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DEVELOPING INTELLECTUAL PROPERTY CULTURE IN UNIVERSITIES AND RESEARCH INSTITUTES

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***Abstract*—** Paper presents some aspects regarding the problem of Intellectual Property (IP) in universities, or Research and Development (R&D) Institutes in the way to promote and to protect the innovative results or products. It is very known that China, but not as single example, realized immediately all new products and they are staying to find products without international protection. In this way paper presents a methodology to stimulate the innovative process and the law protection of Intellectual Propriety Rights (IPR). This opportunity was drafted after the discussions held during the roving workshops "Disseminating IP Knowledge at Universities", in Bucharest (2007), Den Hague (2008), Iaşi (2009) or Brussels (2011), and after discutions and the metodology established in Technical Comitee (CT) 383 "Management of Innovation", Romanian Association for Standardization, (ASRO), Romania in 2012.

Keywords **—** education, intellectual propriety, methodology, strategy.

I. INTRODUCTION

R&D institutes in order to create a strategy at a national scale, first and foremost, the role of the university in society should be revised. The proposed methodology is realized to stimulate and sensibleness the aspect of protection the innovative creation.

When it exists an intention to elaborate a document like a methodology to promote and avareness IP in universities and R&D Institutes some questions appear:

- It can be promote in Universities as autonomous institutions?

- Is it possible that society, as work market, can impose from the outside certain rules supposed to help universities?

- Are universities those which provide to the society a system of rules and to give a way for development directions [4]?

A possible manner to develop IP culture in universities is to identify those successful practices already existing and to generalize them. Taking into account that the university is very responsive to outside intrusions, it is highly advised that the IP techniques, methods, procedures, and methodologies that proved themselves efficient should be undertaken and, as much as possible, generalized at national level [2], [5].

II. THE ROLE OF KNOWLEDGE AND CREATIVITY IN LEARNING PROCESSES

Knowledge plays a key role in the process of innovation by SMEs in medium technology sectors, where innovation is based on the capability to informally search for a solution to local problems together with other partners. This process is different from the formal research activities in the high technology sectors.

It is well known the "Triple Helix" Michael Porter Model, in which there is a good relation between research department- R, developing department- D, implementing department- I, in the creativity process-C.

Using the Figure 1 it can be seen the way and the stages from the market demands to industrial development of the innovative companies. For the very beginning (I) market represents a stimulus in technology development, new technologies are necessary to stay on market, to realised products at the right price, price imposed by the concurrence, and also by the customer's demands. Knowing the market demands the second stage (II) is about new innovation projects, new aspects concerning product design. After the project stage the process is continuing with innovation adoption, and finally, the industrial development of the innovative SMEs (stages III and IV).

The new concept for research to business is to accept the "Four - leaf Clover Model", presented in Fig.2, a good relationship between academia, industry, government policy and also using consulting companies (INNOVA, ZENNIT - GTZ, PROVENDIS a.s.o.), Commerce Chambers, or Technological and Business Incubators, Scientific Parks.

All of these models are the principal actors to developing the potential innovative in an geographical area, at the base of a cluster, for example.

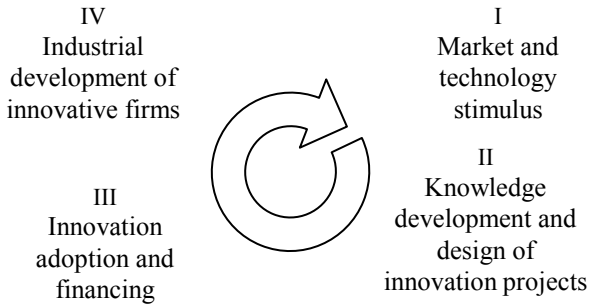

Fig. 1 - The fields of innovation policies

Fig. 2 – The Four-leaf Clover Model

It is very known that a new protected product must be offered to the "big" industry. In this way there are some possibilities offered by entities like: technological and business incubators, industrial scientific parks, clusters, etc.

III. What About A Strategy Establishing

To be able to talk about IP in Romania and to know which are the steps to create an IP culture and to integrate IP in the various faculties and especially in science, engineering and business faculties (entrepreneurship, innovation management), the first poit is to know what IP culture is. It is an organizational value system resulting from an environment oriented to observing and protecting industrial/ intellectual property [5], [6]. IP culture consists of all the behavioral and professional reactions related to observing the right to intellectual property, reactions supported both by a law system and by a system of unwritten rules, structured over time in institutions and society. Anyway, the general conclusion is that at this moment we cannot talk about authentic quality culture in Romanian universities. This is explainable for the following reasons:

- IP is discussed at a European level of demands for a short time (since 1990) in the Romanian society;
- there is currently an insufficient number of faculties and curricula able to carry on IP courses;
- there are few teachers specialized in IP;
- there are not enough post-university courses debating IP.

Concerning the IP issue in universities, it is obviously to note that:

a) Generally, Romanian universities have not managed to create an efficient and coherent way of thinking and acting regarding intellectual property and especially regarding industrial property achievement and enhancement. There are no distinct and practiced university policies in the field of IP.

b) Despite the important potential and the significant overweight at a national level, the contributions of the university researches to national production of inventions, brands, and industrial models are not so relevant.

c) The inventions achieved by university specialists have a higher confirmation rate than the national average and approaches especially top technical fields. This could be taken into account as a real starting point for improving the criteria of performances that are specific to top universities in the world evaluation.

d) In most universities there are no adequate forms of training, informing and assistance in the field of intellectual property. Everyone seems to ignore the fact that universities (especially technical ones) have significant human and operational potential that could produce inventions liable to be enhanced, could offer specialized evaluators and could help operational centers to enhance industrial property.

The IP culture should be viewed as directly related to two other components of university culture: quality culture and creativity culture.

Quality culture is a system of organizational values resulting from an environment oriented to maintaining and continuously improving quality. Organizations with a quality culture are generally characterized by aspects like [8], [9]:

- Clients' responses are actively considered with the purpose of continuously improving the quality;
- The hired managers are equally involved in continuously improving the quality;
- Teamwork is essential;
- Education and instruction are performed in order the guarantee, at every level, staff with appropriate skills and knowledge;
- Rewards and promotions are based on every individual's contribution in quality improvement;
- Employed colleagues are seen as internal clients;
- Suppliers are treated as partners.

Creativity culture is also called innovation/ creation/ invention culture etc. It is a system of organizational values that results from an environment oriented towards discovering, creating and promoting what is new.

IP culture is closely related to creativity culture, because the (technical or artistic) creation process ends with procedures of protecting that specific creation. It is assumed that in Romanian universities, IP related information is offered to students together with information about creation techniques and methods (logical or intuitive). This is typical especially for technical universities.

In this way, Romanian universities will be more and more compelled to reconsider their fundamental elements starting from the relationship with industrial partners, and to adopt coherent policies regarding the evaluation of the industrial property. At least two major aims have to be considered:

- Evaluating one's own creation;
- Avoiding breaching the rights of the other.

In this context, the main coordinates of a university policy in the field should envisage the following operational systems:

- A system for assuring industrial property culture (education, good practice, operative information);
- An assessment system (procedures, methods, specialists);
- A capitalization system (regulations, service patents);
- An evaluation system (cessions, licenses, know-how).

IV. Establishing An Ip Strategy

The action plan suggested consists of several steps that should be made in order to create an IP culture and to integrate IP in various faculties, and especially in science, engineering and business faculties (entrepreneurship, innovation management):

1) Studying the level of IP culture development in universities, by identifying the following indicators:
   - disciplines that discuss the IP issue (inclusively and exclusively);
   - number of university teachers qualified in IP;
   - number of students instructed about IP in one year;
   - elaborated didactic aids of the field;
   - post-university courses etc.;
2) Systematizing information about the state of IP culture in Romanian universities.
3) Establishing Romanian successful practices in the field;
4) Studying the level of IP culture development in various European universities;
5) Systematizing information about IP culture development in various European universities. Establishing European successful practices in the field;
6) Elaborating a guide of successful practices for IP culture development in Romanian universities;
7) Disseminating the guide of successful practices to Romanian universities;
8) Establishing a methodology of periodical actualization of the successful practice guide.

Technical universities have an advantage from this respect since it often happens that the chair belongs to inventor-professors. This is one way for Romania to raise awareness about the importance of teaching IP to the teaching staff within various faculties.

Establishing an action plan concerning the development of industrial property in Romanian universities, impose regarding the creative and innovative potential of universities, the necessity of ensuring intellectual property protection and the enhancement of scientific research results (nationally and internationally competitive patents, products and technologies), the following objectives have been established:

a) setting up a network between State Office for Inventions and Trademarks (OSIM), National Ministry of Education (MEN) and Romanian universities in order to allow and facilitate an inter-institutional information exchange and a practical framework able to stimulate research, ways of IP protection (using IP specific elements) and thorough use of research results;
b) setting up Technology Transfer Offices attached to certain universities; the TTO's will receive logistic support from OSIM;
c) extending the teaching of an IP course module (optional) in technical and economic universities;
d) collaborating with and ensuring mutual access to European and international programs in the field of IP protection;
e) jointly organizing seminars, symposia and round tables on current and resonant topics concerning industrial property protection in technical fields
f) including in the Draft Law on employees' inventions (which is currently being elaborated as a legislative initiative of OSIM) a special chapter concerning inventions made in the academic environment;
g) improving the current regulations with the purpose of increasing the importance of patents in awarding scientific degrees to university research staff and professors who are applicants and/or owners of those patents;
i) providing, within the framework of the programs coordinated by MEN, specific funds meant to support the patenting with OSIM, or, in case of especially valuable inventions, for getting European patents with the European Patent Office or international patents.

IP strategy in universities and R&D units is an essential component of general business strategy, being necessary the innovative creation promotion, protection and commercialisation of IPR in new products.

For Romania is important that universities and R&D institutes must become key generators of IP capital actives.

The factors involved in this activity are:

- teachers and researchers;
- doctoral, students from the last years, or generally students;
- sponsors;
- technological transfer units (TT);
- O.P.I.;
- National Council of SMSs and companies;
- Commerce and Industry Chambers etc.

Sometimes there are confliction interests between these

actors, so IP strategy must harmonises the interest of all factors from universities and research institutes.

IP strategy, based on factors presented above means:

- Towardly frame work for dissemination of the new knowledge in public benefice.
- Fairly distribution of the financial benefit or other benefits as result of commercialisation of the innovative product, taking into account inventor's contribution, but in the same time, the institution contribution (university, research institute).
- Promotion, encouraging and supporting the scientific research.
- Students attract to IP and young creativity stimulation.
- Creation of stimulus for researchers and reward intellectual propriety assurance [14].

A lot of scientists associate IPR with juridical sciences and copyright. They can not see the relevance of IP in their research activities. Most of this, some of them consider this action as an activity to obtain the control to their intellectual propriety. It is not good seen the publication of research results, because it is possible to assume patentability by invention divulgation.

It is an adverse reaction in the field of taxes, considering that the level of them is a little bit too high. Sometimes when the research team is numerous, with effective multiple participation in the elaboration process of innovative ideas, proposed for protection, are difficult to establish who the holder is, from here on discuss about the repartition of the benefits realised after the technological transfer and not at least appears interest conflicts.

There are antagonist known reactions, but it is very simple to find solutions, being a innovation management of negotiation. An important factor is communication: meetings and debates with teachers from different faculties, students, doctoral, and also all researchers involved.

In this way choosing the right team and the best lieder to elaborate the IP strategy is a good solution and viable. These lieder must have all the team support, also the support of the head of the faculty university, research institute. Sometimes in team is necessary to include specialists, experts from outside.

IP strategy embraced by the team research members must be able to find responses to questions like:

1. Who is the holder of IPR generate by the research using governmental founds?
2. How will be distribute benefits resulted from the commercialisation of IP between researchers/ inventors, department, institutes, financing team?
3. It exists law regulations about commercialization of IP resulted as research, using government founds?
4. Who is the IPR holder in the case of researches based on private founds?
5. There are utilised "spin-off" companies or licensing contracts for the technological transfer (T.T.) to the private sector, in the way of commercialisation?
6. Who is the administrator of IP actives, including licence negotiations and royalty repartition?
7. How encourage institution the commercialization of research results using entrepreneurial activity?
8. Which payment founds are for the maintenance costs?
9. What is the position of researchers vs. a divulgation of a secret?
10. How are resolved interest conflicts between didactic responsibility and research projects having a commercial character?

Often, a lot of products reface having an innovative character passed; responsibility is at the absence of IP knowledge, the absence of IP specialists, and the institutional frame work, like Technological Management Offices, IP Departments in universities and research institutes.

It is necessary to develop an administrative structure (service, office, department, etc.) or involving a person, a specialist in IPR, attested, certified by OSIM.

This structure, subordinate directly to administration/board (rector/senate, technical or scientifically director, or to technical- scientifically council etc.) is recommended to have an jurist (for contracts, legal dispute, juridical actions etc.) and a specialist for the documents evidence, phases of patents applications, demands of patents, obtained patents, profit obtained, taxes payment, royalty paid to authors, contracts evidence and offers for works who doesn't need university studies.

The department administration depends on institute dimension, financial resources and managerial politics, general or sectorial on IP. SMSs and little entrepreneurs or inventors can access services offered by authorised counsellors in IP.

V. IP IN TRANSILVANIA UNIVERSITY OF BRAŞOV

Transilvania University of Braşov had an Invention Department in its structure ever since its foundation. Starting with 2007 it became the Department of Legislation and Intellectual Property (DIP).

Taking into account the major importance of industrial property protection to economy and the necessity of competitive information management in the IP field, DIP focuses on IP promotion by developing a service system that offers useful information regarding industrial/ intellectual property protection. DIP performs activities of didactic staff training and scientific research, and student training concerning activities of patenting and/or artistic creation protection, and also concerning documentation in the field of IP protection.

This Department has its own headquarters, equipped with all necessary office facilities and a staff.

The department is assisted by a Scientific Council consisting of teachers, researchers, specialists in the main

IP scientific fields, technical science and technologies, modern art, natural sciences, legislative sciences, etc. The role of this Scientific Council is to analyze intellectual property objects (intellectual creations) and industrial property objects, which are liable to be protected by copyright laws or IP rights, according to the law. This council also has to offer counselling regarding the opportunity of requesting protection.

Transilvania University of Braşov founded, in 1993, "The Centre of Technologies, Inventors, and Business - CTIB S.A.", which activates mainly as an interface between the university and the business environment, on three dimensions:

a. Micro-production and technology transfer:
   - Creating prototypes and experimental models resulted from scientific research papers;
   - Transferring technologies from the university to the business environment;

b. Inventors – encouraging students, researchers, and teachers and supporting innovative activities in the university environment;

c. Supporting entrepreneurial initiatives of student - innovators through activities specific to business incubators. CTIB, through its Inventors Department, has had, since 2000, the status of Regional OSIM - PATLIB Centre focused on Industrial Property Promotion, disposing of engineers and consultant lawyers specialized in industrial property.

Before 2007 there were zero registred patents. Why? Maybe because of costs involved in procedures, maybe of the low interest of researchers.

Considering that the intangible capital of an university can be important, our university takes a decicion to help the young researchers to support the publication fee at OSIM.

During the first year of activity (2008), the Department registered 38 patent applications from Transilvania University of Braşov, the authors being: teachers, doctoral students, and students involved in scientific research activities.

The patents situation is prezented in Table I.

Within Technical Faculties, the study programs of the 2nd and 3rd years of study include courses and seminars about Intellectual Property- identifying IP objects, ways to protect and enhance them. Within the Faculty of Product Design Mechatronic and Environment, the disciplines Invent, Fundaments of Technical Creation and Creativity Techniques and Methods, include chapters on IP. Also, beginning from 2011, a cours of IP was introduced at DI, ISER, IVD, IPMI specialisations, and at Master Degree Education. This is the rezult of a project named RECPIN (National Network on Stimulation and Awareness IP in Universities), havind as partners the Aurel Vlaicu University of Arad, ICIA CENTI Cluj – Napoca (a R&D Institute) and Politehnica University of Bucharest. As rezults it was proposed to introduce a Master Degree Education on IP and Technological Transfer.

TABLE I
PATENTS DEMANDS AND CERTIFIED

Year	Number of patents demands	Number of certified patents
2009	9	1
2010	22	5
2011	31	3
2012	23	11

The Faculty of Law has a course of Intellectual Property Rights, while the Master Degree programs include themes in the field of IP.

The Doctoral School holds an Intellectual Property Course with the following chapter-themes: Legislation in the field of Intellectual Property; Identifying Intellectual Property Objectives; Documentary Researches in Databases related to Industrial Property Objects; Patent Applications and How to Describe a Patent, Ways to Evaluate and Enhance Inventions.

Transilvania University activates in an environment with a powerful tradition and experience in the technical field, and the current challenge is to manage to permanently update information and keep the high standard imposed by the rhythm of technical evolution.

In 2006 it was realized a Technological and Business Incubator "Products and Technologies for sustainable Energy" ITA Pro-Energ, which, as entity, cooperate with the economical structures in the region, develop the IP spirit in the young students and beginners/ start-uppers. In this way the Incubator is involved in a lot of projects, having as target to support the innovative initiative of the young researchers (RECPIN, EENet, BISNet, RO-SMEP a.s.o.), and take part to the most important exhibitions, technical forums (Hanovra Messe, TIB).

Technical universities have an advantage from this respect since it often happens that the chair belongs to inventor-professors. This is one way for Romania to raise awareness about the importance of teaching IP to the teaching staff within various faculties.

Within the project, several professional training activities in the field of intellectual property were established for teachers. These teachers are to elaborate didactic aids, to lecture, and to develop IP in their faculties. The point is not to lecture IP to students, but to create that atmosphere which could lead to the insertion of chapters dealing with IP in as many university courses as possible.

The most important objective is to develop and provide training programs for the higher education staff. The training courses will be held by teachers from OSIM, from the field of quality and implementation of the National Framework of Qualification in Higher Education, with the members of the experts, and after that the teaching staffs has abilities to teach students,

doctoral, a.s.o. Also, the teaching staff will have the opportunity to attend courses displaying modern methods and techniques on teaching and learning, intellectual and industrial property, and technical creativity stimulation. Aspects considered will be, for example, developing teachers' responsibility regarding the design of methods and student- centred learning environments, so that the student-teacher relationship is one of partnership, in which each is responsible for achieving the results of learning. Together with the implementation of new teaching methods and techniques, while revising educational plans and subject matter contents, activities of developing virtual teaching/ learning/ evaluation instruments will be financed within the project.

VI. CONCLUSION

One of the most important risks that could occur during the working plan consists in the difficulty of selecting the significant information from within the universities. In order to successfully do that, the way to approach universities will be as official as possible, so that accurate data is offered in due time.

It's necessary to realize a material, may be a Guide of good/best practice, to promote and stimulate the importance of IPR, containing information structured as follows:

1. Discipline titles, with the number of course/ seminar/ project/ practical paper hours;
2. Titles of university courses, reference books, guiding books elaborated strictly in the field of IP;
3. The contact data of the professors teaching IP courses;
4. Statistical data regarding the number of patent applications/ patents;
5. Data regarding university strategies in the field of IP;
6. Information about national/ international law;
7. Models/study cases of introducing IPR in invention, arts, literature, music and medicine or pharmacy description.

As we can see there are some difficulties in the way of protection the innovative creation in universities or R&D institutes. Studies made in the last 2-3 years lead to elaborate a strategy to stimulate and award the creative spirit of researchers. These studies give us a possibility to find and define a method to separate innovative work as service duty and innovation after service.

A good approach could be efficient since the methods, work instruments, procedures, and methodologies contained in the guide would come from "inside" the university, being approved by at least a part of the academic community. The experience accumulated in those universities centres which developed an IP culture can be generalized at national level. These extensions of good practice from some universities at national level impose to realize a Guide of good practice, including: elements of IP, regulations/protection by law, description of documentation, stimulation and awareness methodology, service invention, copy-right law, patents, utility models, design, trade mark, geographical points, semiconductor products, models/study cases of introducing IPR in invention, arts, literature, music and medicine or pharmacy description a.s.o.

This Guide was realised in Transilvania University of Braşov and must be disseminate at national level. It is realised for students, doctoral, researchers, as a complete monograph.

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