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Intellectual Property Law and Technological Innovations: How does Russia stand to gain?

1. Introduction

This paper asks how to distribute equitably the accumulated knowledge? How to intensify the knowledge and innovation processes in order to support the economic restructuring and social progress? We analyse the intellectual property rights (IPR), and verify the pertinence of the idea that the respect of rights should be treated as a mission of law and of economic policy. We survey the literature focusing on the IP rules, which govern social interaction. Given these preliminary remarks, the paper concentrates on market role in knowledge and technology diffusion, as well as on the cost of intellectual property protection especially in perspective to determine the Russian capabilities and prospects.

The structure of the paper is as follows. First, the analytical framework to be used in relation to the IPR and to law in economic studies is outlined. It includes the aspects of both legal and economic approaches. Second, Russian important legal news over the past ten years for enforcement of IPR will be reviewed in detail to demonstrate the world unification of rules of intellectual protection. Some empirical data are enclosed to illustrate the impact of IPR on patenting in Russia. Third, and conclusive, the specificity and limits of legislative introductions are emphasised in order to better situate the IPR laws within economic mechanism.

2. Definitions and theoretical frameworks

2.1. Intellectual capacities and intellectual capital

The very subject of law and economics is justice. Justice is an important property of communities, defended by traditions, culture, meanings, and practices. Justice notions and laws differ markedly around the world. We will consider the norms of justice concerning the human capacities allocation, their maintenance, change, and generalisation. The just allocation of intellectual human capacities is a concern of politics.

All capacities, by nature, are integrated part of their holder. The individual receives its capacities from genetic and environmental influences, education, culture or training. Therefore the uses of capacities provide economic and justice problems at social level. The productive human capacities can furnish benefits to holder, to other persons and to community. Capacities cannot be transferred, but the benefits from intellectual capacities, as constituent of productive ones, can be transferred, and all capacities can be more or less compensated for by other allocations. The transfer of intellectual capacities is realised in the form of rights to decide their use and to receive their service or their proceed. The capacities, and intellectual ones in particular, are more something one *is* rather than something one *has*, and for this reason compensations in terms of money are often seen inadequate. ““Being” and “having” constitute different “spheres”, one has a dignity and the other a price” ((Kolm (1996) p.137). The usage of intellectual capacities in a market society needs also the capacities for economic exchange and bargaining.

What gives rights to use and appropriate the intellectual capacities? In economics one considers that the rights are for origin the intellectual capital. Intellectual capital is often estimated as the value of non-public information possessed by an individual in excess of the costs of learning the information. In priority that kind of information corresponds to knowledge consecrated in discovery. It is possible to give larger interpretation to intellectual capital if one accepts to attribute it to persons to whom the discovered information is transmitted before its large diffusion. For this reason the value of intellectual capital may be increased through collaboration, when the discovery involves techniques that may come into being by personal introduction of knowledge by discoverer and he's active participation in transmitting. The absorption capacity is a co-product of research activity. As the learning is cumulative, the larger is one's capacity to use the external information, the more important is its experience in the technology concerning this information (Cohen, Levinthal (1989)).

However, the valuation of intellectual capital as “background” of intellectual property rights is an area of disagreement, law and economics contribute their mite.

2.2. Economic signification of intellectual property law

In normative framework the law must follow some phases: to decide to who the right must be assigned (entitlement decision), how such right may be protected, to prescribe the form of right. It may be property (absolute) right, liability rule (civil responsibility), or inalienable rule. The laws are important in economic analysis because juridical institutions such as: regimes of property, contractual liberty and restraint, or patrimonial responsibility penetrate the microeconomics. The jurists’ knowledge help the economists to control the relevance of some concepts such as: contract, convention, enterprise, authority, power and what is non-contractual in contractual relations, since the legal rules concern not only the market relations but also relations in the organisations. Such is mainly research activity, which suppose relational contracting and duration.

Economic analysis of intellectual property laws may be conducted through some points of view, and for some distinct ends: to determine what laws are economically efficient, to predict the effects of laws, to forecast what laws will be. The laws may be mandatory or they may incite and motivate. The economic studies on intellectual property rights (IPR) are frequently static, trying to relate the impact of patenting and licensing rules on some particular markets, and especially on technology market.

Microeconomic analysis emphasises the legal rules from their efficiency feature. It is supposed that the laws influence the individual behaviour. The law influence is of economic nature, and the law is implicitly conceived for achieving some objectives. Conceptually, an ethical objective might be social income or social welfare, that may be imagine as aggregation of individuals’ incomes or of their welfare (utility). The incomes may be added, but it is more difficult to appreciate the welfare, since for that many subjective causes must be taken into account. Many reasons were advanced to illustrate that intellectual activity is motivated specially by subjective causes, which are not present on marketplace. For instance, the researcher’s and inventor’s ends are largely influenced by career concerns. The career concerns can have important effects on incentives even in the presence of efficient income compensation contracts. Therefore, the income is retained usually for simplicity as a criterion of efficiency, and the legal rules are evaluated according to the principal of income

maximisation. Economists choose such incentive issues partly because well-developed methods of analysis of this area exist.

Consider for example the regulation prescription in a case when contract and price relations exist. How profit sharing between patent holder (usually employer) and inventor (employee or team) (Levin and Lvos (1998)) may be decided? If the additional income of inventor is worth more to him than it costs the patent holder to produce and defend patent, then holder will be interested in including that condition in the employment contract whether or not the law requires this. If, on the other hand, increase of inventor's income costs the potential patent holder more than it is worth to the inventor, then employer will be not willing to patent this innovation. From the economic efficiency perspective a regulation imposing some level of inventor profit sharing is defective.

The analysis of that kind suggests the freedom of contract between parties, and the function of law is to specify a default contract. It serves also the purpose of reducing the cost of negotiating. Changes in patent law will change the incentives facing both patent holder and inventor.

In analysing the situation as discovery, the contribution of economics is to include explicitly the element of rational choice in producing outcomes that are usually considered as irrational. While a researcher could not choose to do discovery, he does make many choices, which modify the probability that it will happen. In deciding how much to work, how frequently to realise experiences or how frequently to discuss the issue, he is implicitly trading off the cost of an increased chance of invention against the risk of having less leisure, to be victim of work accident or disclose secret. This way of reflect upon an invention is promising in evaluating both laws designed to be conducive to inventions, such as legal work duration or social insurance in research sector, and who remunerates for discovery when it happens. A researcher who knows he will be less healthy, who knows the cost of medical care, or the cost of original idea privation will take this information into account in deciding how intensively to work. The advantage of legislation about profit sharing in case of invention over working time regulation may be captured by modification of behaviour in any way that will increase the chance of invention. But, the law determining the working time could not resolve the problem of research work intensity.

Antitrust law and legislation is another area of economic analysis. One important contribution has been to notify that some elements of law may be based on an inexact judgement of how firms get monopoly power. In some cases the antitrust law may be in contradiction with patent law, which protect firm's exclusive rights on new technology markets (Peaucelle (1998)).

The Coase view, according to which transaction costs decisively affect behaviour, modifies the economic analysis application to the common law. Common law rules tend to promote economic efficiency by internalising social costs and by requiring supplementary legislation. Nevertheless, in small groups the conflict may be resolved by bargaining. Transaction costs refer to the time and effort required carrying out a bargaining. High transaction costs can block the workings of markets, which would otherwise be efficient. In this sense any law may be considered as a mechanism that has to resolve the transaction cost problem.

Consider the problem of externalities. Externality exists where one person's actions impose costs on another, for which the first need not compensate him. For example, the presence of multiple discoveries is frequent and dues to the free access researchers have to knowledge. One researcher publishes in scientific review the results of his work, and he ignores that one other person makes a patent application in the same area. This induces an inefficient result, since the first researcher ignores the costs to the second publishing his paper. But first researcher does not impose the cost; it arises from incompatible activities by two researchers. One of them follows the copyright rules, the other patenting ones. The efficient solution might be to modify one law or other, but a penalty for non-compliance leads to an inefficient result. The economic analysis has to introduce the possibility of agreements between the parties.

Such analyses rise the questions: what portfolio of laws would induce an efficient economic result? And how easy will it be to negotiate changes if the initial portfolio induces inefficient results, and one of party has a greater value for one of the rights? Hence, the IPR may be established through a public authority interaction or through a contract between partners.

Institutional economic theories seek to clarify the contractual characteristic of intra and inter organisation relationships, ignoring economic efficiency framework. Concerns focus here on providing adequate incentives to researchers and inventors, noting the importance of procedural steps (careful identification and the use of non-disclosure agreements). The legal framework would not institute absolute behavioural constraints, but mainly some limits, allowing the innovation market agents some latitude for co-ordination. IPR system give possibility to inventors, competitors and users to organise debates in order to determine the precise rights of usage of property, and also the rules of information transmission. When the deliberation is explicit it serves to elaboration of legal procedures, and when it is implicit, the conventions, fixing the modalities of innovation protection, may arise at industrial level. So, the real scope of IPR is negotiated at bilateral level. Many counterfeiting conflicts

or actions linked to patent traverses are not judge by courts, since the costs may be too high. And some kind of licence agreements may be concluded.

An important issue at the amalgamation of law and economics is an economic analysis of legal and implicit rules' outcomes or an analysis of their contribution to types of social and economic regulations. For instance, OECD governments now look beyond the direct profits of an innovation to its wider social benefits, such as job creation.

2.3. Research activity and IPR

A patent is a document, issued by a government office, which describes the invention and creates a legal situation in which the patented invention can normally be only exploited by, or with the authorisation of the patentee.

In our days it is estimated that the number of patents granted worldwide a year is about 710 000. At the end of 1995 about 3.7 million patents were in force in the world. Intellectual property comprises two main branches: industrial property, mainly in inventions, trademarks and industrial designs, and copyright, mainly in literary, musical, artistic and audio-visual works. We will focus on the first branch, which provides the exclusive rights of industrial exploitation.

According to World Intellectual Property Organisation, an invention is a novel idea, which permits the solution of a specific problem in the field of technology. Usually the idea, in order to be protected by law, must be new in the sense that it has not been published or publicly used; it must be non-obvious in the sense that it would not have occurred to any specialist in the field; and it must be capable of industrial application in the sense that it can be industrially produced or used.

Firms are usually motivated to favour the generic knowledge, believing that a particular new product or process will result from that knowledge. The scientists differentiate regularly between their priority rights on discovery and their proprietary rights recorded by patenting. The priority requires to publish quickly the results, whereas the proprietary rights, having for purpose to provide economic rents, discourages the rapid diffusion of information. This may explain the distinction between two types of property rights differentiating science from technology (Stephan (1996), Dasgupta and David (1987)).

The laws of a State relating to industrial property are generally concerned only with acts accomplished in the State itself. Therefore, a patent is effective only in the State where the government offices the grant or the registration. It is not effective in other States. If the owner of patent desires protection in several States, such protection must be obtained in each of them, or

in European Patent Office (Munich) for protection in 18 European countries, or in Eurasian Patent Office (Moscow), which have effect in nine countries (Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Tajikistan, Turkmenistan), and in some other regional patent offices.

The jurists distinguish two aspects of the problem (for example, Vivant (1997)): intellectual disposition of research results, because any patent must divulge the invention content to large public; and legal control of research results, because any patent gives right to its holder to monopoly economic use.

In relation to the first point we will reference the French legislation. As the law stands (n°82-610 d'orientation et le développement technologique de la France, article 25) the researchers status "must be conducive to free circulation of ideas". But legally also the researcher can be liable to secret with respect to their employer. The academics benefit of exceptional freedom, they may divulge or not their specific knowledge, and they may be rejoin by common law only if their research results are susceptible to by patented inventions. The schema is different for non-academic researchers. A priori the researcher's activity is not detachable from the institution they affiliate to. Consequently the researcher of public or private sector is in legal dependence. Legally he/she could not be hold for his/her work master, no for work findings. Salary employee must refrain from divulging of any creations being of firm activity area. Civil servants, according to the article 7 of 30 December 1983 statutory instrument, can publish the results of their work without prejudice to national (collective) interests and to tiers taking part in these works. The researcher by his/her function must publish. Any patented invention is assigned to employer. And the secret can be imposed also by contract.

The second point is the legal usage of research results. The French IP code distinguishes the patenting and copyrights. The rules of patent law (Code de la propriété intellectuelle, art.L.611-7) concern both public and private sector. No one discovery could be protected by patent. The classification of inventions in public sector differentiates:

- invention "of mission", corresponding to research mission, for which the patent is owned by employer institution;
- invention "out of attributable mission", independent of research mission, but realised grace to employer resources, for which the patent may be allocated to employer if he asks;
- invention "out of mission" gives rights to employee to be patent holder.

Researcher has to inform the employer about the inventions done by him (in private sector not doing this can justify a fair dismissal). Then the employer must take part. One of employer obligation facing the attributable

invention is to allow the benefit to employee-inventor. Surprisingly, the decree 9 (December 1959, Art. 49 al.) stipulates that the patent *can* (not must) be called after his inventor name. It turned out that an employer might omit to quote the inventor-employee name. The researchers have legally the rights for a pecuniary gratification. According to decree n°96-857 on 2 October 1996, Art. R.611 the researcher of public sector receives the complementary remuneration for incentive purpose paid annually. The affected to inventor amount of money is equal to 25% of tax free product from royalties collected for invention, after deduction of total direct cost supported by public person beneficiary.

The ambiguity exists also in the domain of copyrights. The Conseil d'Etat in his avis on 21 November 1972 considered that the necessities of service require that administration would be in vest with copyrights for works created in the line of duty (Vivant (1997)). It would follow that a researcher publishing his research work has no right to get copy-right and even to be recognise as an author.

European procedure of patent application is less favourable for innovator in comparison with the US one. In European case the patent application is published 18 months after its demand and control of its specifications by patent office. The patent may be issued between two and five years later. In US case the publication of patent content is instantaneous with its issue. So, the American examination procedure is confidential. American patent office keeping a secret favours both the development of technology by inventor and patent issue proceeding. An inventor can use this time for preparing the industrial application of innovation. At the divulgence the inventor may have at its disposal both legal protection and decisive advantage on competitors. In Europe competitors have time to organise legal, technological and market resistance.

2.4. Technology innovations and intangible assets

It appears that IPR of firm is related to its innovation capability. It seems important to highlight this fact, since at its turn innovation is positively correlated with firm performance and generally with economic growth. Technological innovation may be defined as a first commercial application of an invention, or as a successful application of new ideas, or as an activity that changes the stocks of the firm in some observable and novel way. The impact of innovation on stocks is likely to be greater where it is protected by IPR, since mostly the IPR owner appropriates the associated rents rather than an inventor.

Using large dataset containing over 4.000 U.S. manufacturing firms and their patenting activity for the past 20 years, Hall, Jaffe and Trajtenberg (1998)

show that patents and especially patent citations can be used as proxies for economically significant innovative activity.

The French firms' survey (François, Lehoucq (1998)) records that 37% of industrial enterprises made at least one application for IP title at least on one market in France or otherwise. In 26 per cent of cases IP title is a patent. The propensity to make an application is greater for innovating firms. 48 % of firms, which recognise to innovate, are owners of IP titles, and mainly they are patent holders. Yet 12 % of patent holders did not induce any innovation.

The question is how the firms use the information embodied in patents in their innovation activity? Usually the proportion of patent analysis represents a small fraction of innovation expenditures of firms. For example, it represents not more than 1.5 – 8.9 per cent of all innovation costs (and 4.6 % in average) in twelve European countries, analysed by Bosworth and Stoneman (1996). The firms of the same countries spend in average 33.5 % of innovation expenditures for R&D, 24 % for product demand analysis, and 6.6 % for market analysis. The impact of patent disclosures as source of information for innovation is also relatively small. Using a mean scores of 1-5 for the same twelve countries, the authors estimate that the average score of patent disclosures is equal to 1, to compare to other sources of information for innovation: within the enterprise information equal to 3.48, client or customers as informants to 3.35, fairs and exhibitions to 2.98, information provided from suppliers of material and components to 2.89, and conferences and journals to 2.56.

2.5. Goods and services exchangeable on technology market

The market of new technologies is first of all an exchange of industrial or experimental industrial technologies. The technology seller chooses usually one of the following forms of transactions (see Valdaitsev, S. (1995)):

- sale of patent licences and of free licences for know-how;
- forward contract (provisional sale) on patent rights;
- sale or lease of experimental models of equipment or mark;
- contracting for the new technology elaboration, for the engineering and the consulting;
- R&D collaboration with objective to legalise future property rights;
- creation of institutionalised joint scientists;
- scientific and industrial co-operation with research outcome purchaser;
- “borrow servant” (innovator centre detaches its leading researchers for diffusion of information and know-how);

- teaching and training of contractors' employees.

The sale of patent licences represents the majority of transactions on technology.

2.6. Cost of patent litigation

From economic point of view the question is whether patent litigation distorts goods and technology markets? Another one is how often the litigation may occur.

Theoretically patent litigation frequency depends on some factors (see Lanjouw and Schankerman (1997)). The likelihood of a potentially litigious situation, such as an infringement of patent rights, increases with:

- the appropriability of returns to inventions in different sectors of activity¹ (the more patents, the more lawsuits by industrial sector occur);
- the number of claims embodied in patent;
- the number of areas of patent adoption; and
- the number of firms involved in innovation activity in the same technology area.

The asymmetry of expectations of parties concerning the likelihood that the plaintiff will predominate at litigation may play its role. Uncertainty is usually about whether infringement has occurred, since inventions are often difficult to be defined precisely in patent publications, and especially in emerging technologies. The asymmetry of information may be provided by the knowledge about how courts will treat the IPR. Some countries sustain separate lawsuits for infringement and validity, typically questions of infringement are tried before a generalist's court and questions of validity before a specialist patent tribunal.

Patent infringement litigation frequently costs too much. For example, in US the amount frequently constitutes more than the annual gross profits of some small or medium sized firms. For most of them, patent litigation is financially out of reach. They seek to enforce patent rights against a potential infringer through licensing.

Patent infringement cases are scientifically and legally difficult, they are expensive and time-consuming. Before choosing to pursue any form of

¹ Arundel and Kabla (1998) evaluated the propensity rates of innovation of Europe's industrial firms for 19 sectors. The propensity rate is equal to the percentage of innovations for which a patent application is made. The propensity rate for product innovations is 36% on an average, varying between 8% in textiles and 79% in pharmaceuticals. The average for process innovations is 25%, varying from 8% in textiles to 47% for precision instruments.

alternative dispute resolution mechanism, the costs and delays inherent in court litigation must be weighed. Because of the huge sums which may be earned in a successful infringement suit, attempting an attack becomes attractive enough to raise venture capital to pay legal fees of the attacking party, even if the chances of success are objectively slim. And in the US at least, lawyers working on a purely speculative basis on potentially lucrative lawsuits are numerous.

The reasons for patent litigation may have different social effects. Lanjouw and Schankerman (1997) compare two types of successful litigation: patent challenges and patent infringements. They argue that if the plaintiff in a challenge suit is active in RTD, he may appropriate the gains of court decision of patent invalidation, and all other firms innovating in the opened technology space, using innovation freely may also benefit. By contrast the gains from a successful patent infringement suit go mainly to patentee and their likely social positive effect is indirect.

If the patentee cannot obtain voluntary termination of an infringing activity or settle the dispute by a license agreement, he may seek redress by initiating litigation in a court (see Levin (1998) for corruption and litigation). Usually the amount of damages recovered by the prevailing patentee is directly related to the ability to prove lost profits or a reasonable royalty (Silverman (1993)).

Sociological studies prove that IPR enforcement is usually too expensive for individuals and society.

Table 1. What does prevent firms from patenting? (in %)

Region	No more secrecy	Too much work time	Not enough protection	Not enough advantages	Too expensive
European Union	13	15	16	38	40
Japan	33	22	22	17	22
United States	11	18	18	16	61

Source: <http://www.ipr-helpdesk.org/>

US companies are mainly dissuaded to file patent applications because of costs. Japanese firms are more afraid to disclose their innovations and lose the secrecy protection. A large part of European firms do not believe that it is worth patenting an innovation, because the advantages of patenting do not justify the related costs and expended work time.

For example, one of the important patent agencies in Russia (funded in 1963) “Sojuzpatent” informs us that *patent infringement cases are rarely*

litigated in Russia and most of such cases are settled amicably prior to any judgement rendered by the court. The “Sojuspapent” experience permits recall only one case in 1997 and which prosecution was suspended due to reaching a settlement between the parties involved.

3. IPR in Russia and perspectives of its enforcement

IPR issues, particularly ownership rights to invention, remain sensitive ones in Russia and other NES.

3.1. New legislation

The present state of legislation of IPR in Russia is the consequence of successive transformations. In USSR the primary source of protection of inventions was a non-proprietary reward, known as the “Inventor's Certificate”. It entitled the inventor to payment for use of the invention, and the State received exclusive rights to use and authorise third persons to use the invention for 15 years. But patenting also existed, giving an exclusive right to inventor. The following table gives an evidence of relative weight of each of intellectual protection documents.

Table 2. Patents and Inventor’s certificates in USSR and Russia

Intellectual protection documents	1990	1992
Grants of patents	1 119	7 698
Inventor’s certificates	73 009	74 593

Source: “Patenti Rossii”

The basis for intellectual property, trademark and patents protection and regulation in Russian Federation is contained in the following federal laws and Civil Code:

- The Constitution of the Russian Federation (Article 44)
- Revised Criminal Code of the Russian Federation, January 1, 1997.
- Civil Code of the Russian Federation (Articles 128 and 138), January 1, 1995.
- The Law on Copyrights and Related Rights, July 9, 1993.
- The Patent Law of the Russian Federation, September 23, 1992.

The Law on Trademarks, Service Marks and Appellations of Origin, September 23, 1992.

The Law on Competition and the Restriction of Monopolistic Activities in Commodity Markets, March 22, 1991.

The IPR regime in Russia also includes significant laws regulating specific industries and technologies, including "On the Customs Tariffs," "On the Legal Protection of Integrated Microcircuit Topology," "On the Legal Protection of Electronic Computation Devices and Databases," etc.

The Presidential Decree "On the Committee of the Russian Federation on Patents and Trademarks," issued on February 12, 1993 established the Committee of the Russian Federation on Patents and Trademarks (Rospatent). Rospatent is responsible for protection of intellectual property; processing, assessment, and registration of patent applications, elaboration of patenting rules, and advising on how patent laws should be implemented.

The Presidential Decree "On the System of the Federal Bodies of the Executive Branch", issued on August 14, 1996 extended policy-making functions on IPR to the Ministry of Justice.

Eurasian Patent Convention came into being on August 12, 1995. Under the Convention an inventor can obtain a single patent that provides legal protection in all nine member-states: the Russian Federation, Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, and Turkmenistan.

The Russian Federation is a signatory to several international agreements that require compliance to international standards of IPR law and enforcement. These agreements include the following:

Paris Convention (Russian Federation, 1994, and USSR, 1965)

Universal Copyright Convention, 1994

Berne Convention, 1994

Geneva Convention (Russian Federation, 1994, and USSR, 1973)

The need for foreign investment and advanced technology explains the introduction of new patent regime, since the Western investors waited for an adequate protection of IPR. Certainly, the infringements in patent protection change foreign firms' location and direct investment decisions (Radosevic (1999)). Firms try to avoid cost by patent litigation and the firm devaluation, which may produce upon the filing of litigation.

The membership of international property organisations incites also the modernisation of national legislation.

The Russian law recognised patents as the only form of protection of inventions, protected product-by-process claims, created the Patent Office, and established a Patent Court. The law rectified the protection of an inventor's rights; at the same time it also contained several provision to protect the State's interest in ensuring adequate access to beneficial inventions. Additionally the "State Fund of Inventions" was created to which patent holders could unilaterally and voluntarily transfer their rights to an invention.

The Russian Federation recognises patents granted by the USSR, the new law followed a trend of increasing protection of inventions, but retained some features of state intervention and control. The new patent law provides protection for inventions, utility models, and industrial designs as in the EU countries. The patent owner has exclusive rights to use the invention for a period of 20 years from the date of the filling of the patent application with the Rospatent.

New Russian laws and deeds resolved some important problems related to developing market control of intellectual property, such as:

- measures for legal protection of intellectual property;
- normative evaluation and pricing of the objects of intellectual and industrial property (sources of expenditure for reproduction, depreciation, taxation...);
- procedures of rights transferring, also on international markets; rules of registration, of renewal fees and of subsidies;
- preferential taxation of inventors' income from licensing (for innovators and patent traders).

Employee-inventor and employer

Under Russian law, the patent holder can be either the inventor, physical persons and/or legal entities indicated by the inventor in the patent application, or the employer of the inventor, if the invention was created in connection with the inventor's employment or in carrying out a specific assignment given by the employer, unless a contract between the employer and inventor stipulates otherwise. The enacted law reverses the presumption of ownership in favour of the employer. The employee-inventor does retain certain rights to the invention, however. First, the employee-inventor is entitled to be compensated "in an amount that is commensurate with the profit that was derived by the employer or could have been derived by him", but not entitled for the transfer of the invention to another party, the decision to keep the invention secret, or the failure to obtain a patent. Moreover, if after four months from the date that the employee notified the employer of the invention, the employer has neither filed

a patent application, nor transferred the rights to the inventor, nor decided to keep the invention secret, the employee-inventor can file the application and obtain the patent. The employer can still use the employee-inventor's patent, but only for the employer's own production and only upon compensating the employee for the use of the invention.

Patent rights are inheritable under the new Russian laws.

Protection of State interests

Elaborating the law, the Russian legislature rejected a provision in the draft statement that would have allowed patent holders to exercise their exclusive rights so long as they did not “damage the interests of society and the state”. The patent law expressly sets out specific examples of acts of patent infringement, such as: “an unauthorised manufacture, use, importation, offer to sell, sale, other marketing or storage for this purpose of the product containing a patented invention”. The law also identifies a number of activities that are not acts of infringement, including the use of devices incorporating inventions protected by patents “for the purposes of scientific research or experimentation, ...for private and non-commercial purposes”, or “where such devices have been legally marketed”.

Incentive to encourage creative activity and to diffuse the ideas

The law seeks to impose the patent holder to use or let others use an invention; so it authorises the compulsory licensing of “non-worked” or “under-worked” patents. For example, if a patent holder has not used or has insufficiently used a patented invention within four years of the patent grant and refuses to license the invention, the law permits any person wishing and ready to use the invention to request a “forced non-exclusive license” from the Supreme Patent Board.

The law stipulates that an invention created in the Russian Federation may be patented in another country only after three months have expired since a patent application for the invention was filed in the Rospatent. However, the Rospatent may permit the applicant to seek a patent in a foreign country before the three-month waiting period in “necessary cases”. The prerequisite for obtaining a patent in a foreign country for an invention created in the Russian Federation is the filing of a patent application in Russia. In any case, foreign patenting incurs high financial costs, and it is complicated by difficulties in getting the necessary information and advice.

The Federal Fund of Inventions was created to promote the use of inventions in the interest of the Russian Federation. It is authorised to select inventions and by contract acquire the rights to them from patent holders. The Fund is intended to be financially self-sufficient, obtaining funding through revenues from the sale of licenses of patents owned by the Fund, voluntary contributions, and appropriations from the federal government. The Fund is also designed to encourage international technological exchanges by providing potential foreign licensees with the licensing records of Fund patents.

To encourage the voluntary use of patents, the law provides a 50% reduction in maintenance fees for a patent holder who has granted an "open license" to a patent, i.e., a license granting the right to use the patented invention to any person. Under the open-license scheme, a party may use the invention under terms negotiated with the patent holder.

Difficulties of enforcement of IPR

As any other State, the Russian State is not in charge of supervision or guaranty the maintenance of IPR on the markets. The patent proprietor has to appeal himself to tribunal in case of infringement. Actually it signifies that he/she will pay 10-15 % of suit amount by appeal. Suit amount is usually calculated by evaluating not recovered income, because the patent rights were offended. Such expenses are often unforeseen by inexperienced innovators. Moreover the accelerated process of IP privatisation raises licensor doubts concerning reliability of licence holder title.

Free licensing of know-how is developing, because the patent registration and protection are costly. Free licensing consists in technology selling contract without previous patenting by inventor. Such practice needs the secret preservation by contractors. In Russia the most revolutionary inventions, being at the root of new technological generations, were not patented, because their inventors were anxious to publish the description of novelty in patent specifications.

The enforcement of patent rights represents problems even if a single Patent Court is established. The law created a two-tier administrative tribunal system composed of the Board of Patent Appeals and the Supreme Patent Board.

According to patent law the contentions between a patent office and a patent pending person, in disagreement with a Board of Patent Appeals, must be resolved by Supreme Patent Board (High Patent Chamber). In practice the disagreements of such kind couldn't be settle because the Supreme Patent Board is not a constitutive of legislative power system, while under second chapter of

first part of General Constitution of Russian Federation and in the meaning of the article n°46 this institution must be a tribunal (Sapsai (1998)). The conventional tribunals haven't IP specialists, and the Constitution makes no provision for new patent tribunal investiture.

Other disagreements, such as courts of arbitration consider invention authorship or infringements of patent proprietor rights. Uncertainty of patent law formulation results in frequent rejection of IP actions by tribunals. Still the number of such actions increases. For example, 74 actions were brought in 1995 to the Moscow tribunals. Furthermore, the discrepancy of patent law causes damage to the state, because the "piracy" extends. It appears that Russian mentality is not respectful to IPR and the entrepreneurs have a low level of patent competence. For instance, in spite of week development of Russian IP market, the US moral persons, succoured by their mentality and experience in tribunals, make facilely applications for patents in Russia. To illustrate it we can see the numbers of patent applications in Russian Federation in 1995 (OECD (1998)): The number of resident patent applications was 17 580 and the number of US applications was 9 355.

Special institution of patent accompaniment is needed. In 1998 about 500 attorneys exercised in Russia, 200 of them practiced in Moscow and near 120 in St.Petersburg. The services of attorneys consist in:

- legalisation of patent applications (national, European or Eurasian);
- registration of licensing contracts;
- registration of programme products;
- patent search;
- IP evaluation;
- IP auditions;
- patent law consulting;
- useful models contracting.

The observers advise to consider cautiously the foreign IP attorneys in Russia, since in many cases they gain in negotiation till 50 % of income of patentable invention. It happened also that foreign intermediary pretend and get exclusive right (Valdaitsev, S. (1995)).

3.2. Some indicators of patenting performance

An increasing number of S&T policy makers have begun to use measures of output based on patents. Following this practice, we present some indicators for Russia, deduced from patent applications.

The table shows (see also table 2) a radical modification of patenting activity after the new Patent law was adopted in Russia on September 23, 1992. The number of grants increases in all groups. At national level the patent activity is relatively notable in areas of: Technological processes, Transport, Chemistry, Consumption and physics.

Table 3. Patents delivered in USSR and Russia by main groups 1990-1994

Groups	USSR			Russia		
	1990		1991	1992	1993	1994
	patents	certificates				
Consumption, necessities of life	121	8033	188	1355	1991	3066
Technological processes and Transport	254	20712	277	1961	3300	4850
Chemistry-Metallurgy	456	12475	294	1429	2414	2906
Textile	43	1071	29	163	273	333
Construction -Mining	46	6503	57	738	1235	1874
Mechanical and Arms	106	8399	119	899	1346	2545
Physics	50	6025	53	707	1297	2916
Electronics	43	9791	65	446	1004	2091

Sources: " Statisticheskie dannie po vidache okhrannikh dokumentov ", M.1997

The technology balance of payments registers the commercial transactions related to international technology and know-how transfers. This indicator may be used as an element of S&T performance. It consists of money paid or received for the use of patents, licences, know-how, trademarks, technical services and for industrial S&T carried out abroad.

Table 4. Russian technology balance of payments

Specification	1993	1994	1995	1996	1997
Receipts (millions rouble)	764	7 917	18 544	816 100	1 018 847
Payments (millions rouble)	3 6964	5 2498	20 113	225 818	64 480
Coverage ratio	0.02	0.15	0.92	3.61	15.80

Source: OECD (1999)

After a relative equilibrium in 1995 of technology transfers in value the coverage rate increased significantly in 1996 and in 1997. It corresponds to the growth of the number of international applications by Russia.

Table 5. Number of international applications received by International Bureau by country of origin and the corresponding percentage of the total

Country of origin	Number of applications		Percentage	
	1995	1996	1995	1996
Russian Federation	288	366	0.7	0.8
United States	16 588	20 828	42.6	44.0
Japan	2 700	3 861	6.9	8.2
France	1 808	2 307	4.6	4.9
Total	38 906	47 291	100	100

Source: WIPO 1998

The number of patent applications by Russia is too small in comparison with other industrialised countries of Western world. However, only these data shouldn't draw a hasty conclusion as for scientific or innovation backwardness.

Table 6. Indicators of patent applications

Indicators	1992	1993	1994	1995	1996
Dependency ratio (non resident/resident)	0.50	0.53	0.94	1.35	1.56
Autosufficiency ratio (resident/national)	0.67	0.65	0.51	0.43	0.39
Inventiveness coefficient (resident/10000 population)	2.70	1.90	1.40	1.20	1.20
Rate of diffusion (external patenting/resident)	-	0.16	0.31	0.42	0.82

Source: OECD (1999)

Increasing dependency ratio signifies the growing interest of foreigners (especially from USA) to patent in Russia and protect their principally commercial advantages in this country. Both autosufficiency ratio and inventiveness coefficient indicate the slowdown of interests for national patenting. By contrast, the external patenting became a binding form of IPR protection.

Table 7. Russia: Grants of European patents by main groups in 1996 and in % of 1990

Groups	Percentages of the world total		Index of specialisation	
	1996	1996 in % to 1990	1996	1996 in % to 1990
Electronic	0.16	107	0.62	125
Engineering	0.30	81	1.14	95
Chemical-pharmaceutical	0.19	101	0.71	118
Chemistry-Metallurgy	0.42	94	1.59	110
Mechanical-transport	0.30	73	1.12	86
Consumption, Construction	0.24	80	0.90	94
Total	0.27	85	1.00	100

Source: OST, Indicateurs 1998

Table 8. Russia: Grants of US patents by main groups in 1996 and in % of 1990

Groups	Percentages of the world total		Index of specialisation	
	1996	1996 in % to 1990	1996	1996 in % to 1990
Electronic	0.08	103	0.54	133
Engineering	0.17	80	1.17	103
Chemical-pharmaceutical	0.13	107	0.93	139
Chemistry-Metallurgy	0.27	98	1.87	127
Mechanical-transport	0.12	54	0.85	71
Consumption, Construction	0.15	63	1.03	81
Total	0.15	77	1.00	100

Source: OST, Indicateurs 1998

Russia maintains the better position in the Chemistry-Metallurgy group in both European and US granted patents. The index of specialisation is increasing in groups of Electronics and of Chemical-pharmaceutical industry.

The weakness of Russia in term of granted patents might have several causes that have nothing in common with scientific development and capability. As we saw earlier, patents incite inventors to disclose their inventions when

otherwise they would rest on secrecy. If we think over the share the defense industry occupies in Russian S&T, we couldn't be astonished at patenting deficiency.

4. Concluding remarks

The IPR laws became similar in different countries, since they adopt the rules of World Intellectual Property Organisations. But the enforcement mechanisms vary from one country to another, greatly in the area of law traditions and mentalities. Enforcement difference and difference in the degree of technology market development explain the patenting maturation.

Nevertheless, the technological innovation systems seem to be barely dependent on IPR. And in Russian environment to focus exclusively on IPR enforcement as a mechanism of innovation system development is too excessive. It turns out that in today Russia the role of tacit agreements in technology transfers is extremely large to allow the evaluation of their market share, as well as the revealing of allocation of IPR in economic organisations.

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