II. IP teaching: a role of the national educational institutions and a level of the scientific research

One may agree that research as well as knowledge which is materialized in technologies and peoples' creation is a substantial impulse for the economic development which is, of course, influenced by all other internal and external factors and creation of intellectual potentials starting from the school and university levels. Therefore, it is extremely important to understand and to control the processes which are related not only to the creation of specific knowledge and distribution of them, however, also the processes in relation with the use of such knowledge.

Such view is reflected in the so-called "European Paradox"[272] which foresees a very important IP education, research and industry interconnection and formulates the important message for the Baltic countries as well. It is essential to stimulate the applied technological research in order to create the end-consumer products which are used as means and processes to develop other better-quality products and services and to compete in the Internal Market as well as in the worldwide market more effectively[273].

Such views and intentions to analyse the actual status of applied sciences and possibilities of their practical implementation were the basis for the report on actual potentials of applied sciences at the Vilnius University in Lithuania with the main aim to clarify how the scientific products could be applied in practice and could be spread in a circle of further innovative activities taking the intellectual property aspects into account[274]. The report is to be considered as one of the most important sources while analysing the actual status in the field of local applied sciences and the conditions of patenting of creative innovations as well as intellectual property protection in this particular field[275].

As specifically described in the Report 2006, the primary source of scientific research in IP field is nowadays found in the biggest universities of the Baltic countries[276]. Let us take the example of the Vilnius University which is one of the leading

272 "*European Paradox*" mainly reflects the view that there exists a strong fundamental science, however, a weak innovative activity. *Note:* this view could be well applied to the Baltic countries as well; see also *Innovation in FP6 European Commission, Community Research, 2005*, p. 3.

273 As also stressed in *Mizaras*, Current Key Aspects of Intellectual Property in Lithuania (ATRIP Congress (2008)), p. 2.

274 Report of the Workgroup established by the Order No. R-121 as of 10 May 2006 of the Rector of the Vilnius University on the topic "*Science at the University of Vilnius: Applied Sciences and Intellectual Property*" (*unofficial publication*) (hereinafter – the "*Report (2006)*", or the "*Vilnius University Report on Applied Sciences and IP (2006)*"). The Report 2006 covers the information in the field of applied sciences in 2004-2005 and is based on the self-analytical material on scientific research at Vilnius University and the findings as of 2004 of the competent experts of the European University Association in this particular field.

275 The numbers (local scientific research level, etc.) as provided in the following text are based on the information from the *Report 2006*.

276 Vilnius University (Lithuania), Riga University (Latvia) and Tartu University (Estonia).

universities in Lithuania in the field of creation of scientific products[277] and in the participation at the international projects (it makes 40 % of all in Lithuania implemented projects) as well as in the scientific publications[278].

Despite the leading positions of the Vilnius University and its incentives to induce innovative as well as R&D activities, references to certain impediments have been reported. The work forces, for example, in the area of technological research in the Vilnius University are still modest. Almost 50 % of the scientists of the highest qualification are older than 50 years, the means and programmes on the education of young generation are well-timed, though, too sporadic. Moreover, the attribution of scientific activities to technological or physics sciences is not strictly regulated which is often reflected in the financing processes of such activities.

The separation of applied sciences from experimental and research in fundamental sciences is likewise not clear. Although, the latter separation can be considered relative, the analysis shows that 80 % of the funds for the scientific projects administered by the Vilnius University are used for applied scientific works; moreover, the international science programs coordinated by the EU and also NATO science programs support objective-applied research and applied innovative activity[279]. The status of applied technological research is well presented by the number of inventions and patents: it is reported that in the period of 2004–2006 twenty (20) inventions made by the Vilnius University employees were patented and three (3) further patent applications submitted[280].

In this context, it is important to mention the percentage of the contracted research and services. Although the commissions provided by local and foreign companies make a substantial part of the scientific research, the local – Lithuanian – commissions amount to around 25 % only[281]. By virtue of the Report 2006, there are particular incentives to innovative activities of the local companies, however, the

277 *E.g.*, in the field of physical sciences the scientific products created at the Vilnius University made 2/3 of all scientific products created in Lithuanian Universities; the scientific products in the area of, for instance, biomedicine increased from 25 to 36 % in 2004-2005, as referred in *Vilnius University Report on Applied Sciences and IP (2006)*, p. 2.

278 In 2005 there were 300 scientific publications published by the Vilnius University (in comparison with 2001 there were 600 publications) among 918 scientific publications published by other Lithuanian universities in the editions of the Institute of Scientific Information, as reported in *Ibid*, p. 2.

279 As reported in *Ibid*, p. 3, Vilnius University exercises about 50 various international scientific programs per year (more than 20 are FP6 projects, and around 30 projects were in 2006).

280 As indicated in *Ibid*, p. 4. These numbers could be compared with the numbers of patented inventions in that period. In comparison, according to *Lithuanian Patent Office Information (2008)*, there were 543 valid patents on the basis on national applications (44, 38 % of Lithuanian applicants) on 31 December 2004, and, similarly, 504 valid patents on the basis on national applications on 31 December 2007.

281 According to the Report, the foreign companies provide funds which are three times bigger than the funds provided by the local partners in the fields such as a research on technologies of industry of materials, a research on medicaments together with Finland and Italy, a production of unique technological equipment under order by Spanish universities, etc. See *Vilnius University Report on Applied Sciences and IP (2006)*, p. 3.

Report 2006 emphasizes that the price of creation of invention and its patenting are extremely high[282]. The Report 2006 also reveals the continuing active discussions that local educational institutions are able to initiate neither new research activities nor favourable conditions for innovative activities mostly because of the lack of financial resources that could be given for such activities[283].

Last but not least aspect to be mentioned are IP studies at the national universities in general. Taking Lithuania as an example, it can be agreed with the opinions that, although, IP courses and seminars (covering all IP rights) are contained in the curriculum of the local universities, shortage of IP studies within non-legal curriculum is considered as one of the weak points in IP studies in Lithuania. Such drawback can be solved by incorporating relevant IP courses within technical orientated subjects at the universities[284].

III. Local research and innovation

1. Research and development areas

On the basis of data on expenditure on R&D structure by field of science and types of research, it is obvious that, for example, in Lithuania technological, agricultural, medical and physical sciences receive much of attention. The same tendency is seen in both the institutions of higher education and universities as well as the Government sectors[285]. In the business sector the expenditure on R&D in the fields of manufacture of chemicals and chemical products as well as machinery and equipment comprises a relatively high percentage[286]. According to the Report 2006, the local and foreign industries involved in the research projects are basically focused on research on substances, electronic and laser technologies, information technologies as well as on database of geophysical research. Contemporarily, the foreign companies are more focused on the fields of innovations which, as rightly pointed out in the Report 2006, have an actual applicability abroad. This is also the case for both Latvia[287] and Estonia[288].

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282 *E.g.*, the patenting of one biochemical product was financed by one local company and amounted to 50,000 Euro. See *Ibid*, p. 4.

283 Due to this, it should be also mentioned that under the Order of the Minister of Economics of Lithuania as of 15 March 2005 the most parts of the costs related to patenting could be compensated, however, there were no guarantees that such compensation could be actually provided. In 2008 a possibility to deduct the expenditures invested into R&D for 3 times instead of one was additionally enacted, as reported in *Mizaras*, Current Key Aspects of Intellectual Property in Lithuania (ATRIP Congress (2008)), p. 2.

284 Such information and opinions were expressed by *Ibid*, pp. 6-8.

285 *Note:* business sector is not covered here. Statistics, *Research Activities in LT (2006)*, p. 25.

286 *E.g.*, as referred in *Statistics Department of Lithuania (2008)*.

287 See more at *Latvian Research Landscape (2008)* which also contains the National Concept of R&D in Latvia for 2002-2010 (EV).

288 See *Statistics Department of Estonia (2008)*.