resources & collaboration, however this is rather in line with the Adriatic average, that also has very low values for such measure.

Interviews with experts

Background and overview of policies

Tenders for creation of innovative companies, tenders for R&D projects in companies, tenders for creation and expansion of development departments in companies and tenders for joint development-technological centers, are among the most notable policies in Slovenia.

The SK-75 and SK-200 programs from SPS which cooperated with the most advanced educational programs have made an important advance. For example, convertible loans – SK75, SK200 are regarded as great initiative, and they cover the expenses of certain incubators and accelerators.

Tax credits for R&D has been a success policy. According to an entrepreneur and former government minister, the government has offered a great mechanism.

“If you really invest, you have eligible expenses, and you can prove it. It has double effect: first, you have great balance sheet, you can show you have 200.000 EUR profit, which is great for banks and at the same time you pay very little tax. But what really is a problem are taxes on salaries. As it is difficult, that a good engineer, which should be well paid, you give half of his salary to the government. It costs companies a lot and the engineer does not go to happy home, this proportion is problematic.”



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The issue of the taxation on salaries, is also highlighted by a business investor, former startup founder, highlighting that while the government has lowered the tax on profits, the salaries are unreasonably highly taxed.

According to a development bank representative, loans provided by bank and subsidized for interest rates, the difference between the market interest rate and the bank interest rate is the state subsidy. These loans are regarded as more appropriate than grants - the funds that do not required to be paid back. Stating that: *“If the company gets something for free it is not efficiently allocated. This way the companies have to think better how to use the funds, because they have to pay them back. This is one important experience, grants are not the way.”* This is similar to SPS that targets more small companies in the early phase of development, while bank loans target more the later phase and also established SMEs and big companies. However due to elements of government subsidy the development banks can finance the companies that are less credit capable and there is aversion in commercial banks to lend them. Further, the interviewee states that *“Sometimes we find out that there would be a third element needed and that is ownership capital. There is lots of projects that would want to get loans from us, but what they really need is equity, not loans. But here is the problem, that our market is not developed in the sense that the offer of VC capital would be sufficient. The second problem is that the entrepreneurs do not want to give up control of the company”*.

Actors, policy formulation and problems

Overall, the very diverse ecosystem is regarded as something positive. However, there is a need for more cooperation and more mutual support, among the actors.

The high bureaucracy in Slovenia is regarded as an obstacle, according to a development bank representative, emphasizing that the government initiatives are produced by some bureaucratic apparatus. The problem is that the companies who are the target of government initiatives are usually very simple, they try to develop a product or service and sell it. Therefore, they simply do not have the people or they cannot afford to have experts who will fill out all these forms. Thus, there is a need for simplified policies. Furthermore, the people who prepare the tenders should try to put themselves in the shoes of companies who are the target. However, the policies are created on the level of government bodies. They prepare all



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that and government confirms it, therefore it could be much more efficient if there would be more cooperation in preparation of the programs. In particular, by engaging different stakeholders in the preparation of the measures, applications etc. that are embodied in the policies.

The problem of unclear tenders, is also highlighted by a government ministry representatives that categorized the main problems when implementing various measures as: badly prepared tender or documentation, meaning that the tender is full of unclear statements that could be interpreted in different ways. However, efforts are made to solve these problems with FAQ section in which explanations are provided publicly for what has not been clear enough in the tender itself. Another problem is that these projects are usually multiple-year projects and that the speed of project implementation is different than anticipated at the application. The consequence is that the funds cannot be appropriately drawn according to needs. The companies get too much in one phase and too little in another. This could be solved if there was a mechanism that would reassign funds between two subsequent government budgets. Often the problem is that there is not enough funds and we have to turn down good projects. Problems on the side of companies: the applicants are too inexperienced when they submit applications and when they submit work reports. The consequence is that they are not selected even though they have good projects or that the work report is not confirmed. Important in this regard is to organize information days and other education of help of project offices when preparing projects. A relatively big risk is also bad financial state of some applicants. Because of that they cannot implement the project according to the signed contract. Certain number of projects is not successfully concluded because of bankruptcies, liquidations and insolvencies.

Monitoring and coordination

Even if informal, there is indeed a need for more coordination. In other words, there is a need for some kind of collective body, which would coordinate the system and establish what works and what is not working. Ecosystem as whole should learn from its mistakes and this learning should be formalized. Therefore there is need for some consulting body. The strategy



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of innovation development of Slovenia (RIS) had envisioned this kind of body. But it had no effect, it was just a debate circle, therefore now it is defunct. This body was meant for learning but it did not fulfil its function.

Perspectives

A staff member of a private support institution declares that the challenge is how to create profitable and growing companies, who will employ people. The role of state is too strong, as there is too much public money and the consequence is that this money is not so smart. For Slovenian startups, it is always easier to get public money than private, which puts them into sleep in some way and doesn't do selection, which is needed. Public money has startups on life support even though they might not have growth potential. Efficient public-private partnership is crucial. I think we need both – there is almost too much of public part, so our focus should be on private. Concretely – the venture capital industry and business angels.

From the perspective of an investor, for the future, first thing is the need is that the money the state puts in startups is more targeted and not so widespread. More targeted and more smart. Second, there is a need to relax the labor and migration legislation so that qualified foreigners from outside EU can come in. Third thing are taxes, as they always determine where people move. Last, providing means for access to national and international funds are regarded as avenue for future progress.