

INTEGRATING INTELLECTUAL PROPERTY INTO INNOVATION POLICY FORMULATION IN SERBIA

*Prepared by the Innovation Policy Section, Innovation Division, WIPO with the Expert Support of
Alfred Radauer, Senior Consultant, Technopolis Group, Austria*

TABLE OF CONTENTS

Executive Summary	3
Chapter 1 – Background.....	4
1.1 The innovation system	4
1.2 Expected outputs	5
Chapter 2 - Methodology	6
Chapter 3 - Innovation system in Serbia	7
3.1 Policy and legal framework	7
3.2 Government sector	9
3.3 Foreign project support	10
3.4 Research and educational base	11
3.5 Industrial base	12
3.6 Intermediaries, institutions and actors that support the innovation system	14
3.7 Financial support and funding agencies	15
3.8 Cooperation between the research base and the industrial base	17
3.9 Framework conditions, education.....	17
Chapter 4 - Initiatives to integrate the IP system into the national innovation system	18
Chapter 5 - Summary of discussions with stakeholders.....	23
5.1 Strategies/policies.....	23
5.2 Brain drain	24
5.3 Access to finance.....	24
5.4 Collaboration between science and industry	24
5.5 Support services	25
Chapter 6 - Conclusions	29
Chapter 7 - Recommendations.....	31
References.....	33
Annex 1 - List of interviewees (stakeholders)	34
Annex 2 - WIPO mission to Serbia	35

EXECUTIVE SUMMARY

Background - The Innovation Policy Section undertook a pilot project in Serbia because the existing body of work on innovation policy has failed to adequately address the role of intellectual property. This project was carried out in coordination with the Department of Transition and Developed Countries (TDC).

Objectives - A primary objective of this project was to understand Serbia's current innovation system, and the extent to which intellectual property is or should be incorporated therein. It included a desk review to map the innovation system in Serbia and to identify the main institutions and actors. A three-day fact-finding mission followed on November 14 to 16, 2013, in which face-to-face interviews were conducted with some major stakeholders. These interviews provided important core information.

Our findings include:

- A number of strategies relating to innovation have recently been promulgated in Serbia.
- The Innovation Law includes a Bayh Dole-type of framework to manage ownership issues and revenue sharing related to research output, and to set up an Innovation Fund.
- EU requirements and projects have been the drivers behind many of the policy initiatives and project activities on the ground.
- Serbia's Science Law links publications in peer-reviewed journals to career advancement.
- A significant number of ICT startups have been set up in Novi Sad by researchers without following the formal requirements of the Innovation Law, but with the tacit approval of the universities where the research was done.
- The universities are "non-integrated institutions," in that they are only loosely formed with faculties that exercise a higher degree of independence and power.
- The Serbian IPO provides valuable services and is well appreciated by its stakeholders.
- Awareness of innovation and IP is generally low.
- Limited funding is available from government sources as well as the Innovation Fund.

Recommendations – Chapter 7 of this report makes recommendations, including:

(a) Recommendations to the Government of Serbia that: innovation and IP-related strategies be refocused; commercialization of research results be considered a criterion for career advancement; the danger of losing novelty through early publication be addressed; and options for support by the Serbian government for international IP filings be considered, (e.g. national subsidies for PCT and Madrid applications) noting that such subsidies for PCT applications have been implemented in other countries (such as China, Italy and Spain).

complexity of the innovative process has resulted in consideration of a broader range of policy interventions. These interventions are designed to support not only the research base but also the industrial base as well as the myriad of intervening institutions and actors that facilitate collaboration between the two. They are also designed to support the interactions and synergies among all of these different elements of the innovation system.

As countries increasingly look to innovation to drive their economic development in a globalized world, the integration of the intellectual property system in innovation policy making becomes more critical. IP plays an essential role in the innovation system by generating incentives for the creation of knowledge by the research base, in enabling such knowledge to be effectively transferred to the industrial base for the creation of useful products and services, and in providing the industrial base the means for adding value to such products and services for effectively competing in the market. In addition, IP has an important role to play in a number of other policy domains (for example, procurement, immigration, tax) of concern to decision-makers in formulating innovation policy.

1.2 EXPECTED OUTPUTS

The underlying project in Serbia tries to describe the innovation system as it operates on the ground in Serbia and where and to what extent intellectual property is or can be incorporated. Practically, this requires determining to what extent the various stakeholders are aware of the intellectual property system and to what extent they are using it (a) to manage their assets (b) to collaborate with other elements of the innovation system and (c) to add value to their operations. In addition, the question arises to what extent the services provided by Serbia's intellectual property office are relevant to the needs of the innovation system stakeholders and used and appreciated by them.

The understanding gained through this process is expected to result *inter alia* in an assessment of the integration of the IP system in Serbia's efforts to create an innovation system including a set of recommendations to the Government of Serbia identifying gaps from an intellectual property perspective.

The report is structured as follows:

- Chapter 1 provides the background for undertaking this project.
- Chapter 2 describes the project methodology.
- Chapter 3 describes the innovation system in Serbia as understood from the available documentation and literature.
- Chapter 4 focuses on existing attempts to integrate intellectual property into the innovation system as understood from the available documentation and literature.
- Chapter 5 sets out information gathered through interviews with stakeholders of innovation policy in Serbia.
- Chapter 6 provides a summary of the findings.
- Chapter 7 proposes recommendations to the Government
- A list of references is provided.
- Annex 1 provides a list of those interviewed.
- Annex 2 identifies those who participated in the mission to Serbia and the authors of the report.

CHAPTER 2 - METHODOLOGY

For implementing this project the following methodology was followed:

1. Desk review – A desk review was undertaken of the innovation system of Serbia, as evidenced by the various strategies, laws and studies conducted on the system by experts, including in particular reports by the European Commission, which has reviewed the innovation systems of many of the countries seeking accession to the European Union. Through this process, the broad contours of the innovation system in Serbia were mapped and the main institutions and people that could be contacted for more in-depth information were identified.
2. Interviews – However extensive a desk review may be, it cannot replace the contextual information available through direct contact with experts and/or stakeholders on the ground. Thus, after conducting the desk review, interview guidelines designed specifically for each type of innovation expert and/or stakeholder (representatives from the university sector, industry, patent attorneys, ministries, intermediaries, etc.) were developed. The interview guidelines were sent in advance to each of the interviewees. A three-day fact-finding mission followed on November 14, 15 and 16, 2013, where interviews were conducted with each of the overall 12 interviewees separately (duration of an interview, on average: one hour). In addition, prior to the mission to Serbia, a telephone interview was conducted with an expert on the Serbian innovation system, who is located in London. The information gathered from the interviewees constitutes the heart of the learning gained in this project.
3. Report – on the basis of these interviews, complemented by the information gathered during the desk review stage, this report was developed, which makes some recommendations that could be considered by the Government of Serbia for integrating IP considerations into the innovation policy of Serbia.

CHAPTER 3 - INNOVATION SYSTEM IN SERBIA

3.1 POLICY AND LEGAL FRAMEWORK

In this first section, we discuss the main elements of the Serbian innovation system. We start by outlining the policy and legal framework conditions (such as important laws and strategies in place) and move on to discuss the main institutional set-up of the Serbian innovation system.

During the last decade, Serbia has made significant efforts to rebuild its war-torn economy and to transit from a controlled economy to a market economy. It is now an official candidate for joining the European Union and the World Trade Organization.

During this time, a series of measures were taken to create an innovation system in the country beginning with the passing of the Strategy of Scientific and Technological Development of the Republic of Serbia 2010-2015 (hereinafter called the S&T Strategy) and the coming into force of the Law on Innovation Activities (Innovation Law) of 2005, further amended in March 24, 2010¹ for the implementation of the Strategy. The Government also passed other relevant strategies and laws, such as the Strategy of Intellectual Property Development for 2011 to 2015 on June 23, 2011 (IP Strategy)² and the Strategy of Competitive and Innovative Small and Medium Sized Enterprises for the period 2008-2013 (SME Strategy)³ as well as a number of other strategies and policy initiatives⁴.

*The S&T Strategy*⁵ outlines the vision of the Serbian Government for developing a knowledge-based economy based on two fundamental principles: Focus and Partner. The idea is to focus its efforts in defined areas and to develop partnerships for achieving its objectives. Thus the Strategy *focuses* on the following seven areas as the national priorities for the period 2010-2015:

- (i) Biomedicine and human health
- (ii) New materials and nanosciences
- (iii) Environmental protection and countering climate change
- (iv) Agriculture and food
- (v) Energy and energy efficiency
- (vi) Information and communication technologies
- (vii) Improvement of decision making processes and affirmation of national identity.

Apart from the last point, these focal areas are commonly cited in many countries as key priorities in terms of innovation policy.

In terms of *partnership* the Strategy envisages that the R&D system in Serbia will partner within and amongst itself as well as with the different elements of the national innovation system as

¹ Official Gazette of the Republic of Serbia, No. 110/2005 and No.18/2010

² Official Gazette of the Republic of Serbia No. 55/05, 71/05, amendment 107/07, 65/08 and 16/11

³ Official Gazette of the Republic of Serbia, No. 55/05, 71/05 - amended, 101/07 and 65/08

⁴ See for a list in English of Government of Serbia Strategies <http://www.gs.gov.rs/english/strategije-vs.html>

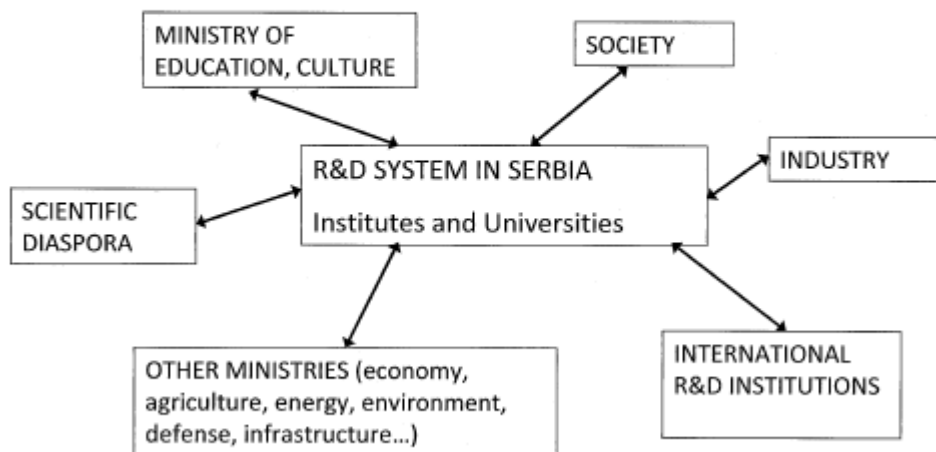
⁵ Based on information provided in Erawatch country reports 2011: Serbia (Report EUR 25702) and 2012, Review of the Innovation Process and the Corresponding Funding Possibilities in Serbia by Dragan Povrenović, 2010 and Private Sector Development Policy Handbook: Establishing a Competence Technology Centre in Serbia, OECD, June 2013 <http://www.oecd.org/investmentcompact/Serbia%20Report%20English%20Version.pdf>

depicted below: industry, international R&D institutions, scientific diaspora, ministry of education and culture, other ministries and society. Within the system it is envisaged that close collaboration will take place between institutes and faculties.

Partnership with society is sought to be achieved through raising awareness of science and the profile of scientists amongst the public. Greater collaboration between science and industry are to be promoted through tax benefits, subsidies, and support for early stage financing mechanisms and incentives for relocation of international hi-tech companies and their R&D capacities. Incentives are to be provided for the Serbian scientific diaspora to enter and participate in the local innovation system. Finally partnering through joint projects and other such ventures with international organizations and R&D institutes will be encouraged.

Figure 3 – The principle of “Partnership” as envisioned in the S&T Strategy

PARTNERSHIP



Source: Nedović, V. (2010), “R&D Strategy & National Funding in Serbia” presentation made at Forschung Austria Workshop August 25, 2010, Alpbach.

In addition, the Strategy includes plans for upgrading existing infrastructure such as buildings and laboratories and for providing new capital equipment for research, development of human capital by strengthening specialized technical schools and centers of excellence in priority areas, implementing programs for popularizing science and increasing public awareness, construction of science parks and developing housing facilities for young scientists and researchers.

The Innovation Law has as its objective the implementation of the vision and objectives of the Strategy. It defines the national innovation system as a sum of organizations, institutions and their relationships aimed at the generation, diffusion and application of scientific and technological knowledge in the Republic of Serbia. It stipulates that the ministry in charge of scientific and research activity and technological development shall be responsible for establishing and implementing the innovation policy which at present is the Ministry of Education, Science and Technological Development (MESTD).

MESTD is also, through the Intellectual Property Office (IPO) which comes under its purview, responsible for the implementation of the IP strategy. A focal point in the ministry on IP coordinates all of these issues.

The Innovation Law envisages the creation of an Innovation Activity Register where all those who receive state funds and are beneficiaries of incentive measures would be registered. The register also separately records technology companies - that is, those that apply or develop technology as an important component of their business activities, and deal with research and development, either of their own or on behalf of others. This register would be a publicly available database.

It provides for the creation of R&D and/or innovation Organizations for the performance of innovation activity which are categorized as Development and Production centers, Research and Development Centers, and Innovation Centers. This means that a particular private company can become a specific type of R&D and or innovation-undertaking organization, if they fulfill certain criteria upon registering.

The Strategy of Competitive and Innovative Small and Medium Sized Enterprises for the period 2008-2013 is another important strategy, because it focuses on SMEs which are often in the spotlight of innovation policy makers. The strategy focuses on export-oriented companies with high growth potential. Its vision is “the development of an entrepreneurial economy, based on knowledge and innovativeness, which creates a strong, competitive and export-oriented SME sector and substantially contributes to an increase in living standards in the Republic of Serbia.” It hopes to achieve the following results (excerpted from page 9 of the SME Strategy):

- More start-ups which survive the early years of business;
- Faster total growth and development of the SME sector, with a more dynamic conversion of micro into small and small into medium-sized enterprises;
- An increase in exports and a significant improvement in the foreign trade balance;
- A higher rate of employment for a highly qualified labour force; long-term capability of finding employment;
- A more balanced regional development.

It expects to achieve these goals through the implementation of basic principles contained in the following five Pillars:

1. Encouraging business start-ups
2. Improving management and workforce skills
3. Improving financing and taxation for SMEs
4. Promoting export and innovation
5. Upgrading legislation and the business environment

3.2 GOVERNMENT SECTOR

The highest political authority in the country is the House of Parliament, and with respect to innovation it is supported by the Parliamentary Committee for Science and Technological Development, which reviews and proposes to Parliament the laws regulating the area of science, technology and innovation.

The Ministry of Education, Science and Technological Development (MESTD) is the main focal point for the national innovation system of Serbia. It is the Ministry responsible for implementing

the S&T Strategy, the Innovation Law and the IP Strategy, and is the main funding arm of the Government.

The Ministry of Economy and Regional Development (MERD) is also an important ministry in this regard, as it also has some schemes available for innovation-active firms. Further, papers list the National Agency for Regional Development (which also has some funding schemes for innovation), Intellectual Property Office, the Institute for Standardization⁶, a number of Quality Certification Agencies and the “Innovation Fund” (see also further down below) as important institutional actors in the innovation system⁷.

The role of the Department for Development Entrepreneurship and Competitiveness of MERD was to provide support to enterprises in technological as well as non-technological innovations. Support was provided through grants and different programs and activities that included consulting services, diagnostic services and training on innovation. It implemented its work through the National Agencies for Regional Development (NARD).

The IPO also contributed to some of this training. Much of the funding was, however, granted for the purchasing of specialist software like integrated management systems. There are plans for implementing an innovation voucher scheme⁸ for purchasing R&D services but this has not yet been implemented.

3.3 FOREIGN PROJECT SUPPORT

The Government also cooperates with and receives support from other international and regional institutions, in particular the European Union (EU), mostly through dedicated innovation-fostering projects. Such EU projects include, amongst others, (i) the Innovation Serbia Project which established the so-called “Innovation Fund” and which is implemented by the World Bank, (ii) the Integrated Innovation Support Programme (IISP) which supports the development of the SME sector in the Republic of Serbia through strengthening of innovation and competitiveness in small and medium-sized enterprises, (iii) the Improved SME Competitiveness and Innovation Project (ICIP) which aims at improving the competitiveness of Serbian SMEs and at increasing the level of innovation in SMEs as well as (iv) WBC-inco.net which involves coordination of research policies with the Western Balkan Countries (FP7 programme) and assists in developing the relationship between the EU and the WBCs in the area of science and technology (S&T). The WBC-inco.net supports the Steering Platform on Research for the Western Balkan countries facilitating interaction between the WBCs, EU Member States, states associated with the Framework Programmes for Research and Technological Development (RTD) and the European Commission. It is a strategic body designed to deal with European, multilateral and regional issues of science and technology policies in and with the WBCs.

⁶ A standard is a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose. The Institute of Standards is the national body responsible for all issues pertaining to standards in the country.

⁷ Erawatch Country Reports 2012 page 13: by Djuro Kutlaca, "Mihajlo Pupin" Institute

⁸ A relatively small amount of money provided by a Government to encourage an SME to use specialized external services that it needs in order to innovate. See for example the UK scheme at <https://vouchers.innovateuk.org/about-innovation-vouchers>

The MESTD is also the coordinator of the activities of the Business Technology Incubator of Technical Faculties in the project Export Promotion of Innovative Products, supported by the Government of Switzerland.

These projects are very important elements in the policy and legal framework of the Serbian innovation system as they establish/strengthen institutions and shape policy.

3.4 RESEARCH AND EDUCATIONAL BASE

The research and educational base as described by Kutlaca⁹ "...are private and public research organisations¹⁰ in Government, higher education and the business enterprise sector. R&D organisations in the public sector form a block which comprises seven public universities with 78 faculties, the Serbian Academy of Sciences and Arts with its 10 scientific institutes, 28 other scientific institutes, a center of scientific excellence, 30 research institutes, 65 innovative organisations, five business associations for support of innovation and 107 registered innovators." Registered innovators are those registered under the Innovation Law in the "Register of organizations and individuals accredited for Innovation activities in Serbia." Furthermore, a number of infrastructures need to be mentioned including the scientific and technical infrastructure, which encompasses the academic intranet, a gene bank, an accelerator, libraries of the institutes and faculties, the University Library and the National Library of Serbia. R&D organizations in the private sector include seven private universities with 45 faculties, research resources of foreign companies in Serbia and research and innovation resources of domestic firms.

Some selected universities are University of Novi Sad; University of Belgrade; University of Nis; University of Kragujevac; University of Arts in Belgrade; public university in Novi Pazar; University Megatrend; University Metropolitan; University Singidunum; and International University in Novi Pazar.

The University of Novi Sad, for example, has some 50,000 students spread over 14 faculties and two research institutions, and employs some 4,500 people. The faculties are independent legal entities that manage their own funding, curriculum and other affairs. They are loosely integrated into an entity called the University, but in and of themselves the faculties are largely independent of the University. This is a special feature of the Serbian (ex-Yugoslav) university system, and, as we will discuss, will have considerable impact on the way(s) IP support services can be sensibly delivered to the universities.

The University of Belgrade includes 31 faculties and 11 institutes. In addition to being a non-integrated university, the University of Belgrade unlike the University of Novi Sad has no campus and is spread out in different buildings in the city of Belgrade.

⁹ Kutlaca, D. (2013) Erawatch Country Reports 2012: Serbia, p 11.

¹⁰ "Research organisation means an entity, such as university or research institute, irrespective of its legal status (organised under public or private law) or way of financing, whose primary goal is to conduct fundamental research, industrial research or experimental development and to disseminate their results by way of teaching, publication or technology transfer" Definition by Innoviscop at <http://www.innoviscop.com/en/definitions/research-organisation> See also <http://www.oecd.org/innovation/policyplatform/48136051.pdf>

The University of Novi Sad is credited to have spun out 90 plus companies, primarily in the ICT sector, and having created 1,692 formal employment opportunities and at least as many informal employment opportunities. The university received no income from these companies even though the intellectual capital that is at the core of these companies was built by the university. The expected revenue to the university will come only if and when these companies are sold and any equity that may be held by the university is capitalized. The benefits, however, are more indirect in that these companies have raised the profile and reputation of the university; they provide scholarships to students, on-the-job training during their studies and jobs after completion of their studies – the latter function was viewed as particularly important in order to counter the “brain drain” observable in Serbia. One of the views on the Novi Sad start-up scene was, in that context, that even if the legality concerning IP usage of R&D conducted through public funds may have been debatable, the benefits of the Novi Sad approach for Serbia (in terms of “stopped” brain drain and paid taxes) prevailed.

A leading state-owned research institute is the “Mihajlo Pupin” Institute, which was established in 1946 to undertake applied research as a response to an earlier “Vinca Institute” which focused essentially on basic research. It is engaged in developing products and services in the area of customized IT solutions, hardware & software outsourcing, technology consulting, engineering, prototyping, and system design & integration. It earns most of its revenues through industry contracts while a small percentage (11-12%) is provided through public projects funded by the Government.

The Government has also initiated the creation of a network of Serbian scientists based abroad (the “scientific diaspora”) and is providing them incentives to return and contribute to the research base of the country by lecturing, teaching, launching start-ups, participating in joint projects and other initiatives so as to transfer their knowledge and skills for the benefit of Serbian society. Similarly, incentives are provided to attract foreign students and teachers into academia.

3.5 INDUSTRIAL BASE

According to the Serbian Chamber of Commerce and Industry, in 2010, out of total 319,044 companies the SME¹¹ sector made up 99.8 percent (318,540). The most dominant are micro enterprises (306,669)¹², then the small and medium-sized enterprises (11,871). This industry structure is in line with that of most other countries and underlines the importance of the SME sector for the economy.

In contrast to the research activity referred to in the previous section, there is little or no research and development in industry due to the process of privatizations that began in 2000 which converted or discontinued the internal R&D units that existed in the state-owned companies. International companies attracted into the Serbian market acquired local companies mainly to access the Serbian and regional markets and not necessarily to develop

¹¹ The EC definition of a SME is as follows: “The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding 50 million euro, and/or an annual balance sheet total not exceeding 43 million euro.” Extract of Article 2 of the Annex of Recommendation 2003/361/EC.

¹² Micro enterprises are those with up to 9 employees, small enterprises are those with 10 to 49 employees and medium enterprises are those with 50 to 249 employees, Ministry of Economy and Regional Development of Serbia (2011): Report on Small and Medium-Sized Enterprises and Entrepreneurship 2010, p 5.

R&D which, if at all, was done elsewhere. However, the Government has made efforts recently to attract international technology-intensive companies who would be ready to realize a part of their development programs in the country by investing in the existing research capacities or by creating new ones. Microsoft recently opened one of its five development centers outside the USA in Serbia.

Nonetheless, there are a few active enterprises from an IP perspective (for the sake of completeness the University of NIS is retained in this list though it is not an enterprise), judged by their applications within the PCT system. During the period 2008 to 2013 there were ten such companies, referred to in the table below.

Company	Technical field	PCT application
ALTAMED ¹³	Production of bio humus	Device for production and separation of bio humus
VLATACOM ¹⁴	Information technology	Handheld portable device for verification of travel and personal documents, reading of biometric data and identification of persons holding these documents
TIM SISTEM ¹⁵	Heating	Multiple pipe device for conducting smoke for furnaces running on solid or liquid fuel
MICRONAS NIT	Acoustic signal processing	System and procedure of hands-free speech communication using a microphone array
RT-RK ZA ¹⁶	Broadcast communication	System for marking the road edge in low visibility conditions using wireless network of signaling devices
AUDIOTEL ¹⁷	Medicine	Disposable gynecological instrument for dilation of body cavities by fluid injection
UNIVERSITY OF NIS ¹⁸	Electromechanical engineering	A new method for construction of robust switching devices based on the printed circuit board technology
CAPITOL W.B.C.	Chemistry	A process for obtaining agents for fire-inhibiting impregnation of porous materials and depth fire extinction of the so-called smoulder fires on peat land, in coal and communal waste depots
ABS MINEL-TRAFO ¹⁹	Three phase transformers	Wound delta magnetic core for three-phase transformer
IRITEL A.D ²⁰	Electromagnetism	Magnetizer/demagnetizer with a chopped magnetic field

Interview partners have alerted us to the existence of probably some 100 highly innovative and R&D-active firms which would not show up in official statistics, particularly in the database established under the Innovation Law. These firms are reported to be highly export-oriented, but may not have taken part in the “official” innovation system (funding) activities, and/or may have avoided being associated with Serbia (due to the image of Serbia, which is not associated with high-tech countries). Serbia is not alone with such a “cluster” of officially outlying firms among developing countries and/or catching-up economies.

¹³ <http://www.altamed-organic.com/>

¹⁴ <http://www.vlatacom.com/>

¹⁵ at <http://www.timsistem.rs/>

¹⁶ <http://www.rt-rk.com/>

¹⁷ <http://www.gynedil.com/en/patenti/patenti.html>

¹⁸ <http://www.ni.ac.rs/en/>

¹⁹ <http://abselektro.com/>

²⁰ <http://www.iritel.com/index.php/en/iritel-en>

3.6 INTERMEDIARIES, INSTITUTIONS AND ACTORS THAT SUPPORT THE INNOVATION SYSTEM

The Innovation Law provides for organizations that render infrastructural and business support to innovation activity such as business and technology incubators, science and technology parks, organizations for stimulation of innovation activities and centres for transfer of technologies. These can also be registered with the Ministry. It defines these organizations as follows:

- A business and technology incubator is a company the basic business activity of which is to put at disposal, for a certain consideration, business premises, administrative, technical and other services to newly established companies, for a maximum period of five years from the date of their establishment.
- A science and technology park is a company which within a defined space provides infrastructural and professional services to higher education establishments, scientific and research and innovation organizations, and also to high-technology and medium-technology companies within a specific scientific, research and development or production group aiming at their networking and the fastest possible application of new technologies, creation and sales of new products and services on the market.
- An organization for encouragement of innovation activities under this Law is a company that stimulates, through investing in newly established companies, innovative activities within the seven priority areas.
- A center for transfer of technologies is a company that assists in the technology transfer process, which includes assessing the commercial potential of research output, searching for potential partners, protecting the intellectual property, etc.

The Zvezdara park, a science and technology park, has recently been completed in Belgrade. Similar parks are being constructed in the University of Novi Sad and in the city of Niš and Kragujevac. A technology management office has been established in the University of Novi Sad and an initiative to establish a similar office is underway at the University of Belgrade. It must be said that the initiatives to establish TMOs at universities often come from EU-funded projects. This means that there is a (monetary) incentive to establish such a TMO from the outside.

The Chamber of Commerce and Industry of Serbia, which has been in existence for over one hundred years, is also an important intermediary providing support services for businesses. It is a national association of all businesses, and membership is voluntary. Its main task is to represent the interests of its members both nationally and internationally. All of its services are free even to non-members. The majority of the members are from the service sector and its activities are essentially focused on SMEs. It has some 300 full-time staff and works through 16 chambers from across the country. It is also a member of many international organizations, as well as having representative offices in several European countries.

There is, however, only one person who is the IP focal point for the Chamber. This person is also secretary to the Board on Technological Innovations as well as the coordinator for the Young Innovators Network for Sustainable Ideas in the Agro-food Sector (the Noble Ideas

project²¹), and is involved in organizing the Best Technological Innovation Competition in Belgrade.

In terms of IP, the Chamber provides information and consulting services to its members and organizes educational programs, which are done throughout Serbia in cooperation with the IPO (with whom they have a MOU) and they share good practices. One of the ways the Chamber helps SMEs is by connecting them to large companies who may be interested in investing in their innovative projects. It also helps SMEs with finding collaborators and partners.

The Chamber has constituted Boards on different areas, which provide suggestions to the Chamber on issues of interest. One such board is the aforementioned Board on Technological Innovations, which promotes innovation (technological and non-technological innovation) among the members of the Chamber and in that context promotes the effective use of the intellectual property system. It provides information, supports its members in registering in the Innovation Register to obtain financial support, undertakes training and promotes awareness. The Board has 11 members (five from technical areas, five from industry and one from IPO).

3.7 FINANCIAL SUPPORT AND FUNDING AGENCIES

Funding (of R&D) is historically at the centre of discussions on innovation systems, which means that we need to look particularly at what funds are available for whom and by which mechanisms these funds are distributed to the various actors of the innovation system.

In Serbia, the MESTD is essentially the funding arm of the Government²² for innovation-related projects²³ and has, since the beginning of 2006, financed 275 innovation projects, involving four public calls, 33 infrastructure projects and 95 individual inventor projects amounting to approx. €9.5m. The fifth public call is about to be launched for about €2m. These calls are bottom-up in that they are not thematic, and any kind of proposal could be considered as long as it falls within the broad definition of product, process, marketing and organizational innovations. To understand the volume of grant money available per project, contrast this with the some €5m granted under the Innovation Fund to 41 projects.

In a public call, the Serbian Government provides 50% of the project budget and the participant has to come up with the other 50%. In order to be eligible for these funds the beneficiary has to be registered as an “innovative organization” with the Ministry (see the Innovation Law for the various categories of recipients). These innovative organizations are referred to as Development and Production Centers, Research and Development Centers, and Innovation Centers. Companies who are engaged in some kind of R&D would qualify as a Development Center. A Production Center in addition has to show that it owns a patent in order to qualify to

²¹ This project seeks to create a network which aims to foster greater dialogue, exchange and mobility among public/private research centers and young researchers and increasing their visibility and ultimately the collaboration between these researchers and the enterprise sector. Again, “Noble Ideas” is a European project.

²² The Provincial Secretariat for Science and Technological Development in Vojvodina is also a source.

²³ One of the key objectives of the Lisbon Agenda is to ensure that of the 3% of the GDP, which is the targeted amount of allocations for science, only one third comes from the budget of the European countries and the EU, while as much as two thirds should be covered by investments in research activities, made by the private sector. One of the major problems Serbian science is faced with is that the small amount of resources invested in scientific research mainly from one source, were distributed among more than 1,000 projects Povrenović, D., (2010) “Review of the Innovation Process and the Corresponding Funding Possibilities in Serbia.” Belgrade.

be registered. The innovation centers which are housed in universities are also recipients of these grants. The Ministry also provides basic grants for research.

The Innovation Law provides for the setting up of an Innovation Fund (the Fund) for preparation, execution and development of the programs, projects and other activities envisaged in the innovation policy.

The Fund, the first of its kind in Serbia, was established in December 2012. The €8.4m Innovation Serbia Project is financed by the European Union through the Instrument for Pre-Accession Assistance funds for Serbia with expert support from the World Bank. Of the €8.4m, €6m is for grants. The Government of Serbia pays the salaries of those who administer the office and the cost of office space etc., €2.4m goes to World Bank fees, training and advisory services as well as the peer reviewers and the investment committee. The aim of the fund is to bridge the gap in funding for innovative entrepreneurship. It implements two programs of funding: Mini Grants Program and Matching Grants Program. The first is intended for start-ups and the second for those who have passed the start-up stage and looking to scale up.

The Mini Grants Program is aimed to support early-stage, private, micro- and small- enterprises, which possess a technological innovation that has potential for creating new intellectual property and for which there is a clear market need. Its purpose is to stimulate creation of innovative enterprises based on knowledge via private sector start-ups or via spin-offs by providing financing for market-oriented innovative technologies and services with high commercialization potential. Mini Grants projects must be completed within 12 months and can be from any field of science and technology in all industrial sectors. The applicant must be a private sector, micro- or small- company, incorporated in Serbia for no longer than two (2) years at the time of application, with the majority of applicant ownership Serbian. The financing to be awarded under the Mini Grants Program will cover a maximum of eighty-five percent (85%) up to €80,000 of the total Approved Project Budget for a 1 year project.

Applicants for the Matching Grants Program are private micro- and small- enterprises incorporated in Serbia that have a technological innovation or potential for creating new intellectual property with a competitive global/domestic position and for which there is a clear market need. The financing to be awarded under the Matching Grants Program will cover a maximum of seventy percent (70%) and up to €300,000 of the total Approved Project Budget for a 2-year project. These calls are run twice yearly. If successful, a royalty of 5% of the revenues derived from the product developed must be paid back to the fund for a period of five years.

The recipients of the grants are screened through a process of peer review by academics, followed by a pre-selection process by an internationally constituted investment committee. The Fund makes on-site visits, and makes a recommendation to the investment committee which the committee takes into consideration in making its decision. Some 300 applications were received for the first 3 calls. Of these, 41 received funding amounting to some €5m²⁴. The percentage of recipients being low has led to a slight decrease in applicants. However, there are some returning projects (almost a third) that are those projects that were previously rejected that have been improved and resubmitted. IP issues are taken into account in making the

²⁴seehttp://www.europa.rs/en/projects/projektne_aktivnosti/2663/Innovation+Fund+Approved+over+EUR+4.7+Million+in+Financing+through+the+Innovation+Serbia+Project.html

decision. Many of the recipients of these grants are in the ICT sector. They are micro and small enterprises; that is, they have up to a maximum of 50 employees. There are some success stories from the first cycle. Most of the recipients aspire to go international.

There do not seem to be other private funding mechanisms for early stage innovative activity available such as through banks²⁵, networks of “business angels” (though there are a few successful individual cases, where innovators have been associated with individual owners of capital) or venture capitalists²⁶; nor has crowd funding caught on. There are apparently no initiatives on the part of the Government to promote the building up of such sources of funding except for some preliminary effort to establish a venture capital industry. Also, given that many projects and activities in the area of innovation are being driven by EU funding, there is the issue of sustainability of some of these projects.

3.8 COOPERATION BETWEEN THE RESEARCH BASE AND THE INDUSTRIAL BASE²⁷

Several initiatives have been introduced by the Government to encourage a more active cooperation and collaboration between universities, public research organizations and the enterprise sector in Serbia. These include tax benefits for (a) investments made by corporations into the projects involving R&D organizations which are co-financed by MESTD, (b) on salaries for researchers hired by the private sector and (c) on start-ups created by researchers under 30 years of age. The Government would also subsidize doctoral studies of a private sector employee and cover the costs of patent applications and other forms of protection of IP for projects co-financed by the MESTD.

Several local institutions and companies have cooperation programs with international leaders (Faculty of Electrical Engineering, Belgrade, “Mihajlo Pupin” Institute, Institute of Field and Vegetable Crops, Novi Sad and others).

3.9 FRAMEWORK CONDITIONS, EDUCATION

The Government has also taken initiatives to create greater awareness amongst the general public on the importance of innovation through projects to popularize science. The new Center for the Promotion of Science²⁸ in Belgrade is one of the core projects within the MESTD initiative to build a new national scientific infrastructure. The great popularity of the Festival of Science reveals that there is interest in such events. Therefore, the construction of a new, modern, interactive center has been planned, where children and their parents will gain knowledge about topical issues in science.

²⁵ The Development Bank of Vojvodina provides funds to be used by the innovators from the territory of the autonomous province of Vojvodina.. Ibid, Povrenović, p91

²⁶ The Investment Fund “Orah”, established in 1999 in Serbia and funded by foreign investors' capital provides funding for early stage IT companies. It tried unsuccessfully to gather donors (IFC, EBRD), government institutions and private sector institutions (insurance companies) to establish a fund for funding innovative companies. Other active risk capital funds in Serbia have been funded through donations as of 2000, and they have been focused on the whole region, for example, Copernicus Fond (financed through EBRD, IFC and private partners' funds) and the South-East Europe Capital Investments Fund (funded by OPIC and Soros Foundation). These funds are oriented to bigger companies. Ibid., Povrenović, p 90

²⁷ A discussion on TTOs can be found at Chapter 5.5.

²⁸ <http://www.cpn.rs/o-centru/?lang=en>

CHAPTER 4 - INITIATIVES TO INTEGRATE THE IP SYSTEM INTO THE NATIONAL INNOVATION SYSTEM

Given that the Republic of Serbia is now an official candidate for joining the European Union and the World Trade Organization, its legal framework for the protection of intellectual property rights in Serbia is broadly compatible with international practice.

In its IP strategy the Government envisions that by 2015 the following will be achieved:

- The level of intellectual property protection will be at the level of the EU.
- The Intellectual Property Office will be an efficient and competent Government agency predominantly financed from its own income with one third of its staff engaged in providing services to its users, mediation between the holders of rights and industry and coordinating IP issues with other Government bodies.
- IP infringement levels will be down to EU averages.
- Technology transfer offices will be established in the largest state universities.
- Science and industry will actively collaborate on the basis of strong IP management.
- Programs will be established for promoting innovation.
- An efficient and functioning system of collective management of copyright and related rights will be in place.
- Authors and performers, on the one hand, and the creative industry, on the other hand will understand the importance of IP in their collaborations.
- Associations of authors and performers will provide high-quality services which include standard contracts at a minimum cost to their members.
- At all faculties of law, technology, economics, agriculture or management of state universities the curricula will include intellectual property rights.
- Programs to make intellectual property and creativity popular through the school network will be implemented.

To achieve this vision, the strategy focuses on the following four areas and identifies a list of concrete measures that the Government would undertake to implement through the IP Office²⁹ to achieve the above vision:

- Legal and institutional basis of intellectual property protection
- Enforcement of intellectual property rights
- Economic exploitation of intellectual property
- Raising public awareness and education

The Innovation Law also plays an important role in the process of integrating IP into innovation policy formulation by clarifying the important issue of ownership of intellectual property rights and distribution of income in case of commercialization of a research result arising from a project funded from the budget of the Republic of Serbia. It prescribes that the organization where such intellectual property was created is entitled to ownership of that research result. This is a very important initiative on the part of the Government, giving the creators of an innovation as opposed to the Government that funded it the right to exploit and benefit from its creation. As such, the creator may seek IP protection, identified as such in an IP application, and be entitled to compensation amounting to at least 50% of the profit realized by the

²⁹ The Ministry of Agriculture is the competent ministry for the area of plant variety protection.

organization. The relevant ministry would also contribute to the costs of maintaining such a right.

Those responsible for the innovation activity being carried out under funds provided by the Government are mandated to investigate novelty, and if appropriate apply for patent rights.

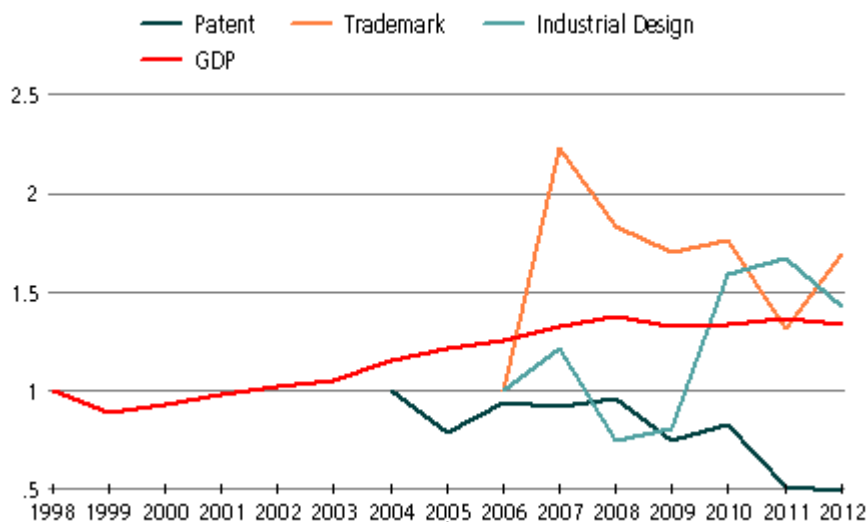
The 2005 Science Law, on the other hand, imposes publishing of scientific articles as a precondition for career advancement in the R&D sector. A direct consequence of such regulation was a large increase in the number of publications. This particular rule of the Science Law is probably the strongest indication of the rather weak links between innovation and IP policies in the country. There is actually no incentive or reward for successful IP management, start-up creation or industry-science collaboration as the “publishing” success metric is the sole one in use. As such, the Science Law runs against the country’s IP strategy.

In terms of patent filings internationally, apart from the 10 companies referred to previously that had filed applications in the PCT system, there were some 110 applications by Serbian individuals for the period 2008 to 2013. Also there are some 50 registered “professional representatives” to the intellectual property office of Serbia.

Overall, one can observe that only a limited number of enterprises/institutions have patent filings and even fewer with international scope. However, the few Serbian companies that do patent could, if properly supported, be the seeds for increased IP usage in the future. In any case, the low numbers of patent filings are clearly a challenge for patent-focused service providers, as the overall demand (and also capacity of the system) to produce relevant patents is low.

Figure 4 - IP filings by Serbian residents in the Serbian IPO and elsewhere in the world

Year	Patent	Trademark	Industrial Design	GDP (Constant 2005 US\$)
1998				52.24
1999				46.39
2000				48.87
2001				51.46
2002				53.58
2003				55.01
2004	473			60.13
2005	372			63.37
2006	443	2,553	175	65.65
2007	437	5,700	213	69.2
2008	452	4,690	131	71.83
2009	353	4,344	142	69.32
2010	390	4,495	279	70.02
2011	243	3,363	292	71.16
2012	234	4,323	249	69.95

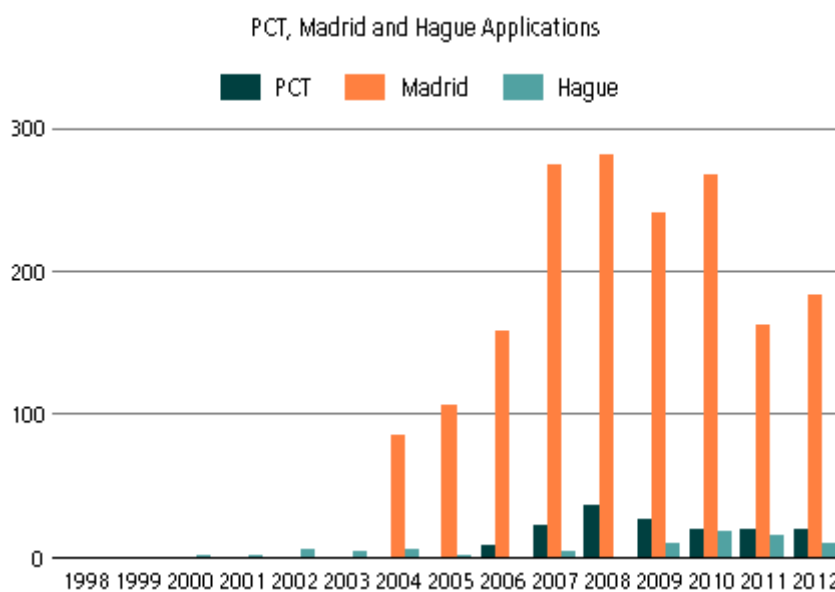


Source: WIPO Statistics database, last updated 01/2014

From an IP standpoint, the Intellectual Property Office is the most important service provider in the Serbian innovation system. It was established in 1920, employs 98 persons and includes the Directorates of Patents, Trademarks, Geographical Indications, Designs, Copyright, Technical Information, International Relations and General Affairs. It conducts substantive examination of patents, and receives some 200 domestic applications and 20 foreign applications per year. It became a member of the European Patent Organization in October 2010. Much of the demand for its services is in the trademark area, where it receives some 4000 applications through the Madrid System.

Figure 5 – International IP applications filed by Serbian residents internationally through WIPO filing systems

Year	PCT	Madrid	Hague
1998			
1999			
2000			1
2001			1
2002			6
2003			4
2004		86	5
2005		107	2
2006	8	158	
2007	23	275	4
2008	37	282	
2009	26	241	10
2010	19	267	18
2011	19	163	15
2012	20	183	9



Source: Source: WIPO Statistics database, last updated 01/2014

The IPO has focused its efforts towards implementing the vision of the Intellectual Property Strategy and particularly in the context of the third and fourth goals of the Strategy: economic exploitation of intellectual property, and raising public awareness and education. In the case of the third goal (the economic exploitation of intellectual property), the strategy commits, among others, to: the establishment of technology transfer centers in at least two state universities, elaborating model contracts for regulating the relationship between universities and industry, offering IP pre-diagnosis services to industry, and elaborating a manual on good practice on IP valuation. In this regard, the Office has made progress towards the establishment of a technology transfer center at the University of Belgrade, and has developed a series of model contracts for regulating the relationship between the universities, PROs and industry particularly with regard to licensing of intellectual property rights. The IPO has also developed its IP pre-diagnosis service to the enterprise sector, which it has been providing as a free service but hopes to make it a fee-based service in the future. The Service provides for the identification and evaluation of the IP assets of an enterprise with recommendations on how they may be used strategically for business competitiveness. This is the Serbian adaptation of the French “IP Prédiagnosis” service. Take-up and implementation of this service in European countries is currently supported by the European Patent Office (EPO).

The Center for Education and Information was established in 2010 under a European Union funded project with four permanent staff. It is responsible for outreach and training and in that capacity has conducted some 100 seminars and undertakes some 5 to 6 IP pre-diagnoses per month. The IP pre-diagnosis service has been quite successful in raising the awareness of stakeholders of the benefits of the IP system. Awareness of the IP system compared to a decade ago has reportedly increased, albeit from a very low baseline. According to interviewees, much of the interest for the pre-diagnosis service comes from contacts made at trade fairs as well as through direct marketing done by the Center for Education and Information.

With respect to the fourth goal, raising public awareness and education, which the Strategy determines to be pivotal to its success, notable are the commitment to support the introduction

of teaching of IP in faculties other than the law faculty and requiring the IPO to connect with universities, public research organizations and chambers of commerce for coordinating IP training activities. In this regard the IPO has translated many of WIPO's IP materials and developed some of their own including for use in the four state universities.

There is also the popular annual Best Technological Innovation Competition in Serbia which the IPO is closely involved in implementing. This has become a very prestigious event, which attracted 130 teams in 2013. Apart from pecuniary awards that may be obtained on the basis of ranking in the competition, all participants will obtain significant non-financial support in the form of one-year training during the competition cycles on how to transform their ideas into innovation, how to verify the innovation by a business plan and how to place it and protect it in the market. In particular, successful participants will have significant media support during the competition cycles on how to transform their ideas into innovation.

Beyond its role as an IP right granting body the IPO plays an awareness creation and educational role with respect to the wider innovation system stakeholders. To that end the IPO has a Memorandum of Understanding with the Chamber of Commerce, and many of the educational events have been conducted in collaboration with the Chamber. The IPO is also present and active in fairs (agricultural, business, trade) as referred to above, where its staff are available to inform and advise the public. The IPO is also often consulted by the Government in terms of IP matters. The IPO was consulted and its advice sought in developing the S&T Strategy and the Law on Innovation Activity, as well as in developing model agreements for sharing of royalties in commercialization transactions.

CHAPTER 5 - SUMMARY OF DISCUSSIONS WITH STAKEHOLDERS

5.1 STRATEGIES/POLICIES

Here, we discuss the feedback provided by our interviewees regarding the state of the Serbian innovation system and issues surrounding the integration of IP matters into innovation policy. We start by looking at the strategy/policy level.

Perhaps the most striking result was that many interviewees believed that there were too many strategies and not enough implementation. The proliferation of strategies was driven by EU requirements that a long-term perspective be demonstrated as a condition for funding and a more general desire to attract foreign direct investment. Similarly, many of the infrastructure projects were driven by the availability of World Bank funding, and have slowed since the economic crisis. There was also a sense that there were too many priorities identified in the strategies, while in practice ICT and Agro food sectors were the priority sectors for the country.

Also there was concern that the top-down manner in which these strategies were formulated set them up for failure as there had not been sufficient input from stakeholders and actors on the ground.

The Innovation Law was seen to have had the positive effect of clarifying intellectual property ownership issues as well as having established the Innovation Fund. The Fund in particular was spoken of in very positive terms by many of the interviewees, although there was some concern about the limited running time. Some were concerned that the existence of the Fund meant that there was less need to collaborate with industry.

The introduction by the Science Law that the career advancement of a scientist would depend on the number of research papers he/she published in peer-reviewed journals has had the positive result of increasing the number of publications, which interviewees felt was a good thing given that knowledge generation had stagnated for many years. However, some expressed the concern that isolating publication as the only output that counted in the reward system did not take into account the importance of commercialization for the innovation system. In this context, the Science Law was also said to hinder innovation, rather than foster it.

There was also some concern expressed as to the requirement to register under the Innovation Law in order to secure funding which was considered unnecessarily bureaucratic. Requiring companies that were already registered in the company register to register again in yet another register was thought to be unnecessary. To illustrate this point we learnt that 80 companies were registered and 140,000 companies were not. However, other interviewees (presumably those who had registered) did not see it as too burdensome. As stated above, there is also a number of R&D active firms which are R&D-intensive but did not register. They are therefore not depicted in official statistics.

There was little recognition of the importance of non-technological innovations. Technological innovation remained the priority. As such, there was no funding, support, information, etc. on non-technological innovations.

The overall picture at the strategy level was, hence, that while there seems to be high-level support evidenced by a plethora of strategies and initiatives, most of the interviewees were

concerned that these activities were not fully thought through and had not achieved their objectives.

5.2 BRAIN DRAIN

A recurrent theme in the interviews was the issue of brain drain, which was identified as one of the most important challenges for the Serbian innovation system. For the short term, many of the EU-funded projects provide some opportunities that would otherwise have not been available, and this has resulted in retaining some talent in the country. However, that can be expected to change once the funding ends unless longer-term solutions can be found. One university in particular, the University of Novi Sad, felt that the number of spin-offs that it was instrumental in creating contributed significantly to keeping talent in Serbia. Further, the pride (not necessarily confined to Serbia) of having highly successful nationals in prestigious positions outside the country was seen to be misplaced and needed to change for this trend to be reversed.

5.3 ACCESS TO FINANCE

Most of the interviewees felt, as everywhere in the world, that access to finance is one of the important barriers to innovation. This includes the lack of venture capital, high rate of interest of bank loans, insufficient information for SMEs about the sources of financing, etc. The resources available to the MESTD for distribution is limited (to the extent that only Innovation Fund money is considered “serious” money). However, the view was expressed that even if the resources are limited they could be better spent, and that the spending needs to be better evaluated. One of the interviewees mentioned that there was interest in creating a VC industry. A framework for crowd funding was also identified as a priority.

On the other hand, a flourishing ICT-software industry has taken root in Novi Sad despite the unavailability of startup capital, and it was explained that this was peculiar to this sector, which in fact needs very little startup capital. In contrast, non ICT-based startups have been generally less successful. One innovative company that was interviewed identified not only the lack of startup capital but in his case the lack of capital for expansion and scale up. Investors were available but required guarantees from the Government. This seemed an issue of confidence.

On the other hand, we were informed that funds that are available have not been tapped and that demand for such funds was low. This seemed to be an issue of information asymmetry.

Many interviewees were frustrated with the cost of filing IP applications, particularly international applications, and thought it would be useful to be supported financially for the filing of international IP applications.

Overall, we can conclude that access to finance is a major problem for the Serbian actors of the innovation system.

5.4 COLLABORATION BETWEEN SCIENCE AND INDUSTRY

Many of the interviewees articulated that there was no collaboration between science and industry. There was a perception by some that there was no industry capable of putting science into commercial use (or at least not a critical mass) and by others that there is no science of relevance to industry. However, as stated, we were informed that there exist some 100

companies that are internationally competitive and that there are areas of strong science working in isolation from each other. In sum, all these efforts by policy makers, including the various strategies, had not resulted in incentivizing cooperation between science and industry.

On the other hand, the experience of some funding programs in being unable to find applicants led to the impression that the base of technology-based growth-oriented companies is small, which was why there were so few takers (i.e., the so-called “absorptive capacity” of Serbian industry was low). On the other hand, some interviews alerted us to the other, often underestimated, direction of technology and knowledge transfer, namely from industry to universities. This could be observed particularly at Novi Sad. There were very dynamic but rather informal collaborations between industry and science particularly in the ICT sector where professors at the University were also employed by industry. Also industry is actively involved in the university, providing expertise as well as teaching, grooming the next batch of employees.

Some interviewees felt that there was also a failure to collaborate within the science sector and within the industry sector. Competition amongst industry was to some extent understandable but they felt that some improvement for collaboration between R&D institutions and universities was appropriate.

Many interviewees referred to the informal or gray economy where many people, mainly students, undertake contract research or contract development for foreign companies. There are also established companies engaged in high-level pharmaceutical research and development for foreign companies.

Further, in order to be truly competitive, products have to meet certain quality, marketing and other standards and, as such, competence in market development is necessary. Support for industry on product development may be useful and it may also motivate them to engage in R&D.

Overall, the conclusion is that the level of collaboration between science and industry is too low, mainly due to the state of economic development of Serbian industry and its ability to absorb university know-how. On the other hand, the other direction of knowledge transfer towards the science base holds a lot of promise and there are sectors – particularly in the ICT area and to some extent in the pharmaceutical area – where collaboration has already started to take place.

5.5 SUPPORT SERVICES

With respect to technology management offices - All interviewees in the knowledge creation side pointed to the “non-integrated” character of Serbian universities as a clear challenge to creating a structured approach to the commercialization of university-created knowledge. The fact that the university houses a loose collection of independent faculties makes it difficult to implement common policies, and it is therefore difficult to have an university-wide IP policy or to organize services such as those that would be provided by a technology transfer office available university-wide, without buy-in from all of the faculties. In one university, under EU funds two staff members have been given the task of acting as a TMO, but from all accounts there does not seem to be much reliance on their services and they are also engaged in other functions in the university. However, in the same university there is a “Center for IP” which has been set up at the initiative of a successful start-up of the university, in which at least one professor is actively involved. Interviewees said that this Center was more useful to them in terms of its advisory services. However, in another university there was greater enthusiasm for the TMO

and in the opinion of that university effort to make that office acceptable and sustainable was needed and was considered a priority.

Two schools of thought were evident. One group of interviewees, primarily from the ICT sector, felt that commercialization was best realized through the researchers who come up with an inventive solution growing that solution themselves; forming a company and involving others with business and other necessary skills, and once that company reaches a certain maturity selling it to a bigger player in that market. In that model, they did not see the relevance of licensing, given the huge amount of tacit knowledge in the hands of the researcher, who has to be involved in the production. As such, they said, neither formal IP management nor a structured TMO is needed in these types of arrangements.

The other school of thought was that a TMO-type office was necessary to engage with the researchers, source potential licensees and assist in taking university knowledge to market. There was an express desire to increase the number of patents coming out of the university - not necessarily domestic patents but regional or even international patents. They felt that to manage and commercialize these patents, assistance through a TMO would be necessary.

Those of the former school of thought felt that there is more advantage in institutions such as science parks and incubators rather than TMOs. These institutions could provide business support services, which are of greater priority. Those staffing the TMOs, though committed and enthusiastic, did not have the exposure to business and the links to effectively carry out their responsibility within a TMO to take a technology to market. The second school of thought did not deny the importance of science parks and incubators, but felt that TMOs have an equally important place in the innovation ecosystem. In both universities, the TMO-type office was funded by external funds and the issues of sustainability of these services was raised.

Other approaches that were raised were support systems such as the Enterprise Europe Network, which some interviewees felt has better credibility for being able to give good advice. Others spoke of the possibility of centralizing the functions of a TMO in a single institution outside the universities that would serve the needs of all universities and public research organizations.

Overall, the question of TMOs was a highly debated one. Most certainly, because the TMOs have been set up as EU projects, one needs to question their sustainability beyond the running time of the project. Furthermore, the relatively young staff at the TMO, though highly committed, will not likely have the experience and the industry ties to successfully find commercial partners for inventions at universities. Another critical point is the reward system which, as stated earlier, takes into account only publications in journals. There is therefore no incentive for researchers to go the IP route or engage in commercialization. Finally, the “non-integrated” nature of the university system creates additional complications for delivering a university-wide TMO service. It is questionable whether the TMOs will be able to succeed in this environment, given that most TMOs have problems covering their cost of operations.

Attitude to IP – There were some interviewees who felt that IP was not that relevant for the innovation system and that it was in fact a burden, but for the most part the interviewees felt that IP was important. Some were of the view that IP and the IPO have been incorporated to the fullest extent in the various strategies. If uptake is insufficient, they said, it is not for the lack of formal integration of the IP system in policy making, but more the failure of the users of the IP

system, due perhaps to low awareness of the system, to use it to its full potential – which, however, in itself raises the question of whether the integration has been actually achieved.

The IPO - Most of the interviewees seemed to be familiar with the services of the IPO, particularly since the introduction of the Center for Education and Information with respect to which the experience seemed to be positive. There were some, however, who stated that they were not familiar with the services of the IPO and saw it only as a technical office that did not have a broader role to play in the innovation system. This must be seen in the context that most of the interviewees were chosen by the IP office and can be assumed to be those that they had strong relations with. Yet, it was positive that the Office was well perceived by and large by the interviewees.

Legal support - Most of the interviewees expressed dissatisfaction with the quality and cost of local legal services in the area of IP. The legal support service providers said that they do very little work for local industry given that the kind of services they are called upon to perform are filing applications for IP rights and this function can be performed by the companies on their own without the intervention of a lawyer. The majority of the work that occupies lawyers pertains to the filing of applications on behalf of foreign companies. With respect to work in the patent sphere, they often elicit the services of specialized patent agents (there are some 10 to 15 such agents) who have the necessary technical background. Similarly, judges do not have a technical background, and in patent cases they often have to engage the services of technical experts. The view was expressed in this regard that it would be useful to have an independent specialized IP court separate from the already existing specialized IP chamber of the trade appeal court.

Integration of IP teaching into technical and business curricula - Many of the interviewees identified a need for better integration of IP teaching in technical and business schools and faculties. Given that IP was understood mostly in the context of enforcement, i.e. as a right to be enforced, there was little appreciation of the business side of IP. Some universities do teach some IP outside the law faculty, but it is ad hoc. Developing curricula on innovation management was identified as a good area to focus on. The suggestion was made that the teaching could be provided by the IPO and the law firms. Reference was made to the experience of the Canadian IPO, which has successfully collaborated with law offices to develop this service. However, it was recognized that changing or adding to curricula is very difficult and higher-level support would be needed if system-wide changes are to be made in the higher education curricula. The IPO does conduct ad hoc training for different faculties depending on their personal interaction with professors. This kind of teaching could also be extended to secondary schools.

Awareness creation and capacity building - Most interviewees were of the mind that awareness creation and capacity building efforts targeted to the needs of different stakeholders and different sectors is necessary. The experience of those in the ICT sector vis-à-vis those not in that sector was illustrative. The interviewees in the ICT sector expressed less need for IP support vis-à-vis those in the non-ICT sector. It was also stated that it was important to make the presence of IP known in diverse ways constantly and regularly so that it becomes ingrained in the thinking of the users and becomes part of their working practice.

On the other hand, there were some interviewees who said that they saw little advantage in training programs. They found that their learning was through real life experience which stood

them in good stead. What they felt they and companies like them needed in terms of IP support was financial support from the Government for filing international applications and little “interference” from the Government.

Other - There was also an interest in having access to best practices on initiatives and programs that were successful in countries that were similarly placed as well as examples on how IP is instrumental in the commercialization of innovations. There was also an interest in creating a VC industry in Serbia, and some interviewees welcomed suggestions on how best that could be done. Information in terms of guides and publications or specific issues of interest was also raised. In this regard, the Chamber of Commerce and Industry requested the assistance of WIPO in undertaking a study on the contribution of IP to the value of a business.

CHAPTER 6 - CONCLUSIONS

The government of Serbia has recently identified a number of strategies indicating a general policy direction towards innovation policy formulation. The Innovation Law is aimed at implementing one of the more prominent of these, the S&T Strategy, and is an attempt to put in place a series of incentives to promote innovation primarily through funding support. It also brings in a Bayh-Dole³⁰ type of framework to manage ownership issues and revenue sharing related to research output. These are positive developments insofar as they attempt to establish framework conditions for innovation.

However, the various strategies were not necessarily well received by stakeholders, who perceived them as unnecessarily numerous and lacking real understanding of the situation on the ground. It seemed that most strategies were driven by EU requirements to demonstrate long-term policy focus and were not grounded on a local conviction and understanding of what the country needs. In other words, the strategies were not bottom-up, and accordingly there was little buy-in by the stakeholders.

The implementing laws referenced in our analysis, particularly the Science Law and the Innovation Law, were deemed at best as failing to incentivize innovation and at worst as an obstacle to it. Two issues stood out in this regard. The requirement in the Science Law that links publications in peer-reviewed journals to professional advancement appealed to the academic inclination of the research base and resulted in an increase in publications but no increase in commercialization of research results. Thus, the law failed to target the research base that could commercialize innovation. In addition, from an IP perspective, the law promoted the early disclosure of research findings without also alerting researchers to the danger of losing novelty for the purposes of patent or design right protection. The requirement in the Innovation Law to register (in the "Innovation Register") in order to qualify for State funding was seen as an additional administrative burden, resulting in a very small number of companies seeking State funding. We were also informed that in certain cases in order to obtain funding a company would have to demonstrate that it already owned a patent, which also limits participation in the program.

The Bayh Dole-type clauses in the Law on Innovative Activity provide that ownership of IP created in a university through Government-funded research vests in that university and can be freely dealt with by the researcher only once the university has formally relinquished the right. Under the law, researchers do not have the right to form companies on the basis of such IP as many of the start-ups in Novi Sad had been established. Thus, these arrangements were inherently informal and were not expected to survive a legal challenge. Yet, the universities seemed content with this practice and did not assert their rights in the IP. The practice of building companies on the basis of research results developed in the university is a practical reality that seems to be well accepted, as demonstrated by the successful establishment of a number of such companies, contributing to the local and wider economy. However, lack of clarity as to the ownership of IP rights is bound to cause problems in the future. The universities

³⁰ The Bayh Dole Act or the Patent and Trademark Amendments Act of 1980 is a United States legislation that provided for ownership of intellectual property arising out of federal research funding to be held by a university where previously it had to be assigned to the government.

themselves may at some point demand shares or royalties, and future investors may be discouraged where ownership issues are not clear.

Also the universities are what is referred to as “non-integrated institutions,” which means that they are loosely formed and the faculties are independent and exercise greater powers than the university itself. In terms of IP management, this poses the problem of how one can have an integrated IP policy for the whole university and ensure the efficient functioning of an IP management office that would serve the university as a whole. In addition, some interviewees cited cultural reasons stemming from the socialist era that seem to give rise to a deep-seated suspicion of authority, reluctance to share information and knowledge and a discomfort with property rights. The reluctance to share knowledge was not only a reluctance to share with others, but once shared a desire to keep it within the country.

The IPO is making a conscious effort to become a useful participant in the innovation ecosystem and to contribute more than being a mere registrar of rights. Since the establishment of the Education and Training Center in 2010, it has made an effort to reach out to various stakeholders and, from the discussions we had, their efforts seem to be well appreciated, particularly its IP diagnosis service and its training programs. This effort needs to continue, for there is a lot more ground to cover.

Most of the stakeholders interviewed had an understanding of intellectual property, and some of them were very astute users of the system, having integrated IP concepts where relevant in their strategies and business operations. However, there was a general sense that by and large awareness was low and the capacity of those who provide support services should be strengthened. Thus, they are aware of the value of IP and expressed the need for support, whether it be financial support for using the system or support services that would facilitate their access to and use of the system.

Funding, though limited, was available for innovative projects through the MESTD as well as the Innovation Fund. The funds available through the ministry were significantly limited in comparison to the Innovation Fund, and were also subject to more stringent eligibility criteria.

There were a number of successful start-ups particularly in the area of Novi Sad in the information and communication technologies sector, which was a source of great pride and confidence for Serbia. The experience here seemed attributable to the low startup costs of ICT as well as the very different IP needs of that sector. Many of these companies used first-to-market and lead-time advantage, rather than relying on IP for competitive positioning. If they relied on IP it was more likely to be copyright and trademarks as opposed to patents. They said that to patent something with all the attendant costs was not worthwhile since the new product would be released before the application could even be considered. Those involved in this sector and engaged in research in this area did not see the need for assistance in the form of technology management offices, but expressed the need for more business support services in which IP could be incorporated. Strengthening the capacity of an incubator to provide IP-related services is therefore of more relevance particularly in the ICT sector.

The proximity to Europe and imminent accession to the EU, coupled with a strong educational and research base at low cost, puts Serbia at a position of great advantage and should be exploited.

CHAPTER 7 - RECOMMENDATIONS

1. Our impression was that the country was “over strategized,” diluting focus, and that the existing strategy also does not reflect needs on the ground. Therefore, it is recommended that strategies be refocused and reconsidered through a bottom-up process, where the views of stakeholders are more thoroughly investigated and their needs more thoroughly reflected.
2. The requirement in the Innovation Law that a company be specially registered (in addition to appearing in the business registry) in order to obtain state funding seems to discourage participation and consideration should be given to its removal.
3. The additional requirement in the Innovation Law that certain categories of applicant companies must show that they already own a patent adds an unnecessary burden to participation in the program and should be reconsidered.
4. In addition to academic publication, steps taken towards appropriate commercialization of a research result, including obtaining a patent, should also be considered as criteria for advancement in scientific careers, in order to incentivize inventors to protect for commercial exploitation those innovations with significant market potential, and to provide a potential source of revenue to fund ongoing research.
5. Given that publication of research results prior to obtaining intellectual property protection could jeopardize patentability, the risks of premature publication should be communicated to relevant actors, and procedures developed to manage publication in a way that balances academic interests and commercial potential.
6. To reduce the burden of high costs of filing international applications for intellectual property rights, options should be explored for support by the Serbian government of high-growth companies with commercially promising innovations seeking to use IP systems for access to international markets. For example subsidies for PCT and Madrid applications could be considered, as implemented in other countries such as China, Italy and Spain. Perhaps loan-funded programs such as those run by MERD could be redesigned for this purpose.
7. The business strategy aspects of IP require that the ability to understand the IP system be broadened beyond the legal profession. Therefore, the Serbian Government should consider adapting or augmenting the syllabi of technical schools and management faculties to include intellectual property as a subject adapted to the needs of that discipline. An important point in this regard is due consideration of business models, as IP rights on their own without a proper concept of how to commercialize them (with consideration of target customers, markets access, etc.) are of little use.
8. If a technology management facility is to be successful and sustainable it needs to be managed by competent and experienced staff and supplied with a critical mass of research output to take to market. Thus, having separate offices for each university or PRO is not practical. The establishment or strengthening of a single institution that would manage this function for all of universities or a group of them should be considered. Whether the Innovation Fund could transform itself, once the EU funded project is over, to provide these kinds of services to all interested parties is something to be explored.
9. The Innovation Law provides the legal framework for ownership and revenue sharing of IP generated through government funded research. Awareness therefore must be created among

academic researchers that the IP belongs to the university and that business has to be conducted through the university unless it has relinquished its rights to the IP.

10. A scheme might also be considered by which local innovators are linked to foreign investors and provided with support for taking their innovations to the next level.

REFERENCES

Policy documents

Law on Innovation Activity, ("Official Gazette of the RS", No. 110/2005 and No.18/2010)

Strategy for Intellectual Property Development for the period 2011-2015 (official Gazette RS, no 55/05, 71/05, amendment 101/07, 65/08 and 16/11)

Strategy of Scientific and Technological Development of the Republic of Serbia 2010-2015

Studies and reports

Arnold, E. et al. (2012): Knowledge Transfer From Public Research Organisations, Brussels: European Parliament, http://www.technopolis-group.com/resources/downloads/reports/IPOL-STOA_ET_2012_488798_EN.pdf, retrieved January 13, 2014

Kutlaca D (2013): Erawatch Country Reports 2011 – Serbia
http://erawatch.jrc.ec.europa.eu/erawatch/export/sites/default/galleries/generic_files/file_0324.pdf retrieved January 20, 2014

Kutlaca, D. (2012): Erawatch Country Reports 2012 – Serbia,
http://erawatch.jrc.ec.europa.eu/erawatch/export/sites/default/galleries/generic_files/file_0412.pdf, retrieved Dec 20, 2013

OECD (2013): Private Sector Development Policy Handbook - Establishing a Competence Technology Centre In Serbia,
<http://www.oecd.org/investmentcompact/Serbia%20Report%20English%20Version.pdf>, retrieved Jan 13, 2014

OECD(2009): Western Balkans: Progress in the Implementation of the European Charter for Small Enterprises: 2009 SME Policy Index, Part II: Policy Measures to Support High-Growth SMEs in the Western Balkans, <http://www.oecd.org/daf/psd/43469926.pdf>, retrieved January 13, 2014

Povrenovic, D. (2010): Review of the Innovation Process and the Corresponding Funding Possibilities in Serbia
http://www.zis.gov.rs/upload/documents/pdf_en/pdf/Review%20of%20the%20Innovation%20Process_FINAL%20TEKST%20Povrenovic.pdf, retrieved January 13, 2014

Radauer, A. et al. (2007): Benchmarking National and Regional Support Services for SMEs in the Area of Industrial and Intellectual Property, European Commission: PRO Inno paper no. 4

ANNEX 1 - LIST OF INTERVIEWEES (STAKEHOLDERS)

1. University of Novi Sad– Professor Miroslav Veskovic, Rector, Professor Zita Bosnjak, Vice Rector, Vojin Senk, Full Professor, Department of Power, Electronics and Communications Engineering, Professor Dragan Kukolj, Department of Computing and Control and coordinator of the Intellectual Property Centre and Vladimir Nikic [title?]
2. RT-RK Institute for Computer Based Systems - Nikola Teslić, CTO and Deputy General Manager and Professor Dragan Kukolj, consultant coordinator of the Intellectual Property Center at the University of Novi Sad
3. RPC Peshovich, Mr Predrag Pesovic, Director
4. Intellectual Property Office Mrs, Branka, Totic, Director, Mrs Mirjana Jelic, Assistant Director and Mrs Daniela Zlatic Sutic, Head of the Education and Information Center
5. University of Belgrade and TTO - Mrs Ivanka Popovic, Vice Rector for Science
6. The Ministry of Education, Science and Technological Development - Prof. Ivica Radović, Deputy Minister, Mrs Marina Vukobratović Karan, Head of the Group for Technology Transfer and Innovation System
7. Ministry of Economy Department for Development Entrepreneurship and Competitiveness - Katarina Obradovic Jovanovic, Head of SME Unit and Branka
8. Innovation fund - Stefan Popović, Program Manager and Marko Atanasovski, Program Manager, International Cooperation and Financing
9. Vlatokom - Mr Sasa Vujic, Director of Electro-Optical Systems Development
10. Law Office Mikijelj Jankovic & Bogdanovic (MJB) Mr Dejan Bogdanovic, attorney and patent agent and Mara V. Janković, attorney
11. Chamber of Commerce and Industry of Serbia - Mrs, Vidosava Dzadic, Vice President and Mrs Danica Micanovic, Secretary of the Board the technological Innovations
12. Institut Mihajlo Pupin - Prof. Djuro Kutlaca, Director of the Centre for Research of Science and Technology
13. Slavo Radosevic, Professor of Industry and Innovation Studies, Deputy Director, School of Slavonic and East European Studies, University College London, United Kingdom

ANNEX 2 - WIPO MISSION TO SERBIA³¹

- Mrs. Biserka Strel, Head, Section for Central European and Baltic States and Mediterranean Countries, Department for Transition and Developed Countries
- Mrs. Tamara Nanayakkara, Head, Innovation Policy Section, Innovation Division
- Mr. Alfred Radauer, Senior Consultant, Technopolis Group, Austria

Mrs. Daniela Zlatić Šutić, Senior Counselor, Head of Education and Information Center, Intellectual Property Office of Serbia accompanied the WIPO mission and participated in the interviews.

³¹ The Report was written by Mrs. Tamara Nanayakkara, Head, Innovation Policy Section, Innovation Division, WIPO with support from Mr. Alfred Radauer