



# Economic and Social Council

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## Economic Commission for Europe

### Committee on Economic Cooperation and Integration

#### International Conference “From Applied Research to Entrepreneurship: Promoting Innovation-driven Start-ups and Academic Spin-offs”

Kiev, Ukraine, 9 – 11 November 2010

### Report

#### I. Attendance

1. The International Conference “From Applied Research to Entrepreneurship: Promoting Innovation-driven Start-ups and Academic Spin-offs” and a Capacity-building Seminar “Intellectual Property Management at Public Research Organizations” organized in Kiev, Ukraine, from 9 to 11 November 2010 brought together 178 representatives of Governments, academia, private companies, business associations from 15 UNECE member States as well as a representative of the European Commission.

#### II. Opening of the Conference

2. The International Conference was welcomed by Messrs. Sergiy Tigipko, Vice Prime Minister for Economy of Ukraine and Andrey Vasilyev, Deputy Executive Secretary of United Nations Economic Commission for Europe. In their addresses, they emphasized the relevance of the topic of the Conference and the Capacity-building Seminar for emerging market economies. They encouraged the participants to actively exchange country experiences and good practices to facilitate the establishment of an environment conducive to innovation and commercialization of research and development (R&D) results.

#### III. Summary of Discussion

##### A. International Conference

3. The International Conference discussed major issues related to the establishment of an enabling environment for setting up new innovative companies and developing their competitive advantages through the commercialization of their R&D results. It considered key factors that drive innovative entrepreneurship as well as difficulties that would-be entrepreneurs from within the research community face when establishing an enterprise

based on R&D results. In particular, it discussed conditions for commercializing innovative outputs, including through international patenting, licensing and the establishment of new enterprises and also reflected on entrepreneurship education, ways and means of fostering the entrepreneurial mindset and reducing barriers to communication between academia and industry. As a result of its deliberations, the Conference discussed and adopted conclusions and recommendations for central and local Governments, which are presented in the Annex to this document.

4. The first working session of the International Conference discussed key drivers of commercialization of R&D results as well as major obstacles to this process in emerging market economies.

5. The participants noted that the problems related to unimpeded commercialization of R&D results were not unique to emerging market economies. However, the gap between the accumulated stock of knowledge and the number of patented inventions is the largest in the latter group of countries. The differences in R&D potential between the developed and emerging market economies are manifest both in the lower inputs in the innovation process (in terms of number of researchers, enrolment in tertiary education, levels of R&D expenditures per inhabitant, etc) in the second group of countries and in the lower efficiency of converting these inputs into commercialized innovations.

6. Partly this is explained by the general business environment, which is often characterized by a heavy administrative burden on enterprises, violations of property rights and corruption, creating poor incentives for entrepreneurship and the commercialization of research. It was also noted that in many countries the existing system of taxation did not encourage the corporate R&D and innovation. At the same time, many speakers emphasized that the major obstacle to innovation and commercialization was the insufficient communication and collaboration between the scientific community and industry. Regulatory hurdles and unclear property rights restrain private investment in R&D and result in disproportionately low patenting of inventions by universities and research institutions. Linkages between industry and science need to be strengthened to ensure that research activity anticipates and takes advantage of market needs. This could pave the way for more important private investment in innovation.

7. To improve the situation, the whole tax regime needs to be streamlined in order to achieve an adequate balance between R&D subsidies and tax incentives. While a lot of improvements have been introduced into the relevant legislative texts, the major challenge related to commercialization consists in their implementation and more efficient organization, in particular, more rational division of responsibilities among Government agencies and other stakeholders. Equally important is the need to improve the statistical reporting on innovation. The statistical methodology should be harmonized with that of the OECD and Eurostat. This would facilitate the comparison of innovation status of individual developed and emerging market economies and the decision-making.

8. The second session dealt with the commercialization in academic research institutions, problems of academic entrepreneurs and ways and means of strengthening industry-science linkages.

9. The participants agreed that one of the most challenging objectives of innovation policy was fostering technology transfer (through licensing or sale of IP rights) from universities to private companies. The establishment of technology transfer offices in universities could contribute to this endeavour, facilitating the collaboration between the scientific community and companies. Equally important could be measures encouraging academic entrepreneurship. To foster spin-offs, universities should have coherent policies regarding the ownership of patents, which provide financial incentives for successful researchers. These incentives could be incorporated in specific agreements between the

research institution and the inventor to the effect of sharing revenues generated by the patented invention. Training centres for entrepreneurs established by some of the universities help academics acquire the necessary business skills and network with industrial entrepreneurs and venture capitalists. Along the same lines, the proof of concept centres at the universities are instrumental in selecting the technologies with promising commercial potential, help the inventors with putting together the business plan or licensing package thus assisting them in transforming the innovation into a viable revenue-generating product.

10. Ways and means of ensuring a more effective commercialization include developing cooperation in R&D through national and international open innovation projects and research joint ventures. The business community should be more actively involved in advising on university curricula, and on available and future job opportunities. At the same time, curricula in scientific subjects at universities should include courses on entrepreneurship training. The mobility of personnel between research institutions and private companies could also contribute to their productive cooperation. The industrial liaison offices established by universities facilitate long-term relationships of academia with the corporate community.

11. The Conference noted that in certain cases efficient tools of Government support to commercialization did not necessarily involve a significant financial burden for the state budget. As an example, innovation vouchers, ranging in value from EUR 500 in Belgium to EUR 25 thousand in Portugal, are a public support initiative, which enable innovative SMEs to buy expert services from knowledge support institutions facilitating them to develop new products, services and processes, and, in some cases, manage their intellectual property. The innovation voucher schemes, which bring immediate results and are simple to operate, could be emulated in emerging market economies forging closer links among the academic science at the regional level and business sector.

12. Session number three reflected on ways and means of facilitating the financing of start-ups and the role of innovation support institutions.

13. The financing needs of innovation-based SMEs and spin-offs can be met through a variety of sources, which reflect the changing needs of innovative companies at different stages of development. Specialised financial intermediaries, such as business angels and venture capital firms, have emerged in developed market economies to address the specific financing challenges of innovative companies. However, these forms of financing are not yet well developed in emerging market economies and therefore would benefit from public support.

14. Governments should facilitate the development of national business angel networks and their links with research institutions and universities. Regulations should encourage also the involvement of venture capital companies in early-stage financing, including through hybrid public-private funds. Governments should facilitate closer collaboration between different types of investors to ensure the continuity of financing, which would match the needs of start-ups at different stages of their life cycle. Corporate venture capital investment should also be promoted, as it can help to bridge the financing gap caused by the lack of development of financial markets. Public grants should be used as seed capital, especially in emerging markets, where alternative sources of private financing may be particularly scarce.

15. The international experience shows that high-tech SMEs grow and mature faster when effective innovation support institutions are in place. Business incubators and science parks, which are pivotal at the early stage of SME development, should be established with due regard to the peculiarities of the local economy. In particular, science parks, having the advantage of proximity to universities, enable to reap the synergic effect of clustering small

innovation-based enterprises, public research institutions, and larger companies. It was noted that the innovation support institutions also had beneficial spill-over effects on the local economy. At the beginning of the current decade, business incubators in North America provided employment to 82 thousand persons every year and generated annual earnings of more than USD 7 bn. Along the same lines, their counterparts in Europe create over 40 thousand new jobs every year.

16. Session four of the Conference was structured as a panel discussion involving most of the speakers from the previous sessions. It discussed and adopted some conclusions and recommendations to Governments of UNECE region aimed at fostering the commercialization of R&D results and development of new innovative enterprises.

## **B. Capacity-building Seminar**

17. The Capacity-building Seminar, which followed the conference, focused on strategies of public research organizations for using intellectual property rights for the purpose of commercializing research results, as well as on ways and means of managing cooperation between the latter and private companies. In particular, it discussed issues related to identifying the intellectual property of the organization and its potential for knowledge transfer, as well as finding appropriate instruments of protecting intellectual property rights, including through international commercialization.

18. The Seminar was structured into two sessions, the first one focusing on “Building an intellectual property portfolio”, and the second focusing on “Using the intellectual property portfolio for the benefit of business and society”, and was attended by leading national and international experts from public research organizations and intellectual property offices.

19. It was stressed that it is important to strike a balance between the commercialization of applied research results and the dissemination of fundamental science outputs. This can be achieved either within a given institution, or through a division of labour among the public research organizations of a country.

20. In order to achieve this balance, public research organizations need to create appropriate incentives, both for commercialization and for fundamental research. These comprise career and financial incentives, including clear rules governing the ownership of intellectual property created through research and the sharing of revenues generated through its commercialization. As part of the above balance, it is necessary to build an intellectual property culture within the academic community, and to overcome any culture conflicts between science and business.

21. The international experience suggests that the knowledge transfer strategy of a public research organization should be aligned with the organization’s mission, its goals and its resources. The strategy should be broad in the sense that it should cover not only new technologies but all the knowledge created within the organization, all its intellectual assets.

22. The management of intellectual property more narrowly defined is one facet of an effective knowledge transfer strategy. In keeping with a knowledge transfer strategy aiming at transferring all knowledge rather than just technology, the intellectual property strategy needs to cover not only patents, but also trademarks and copyrights.

23. In order to determine the optimal commercialization strategy for a given intellectual asset, it is necessary to analyze the relevant market environment, including the prevailing technology trends, propensity for litigation, potential competitors and allies. This analysis of the market environment should determine which intellectual assets to protect and how to protect them (through patents, trademarks or copyrights), and in which jurisdictions to

obtain protection.

24. Another strategic consideration for public research organizations is the purpose for which a given intellectual property right is to be used. The various purposes may include blocking competitors, conducting further R&D, commercialization through licensing or establishing start-ups, forming strategic alliances, or the development of standards and technology platforms.

25. The participants noted that the intellectual property management strategy also needs to take into account the resources required and available to cover the costs of intellectual property rights protection and particularly enforcement, including, where appropriate, at the international level.

26. One often vexing issue discussed at the Seminar was the proper valuation of intellectual property in a commercialization deal, be it a licensing agreement, a sale of intellectual property, or the contribution of intellectual property into a new start-up or spin-off company. Putting a value on the intellectual property associated with new research can be difficult because the underlying technology has not been tested by the market, and it is not yet clear how big the market for it will be. Also, the costs of bringing it to market may not be fully known. It was argued therefore that there were no generally applicable rules for the valuation of intellectual property generated at public research organizations. The valuation needs to be established with a particular commercial application in mind, and with due account taken of the state of development of the intellectual asset and the existing competition in the targeted market.

27. The outcomes of the International Conference and the Capacity-building Seminar were reported to the UNECE Committee on Economic Cooperation and Integration at its fifth session in December 2010.

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## Annex

### Conclusions and recommendations

#### International Conference “From Applied Research to Entrepreneurship: Promoting Innovation-driven Start-ups and Academic Spin-offs”

Kiev, Ukraine, 9 – 11 November 2010

Drawing on the comprehensive discussions and exchange of views during the UNECE International Conference “From Applied Research to Entrepreneurship: Promoting Innovation-driven Start-ups and Academic Spin-offs” held on 9–10 November 2010 in Kiev, Ukraine, the participants endorsed a number of conclusions and recommendations.

#### Conclusions

1. The commercialization of the results of research and development (R&D) and their transformation into marketable goods and services increasingly determines the pace of economic development and national competitiveness. The experience accumulated in developed and emerging market economies shows that the factors facilitating commercialization are:

(a) **The scope of research and development**, which determines the stock of inventions and innovations to be commercialized. Among other factors, the scope of R&D depends on the number of universities, research institutions and research communities in the country, investment in R&D from public and private sources and its effectiveness;

(b) **The number, qualification and experience of researchers** in public research organizations and the corporate sector. The availability of highly qualified personnel depends on the quality of education, in particular higher (university) education which, in turn, is largely determined by the funds allocated to education by the state and private sources, university enrolment rates and the quality of education and training therein;

(c) **A regulatory and institutional environment** conducive to innovation, which implies transparency and accountability in public spending and investment, stable property rights including intellectual property rights, independence of the judiciary, harmonization of relevant laws and regulations in accordance with international norms, transparent and stable rules, low costs and simple procedures governing the registration and operation of enterprises, hiring of workers and the registration of intellectual property, transparent tax administration and reasonable taxation rates, as well as ease of access to finance at the various stages of enterprise development;

(d) **Openness to foreign technologies** and to cross-border cooperation in innovation. Research and development is increasingly carried out across national borders and the national capacity to absorb and adapt technologies developed worldwide is one of key drivers of innovation. By participating in international R&D networks and technology transfer, countries can also tap into foreign sources of innovation finance and investment, and into knowledge accumulated abroad, and can increase the pace and quality of their own innovation;

(e) Wide use of **information and communication** technology (ICT) as evidenced by international experience. The latter shows that well developed internet and communication

networks provide support for enterprises, while rendering the business environment more conducive to entrepreneurship;

(f) **The intensity of linkages** between the various actors involved in innovation. These links are provided by public, private or public-private organizations that support entrepreneurs in establishing spin-off companies, commercializing their innovations, bringing them to the market and finding financial solutions. Among others, such institutions include training, consulting and technology transfer centres, incubators and pre-incubators, seed capital funds and technology parks.

2. Available evidence shows that, during the 2000s, the drivers of innovation in emerging market economies of the UNECE region were generally less powerful than those in developed market economies. The emerging market economies lagged behind the OECD countries in terms of public and private investment in research and development, public expenditure on education and enrolment in higher education, the development of information and communication technologies, as well as the scope of the infrastructure supporting innovation. As a result, the process of commercialization in emerging market economies still faces considerable challenges regarding the effectiveness with which they convert the resources invested in R&D into commercial outputs.

3. While significant progress has been reported over the transition period, the overall business environment in many of the emerging market economies is still not sufficiently conducive to innovation and commercialization of R&D results. Weak protection of property rights, including IPRs, administrative hurdles and corruption, malfunctioning of the judiciary – all these factors hamper innovation. Equally significant, business operators often underestimate the critical role of innovation for remaining competitive in a market economy.

4. The available evidence also attests to the low level of financing from private sources, which is one of the major factors behind the insufficient funding for R&D in most of these countries. The lack of direct involvement of private companies in the process of applied research has discouraged the orientation of the latter towards commercial needs and has limited the demand for commercialized products of R&D.

5. As a result, during the 2000s, emerging market economies had rather low rates of resident patent applications per million inhabitants in comparison with more developed European economies. High cost of intellectual property (IP) protection (especially, for patents) as well as protracted patenting procedures also hamper the commercialization of R&D results by SMEs or public research organizations.

6. In emerging market economies, most universities and R&D institutions face additional, specific problems related to the commercialization of intellectual property, such as the lack of competent staff and internal expertise in the intellectual property area and insufficient financial autonomy of universities, which hamper them in developing their own policy vis-à-vis their research workers and IP protection of university inventions; as well as scarce resources to bear the costs associated with patent registration, renewal and litigation.

7. International experience shows that a coherent innovation and commercialization policy facilitates the transfer of academic knowledge produced by public research to the business sector (technology transfer). Methods of technology transfer include the sale or assignment of intellectual property rights, licensing, establishment of spin-offs and start-ups, various types of cooperation and partnership between academia and industry, and cooperation of companies with the education system.

8. Recently, many countries in the UNECE region have seen an increase in the number, scope and level of higher education courses that focus on commercialization and entrepreneurship. Inter alia, these programmes aim at facilitating communication between

researchers and business managers. The curricula include cross-disciplinary issues related to technology, intellectual property rights, business management, entrepreneurship and IT, and emphasize practical know-how through established links with private business or university-based commercial operations.

9. The international experience also shows that high-technology SMEs grow and mature faster when effective innovation support institutions are in place. In particular, business incubators, proof of concept centres, science parks and innovation clusters demonstrate their effectiveness as vehicles that support R&D commercialization and innovation. The science park-based companies are reported to outperform other firms in the same sectors in terms of revenues, quantity of new products developed and number of registered patents.

### **Recommendations to central and local governments:**

10. Consistently implement measures aimed at improving the general business and innovation environment, in particular harmonizing the relevant laws and regulations with international norms; alleviating the administrative burden on enterprises, reducing costs and simplifying the procedures governing their establishment and operation and, where appropriate, implementing deregulation; preventing violations of property rights and fostering transparency of regulations and their application, in particular, with respect to intellectual property protection.

11. Promote private investment and involvement of the private sector in commercialization and technology transfer, using the broad spectrum of public-private partnership instruments. To this end, facilitate and forge closer links between industry, academia and universities. Such closer collaboration could take the form of training and re-training of practitioners from industry at universities and science parks, establishment of joint research laboratories and opening research facilities to external users. Public sponsoring of science parks, as well as some fiscal incentives, could be instrumental in achieving this.

12. Ensure compliance of the rules and regulations of commercialization with the existing laws and regulations, thus guaranteeing a fair distribution of income stemming from commercial results according to inventors' and other stakeholders' contributions. Encourage universities to develop coherent policies regarding the ownership of intellectual property, thus creating financial and non-financial incentives for successful researchers. Facilitate the use of R&D outputs generated within the research institution in the interest of the public at large (technology transfer) through licensing or other forms of commercialization. The establishment of technology transfer offices in universities could contribute to this endeavour. Ensure that research results remain in the public domain for use in future research.

13. Explore international good practices of open innovation, particularly applicable to SMEs, and the feasibility of their use nationally for the purposes of commercialization. Foster the participation of academia and enterprises in cross-border open innovation and facilitate the diffusion of new products and technologies developed abroad in the domestic market through consistent promotion of foreign trade and international direct investment, and the international mobility of knowledge workers.

14. Adopt a proactive approach to facilitating and fostering the financing of innovation-based start-up companies using, among other instruments, merit-based awards and feasibility grants, facilitate the development of national business angel networks and their links with research institutions and universities, and promote partnerships between industry and government. Put in place public initiatives to encourage the involvement of venture

capital, and corporate venture capital firms in early-stage financing, including through hybrid public-private funds that create more favourable risk-reward ratios for private investors. Closer collaboration between different types of investors should be promoted to ensure the continuity of financing for start-ups at various stages of their life cycle.

15. Draw on and share the international good practices of regulation and operation of innovation support institutions, use them as a model, and promote linkages and networking among those institutions. When establishing business incubators, proof of concept centres, science parks and innovation clusters, due attention should be paid to factors contributing to their success, e.g. proximity to universities and their research base, a firm technological base of local industry and start-ups, well-educated and trained local workforce and adequate social infrastructure.

16. Collect information on existing innovative technologies, where appropriate, creating to this end national and subnational databases, and distribute this information through various channels, including the mass media.

17. Collect and disseminate information on good practices of promoting new innovative enterprises and strengthening industry-science linkages in developed and emerging market economies. On this basis, and in cooperation with interested private companies and entrepreneurs' associations, governments could initiate training courses and expert consultative services dealing with innovation and enterprise development, for company managers, academic entrepreneurs and public officials.

18. The International Conference invites the UNECE secretariat to review the good practices presented and discussed at the Conference, and ensure a wide dissemination of its outcomes to the stakeholders.

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