

Free software, *Copyleft* and Trends in Intellectual Property

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Abstract

This article discusses the implications of the intellectual property system as applied to software, especially the use of patents, for innovation in developing countries; it also assesses the possible consequences of the appearance of free software and a new intellectual property system in the innovation process in countries such as Brazil; finally, it attempts to analyse the new dimension of intellectual property as well as its context in the current debate on 'global patents' as opposed to a more flexible copyright system. Some of the questions discussed are: Is a more flexible copyright system an instrument to promote technological innovation? Does the reduction of the income of some software companies in developed countries point toward an exhaustion of the sales model of user licenses for software? What are the threats and opportunities for the new business model based on free software and *copyleft* in Brazil? Can the motivations for the use and development of free software promote the Brazilian software industry?

1. Introduction

The current economic scenario is marked by the intensive use of knowledge and by the importance that intellectual property has been gaining as a competitive factor for the development of nations. Within this context, the appearance of so-called free software (FS) or Open Source Software (OSS) introduces new modalities of expression and exercise of copyrights, which traditionally protect the inventors of computer programmes. These new modalities are not neutral regarding incentives and the innovation process in the area of software, especially in developing countries.

The spread of FS raises certain issues of an institutional nature. It is argued that this type of protection of software copyrights may become a powerful instrument in the promotion of technological innovation and even in the economic valorisation of authors' intellectual property assets. By facilitating the generation and spread of innovation, the free software protection system would give more opportunities for the author to profit than those

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allowed by the traditional property system, in which relatively few companies tend to appropriate the majority of benefits generated by the business.

This article is divided into three sections. In the first section, we analyse what would be the most adequate intellectual protection system for software and its implications for the spread of technologies; next, we approach the new dimension of intellectual property and its context in the current debate on global patents; the third section presents the threats and opportunities for the new type of business based on free software and the motivations for its use and development. Finally, we put forward the conclusions we draw from the issues discussed throughout the article.

2. Software protection systems and their implications for the spread of technologies

Brazil, as a signatory to the Agreement on Trade-Related Aspects of Intellectual Property Rights of the World Trade Organization (WTO-Trips), has accepted the principle that grants to computer programmes the copyright system as defined by the Bern Convention. In the United States, patent protection is used for software, whereas, in the European Union, Poland voted against the proposal to patent software, thus removing, at least temporarily, this issue from the European Parliament's agenda.

The discussion concerning what protection system is most adequate for computer software is a heated one, involving the issue of whether computer programmes are closer to an intellectual work, thus deserving the copyright that is granted to them, or to an invention, which would mean that they should be protected by a patent. The adoption of one of these systems —patent or copyright— entails fundamental consequences, not only in the legal field, but, which is far more important, in the economic one. Opinions usually vary according to the interests of the countries involved, even though there is no general agreement even within the borders of each country.

Even among Brazilian legal scholars, there is a disagreement about what is the most adequate system for computer programme. Defenders of the patent system (Ascensão, 1997; Poli, 2003) argue that the contents that are to be protected in the software are different from those of a literary or art work. A literary or art work is defined by the fact that creativity lies in the mode of expression, whereas, in the software, creativity lies in the process, the mode of expression assuming a secondary role. In the first case, it is fitting to apply the copyright system, which protects the expression more than the actual contents; in the second case, however, the creative process resembles the invention of a process, and patent protection becomes applicable.

There are two significant differences between these two systems, with both legal and economic implications, i.e., the term of the protection and the object under protection. The first of these differences shows that, in the patent system, the term of the protection is of 20 years and, for copyright, particularly in the case of software, the term is of 50 years. Considering that a computer programme will usually become obsolete in a short period of time, society will not benefit from the knowledge contained in the code that originated a specific computer programme after 20 or 50 years of protection have elapsed.

From this point of view, one might consider the choice between the patent and the copyright systems to be indifferent. This would be a mistake, however. From a conceptual point of view, a patent grants a private monopoly, but, in exchange, allows private data to be used by society. But if such data is no longer useful when it is made available, one could argue that society is not striking a good deal; in this case, the monopoly would not contribute to the promotion of innovation in general, but would only be an incentive for the holder of the protection.

In the case of copyright protection, the picture is altogether different, more favourable to innovation and to society. Works under the protection of copyright must circulate in order to accrue value. A book, a disc or software under the protection of copyright that is not sold or licensed generates no profit for its author other than prestige (paternity right). Besides, granting copyright does not restrict new creations very similar to another one, provided they are expressed differently from the original. The same story can be told in many different ways, the same idea spread with different appearances, and protecting the author of one of those does not inhibit the initiative of the others. On the contrary, a story that is commercially successful will certainly favour many versions, because each one is meant for a specific public, moulded on different media, etc. In other words, copyright protection does not restrict the spread of information, knowledge or ideas contained in a work; on the contrary, it whets the curiosity, stimulates creativity, and the deepening of ideas and topics dealt with in the work under protection. Transferring the same reasoning to the case of software, it is not difficult to understand why this system, while ensuring the protection of the owner's rights, also stimulates competition and the continuation of the innovation process. The presence of a successful software on the market will stimulate competitors to develop a similar and better product without, however, infringing upon the rights of the authors of other products. This dynamics transfers competition from the arena of the special monopoly granted by protection to the economic one, in which leadership and market share will depend on entrepreneurship, distribution network, attention given to clients, reliability, periodical updating and other such factors. Microsoft, the leading industry in software, would probably not have been consolidated if the system of protection were the patent one.³ It is precisely to reinforce the position of American companies, leaders in the area, that the new intellectual property system in the U.S. included two crucial areas for the registering of patents, i.e., genome and software (including mathematical algorithms).

Coriat (2004) states that the possibility to patent algorithm "cleared the way for patenting software". It appears that the new intellectual property system aimed at ensuring the advantages of North American advanced research to be transformed into competitive advantages by granting exclusive licenses, to the detriment of "rival" companies.

In information technology, the products of knowledge are inputs for other areas of innovation, and for this reason the grant of patents endangers innovation in general, especially in developing countries. A situation similar to that of preventive patents is thus created, which will hinder enterprisers and innovators from freely developing an "idea"

³ The suit that Apple brought against Microsoft was based on the idea that the idea and the concept of the Windows system was a copy of the operational system used and protected by Apple. Microsoft won the case by showing that the idea, although similar, was expressed in a different way, if compared to the Apple programmes.

that has already been introduced without having to pay intellectual property rights. In such a system, there is a high potential for paralysis of the innovation process and conflict regarding innovations. On the one hand, given the cumulative nature of innovation and the difficulty to obtain data about patent registers in the world, software protection in this system will increase the uncertainty that is itself inherent to innovation. At any moment, the creator/inventor may be taken by surprise by the charge of rights over patents previously registered, whose basic ideas were incorporated to the new software in good faith. It is obvious that this risk might restrict the process in some strategic areas, in which large corporations already rule above others. Small businesses that currently contribute for incremental innovations that are of great importance to the market by changing the original product in a way that is legal under the copyright protection system will lose legal basis to act in such a way. On the other hand, the same asymmetry in the available information might further deepen the dispute over rights, since the application of patent to software always leaves room for controversy and possible legal disputes. The result is the raise of transaction costs involved in the creation of the software, an unfavourable factor for the small businesses that currently act on this market.

The other difference is related to the object that is protected in each system. In the patent system, as Grossi states (2004), it is ideas, systems, methods, algorithms and programme functions that are the object of protection, thus entailing that all its components would be protected by a monopoly. In the copyright system, what is protected is the mode or form of expression, and not the idea implicit in the work. In this point, the computer programme patent will entail a barrier to competitiveness on the software market by defending the idea and the algorithms implicit in it, binding technological innovation to the exclusive use of the title-holder of the corresponding rights for a 20-year term.

We have thus seen that the most relevant argument against adopting the patent system for software is related to the possibility of protecting the implicit idea of the software, as stated by Grossi (2004:5): “The fact that the idea must be shared is a competitive and developmental prerequisite of the software market... The adoption of the patent protection system for software would end up making the whole market impossible, since it would bind the use of a solution in other programmes to the payment of specific royalties. The programmes that are available on the market are by themselves very similar, varying, as a rule, only in some functional and visual particularities”.

Defenders of the patent system argue that their point of departure is rewarding the inventor with the temporary monopoly of the invention, which is appropriate to the sectors that invest many years and large sums of money in order to develop a programme, and that this promotes innovation. Nevertheless, Balça (2005) presents facts that make evident the incongruence of the argument according to which the use of the patent system is necessary to protect innovation; as an example, he quotes Oracle, which practises crossed licensing with other companies that might accuse it of violating their patents. This licensing averts the costs and risks of mutual litigation.

Opponents of these ideas see patents as a means for the company to survive without innovation. For Stallman, patents are “land mines for programmers”, because they will run the risk of stumbling over a patent that may be able to hamper or destroy the project of a software design (Inovação, 2004). In this sense, Grossi (2004:7) supports the

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primacy of software copyright “under pain of eliminating the competitive factor from the market, favouring large corporations that, holders of a vast number of patents, would be unable to determine what kind of technological innovation would be implemented at a certain time”.

The application of patent protection for computer programmes can also cause the reduction of innovation in the area of information technologies due to the absence of competitiveness. In this direction, Torvalds and Cox (2005) argue that software patents do not promote innovation and R&D, since they are detrimental to small businesses, weaken the market, raise expenses with patents and increase market barriers.

The industry of proprietary software has developed efficient market barriers and enough market power to operate within a high margin of profitability (thus compensating through price the predatory action of non-authorized copies). In the case of the North American software industry, the software patent is a powerful institutional barrier for entering the market. Other barriers, mentioned by (Gutierrez and Alexandre, 2004), are represented by the need for a minimum scale-level, diversified products and goods, the creation of associated services networks and the need of capital for the investment in technology, marketing and commercialising expenses.

Buainain and Mendes (2005) state that the entry of free software onto the market —with a new intellectual property system, the *copyleft*, which we present in the next section— changes this situation and makes it possible for many of the barriers to the entry of new competitors to be overcome. Because it is based on open source patterns, the generation of free software benefits greatly from the network economies,⁴ associates competences at a low coordination cost, reduces production cost, the need for capital to be invested in R & D, as well as the size of the minimum scale of sustainable production. These factors strengthen the national software industry in developing countries, promoting technological innovation, which would be impossible if the patent regime was adopted.

3. Global patents versus more flexible copyright

It is in this scenario of discussion about the uses of knowledge, patent monopoly as opposed to the sharing of knowledge, and the importance of intangible assets for economic development —as much for peripheral as for central nations— that *copyleft* appears as a proposed alternative system for regulating intellectual property. Colares (2004:6) states about this system: “With the appearance of the free software and the open source software, emerges what one has agreed to name *copyleft*. As opposed to the copyright system, in which there is a primacy of economic rights on copies, to the detriment of other interests, including moral, the *copyleft* system is accurately defined as

⁴ Network economy is a concept presented by Shapiro and Varian (1999: 206) as refers to the fact that “it’s better to be connected to a large rather than to a small net”, and this “the larger the better” feature generates the “positive feedback”, which happens when a system benefits from the its larger number of users, making new users to adopt the same system.

the permission given to the general public to redistribute freely a computer programme or other authorial works.”

Free software is referred to four different specific freedoms given to the user: (i) freedom to run the software to any end; (ii) freedom to study the software so as to understand how it works and to adapt it in any way; (iii) freedom to distribute and share the software; (iv) freedom to improve the software and redistribute such changes so that everyone may benefit from it.

Free software is also based on authorial right, with the difference that the author chooses to let the user use, study, change and redistribute the programme he or she created.

As many imagine that FS is spontaneously or voluntarily produced and that therefore it can be appropriated and used at no cost, it is important to emphasize that free software does not necessarily mean software free of charges.⁵ In practice, the OSS system does not deny the property right, but changes the contractual relation between owners and users. Whereas in the copyright system, the owner licenses the use of a copy of the protected asset—and thus get paid—, in the *copyleft* system, remuneration comes from the sale of services based on the use of software available for general use in the free category. Its adoption changes the approach from a property to a services contract. The freedom to copy, change and redistribute associated with OSS is not dependent on the absence of costs. In the case of property software, its copy, redistribution or change is, to some measure, forbidden by the owner, and it is necessary to ask for permission or pay in order to use it.

It is the author of a computer programme who chooses whether to make a software available in the FS category. Therefore, he or she may use their rights, making the programme flexible enough to allow the use of their work by others, according to the General Public License (GNU), an integrate feature of the *copyleft* concept.

Concurrently with the spread of free software, the Substantive Patent Law Treaty is being discussed in the World Intellectual Property Organization, in order to harmonize the granting criteria, establishing a pillar for the global patent project. The Treaty goes beyond the Trips Agreement, which establishes criteria for patenting—novelty, inventive activity and industrial applicability— without, however, determining how these criteria should be applied. This gap allows for each country to decide as to this application, with the result that some inventions may be patented in a country and not in another, the very case of software, patented in the U.S. but not in the majority of other nations. The Treaty, in its turn, establishes that a patent granted in a country, in accordance with the terms internationally agreed, would necessarily have to be approved in the other signatory countries.

This would be a major change in the conduction of international agreements related to intellectual property rights, whose application has so far respected the principle of territoriality. The issue under discussion is whether the global patent may contribute towards reducing the inequality currently existing among nations, or if, under the pretext

⁵ In fact, free software is a misleading expression, and is currently being replaced by “open source” software.

of facilitating patenting in general, will reinforce this inequality, opposing developed and technology holding nations and developing countries.

The Treaty shows the concern that the global patent may limit the authority of countries to control patent rights, eliminate the prerogative to decide whether to grant or not register, besides removing from the competence of national justice the trial and cancelling of patents.

Brazil and other 13 developing countries—among which Argentina, Bolivia, Cuba, Egypt, South Africa, Tanzania, and Venezuela—reassert their opposition to global patent, for they consider the treaty a possible new instrument of pressure, including commercial pressure, against developing nations. On the other side, stand the upholders of global patents, countries that have a natural interest in it, the United States, England, France, Germany, Italy and Japan. For negotiators of the southern countries, the project encourages the view favoured by the U.S. that the exploitation of patents can be made solely through imports. That is to say that a North-American company has its patent protected in Brazil, but will only import the product from the mother company, instead of producing it locally. This would strengthen the position of developed countries as patent producers and of developing countries as mere importers, without promoting innovation and economic development. Developing nations fear that harmonizing patents will reduce the current flexibility of certain situations.

The idea defended by developed countries in favour of this Treaty promotes the extension of global patents, one of whose consequences is the creation of institutional barriers that can hinder growth in developing countries by inhibiting the production of local technologies and innovations. It could be mentioned as examples of this institutional barrier—which brings in itself acute economic conflicts between North/South nations—the recent cases involving pharmaceutical companies and the government of South Africa, or the dispute between the U.S. and Brazil concerning the right to appeal against compulsory licensing to produce generics at a lower price (ORSI et al., 2002).

Castelo Branco (2004) states that developing countries must seek alternative solutions that preserve territoriality and allow them to cater for the interests of the productive sector and for the country to rely on its own modern and competitive technologies.

From the point of view of the interests of developing countries, global patent would mean a further step in enforcing unique and homogeneous global rules to deeply contrasted countries. A recent study by the UNCTAD shows evidence to support an unoptimistic view of the positive effects of so-called globalisation and structural reforms for the majority of developing countries. The structural inequalities that separate developed countries from the others would be growing in the last decade, and not reducing, as expected. Global rules that fall upon unequal countries will certainly play a fundamental role in this process.

In this sense, the defence of global patents opposes the movement of making authors' rights more flexible—the exponent of which can be found in free software and *copyleft*—and the necessary application of the welfare theory that supports social utility as a basis for granting patents and for other intellectual property rights.

4. New business model based on free software: threats and opportunities

Concurrently with the process of evolution and consolidation of the software industry based on the sale of user licenses—as one of the attributes granted to holders of patrimonial rights for intellectual property—the movement in favour of FS also appeared and evolved, disputing the restrictions to access and freedom for the development and change of software. The use of FS became widespread in the whole world.

While this expansion happens, there are also signs of retraction in the earnings and loss of dynamism of North American software companies, as Gutierrez and Alexandre present (2004:35), mentioning that “in 2002, the income of the 500 largest software companies [in the United States] amounted to US\$ 289,7 billion, which meant an 18% retraction in relation to the previous year”. They assert that the reduction in the earnings cannot be ascribed only to the weak performance of world economy, but is also the result of an exhaustion of the user license sales model, of piracy and other means of commercialisation and access to products.

In this context, the emergence of FS industry appears to be a potential new business model. Whereas proprietary software is based on property licenses, that of FS is based on services' sales. Silveira (2004) supports the idea that the strategy of FS producers is to sell development, training and specialized support, while the owner of proprietary software lives on the technological imprisonment⁶ of its clients by means of payment of user licenses. FS would demand permanent innovation to maintain its clientele, whereas proprietary software would ensure the market based on advantages resulting from the difficulties posed to changes. In practice, this is a different strategy, aiming at the elimination of competitive barriers created by leading companies based on the copyright system.

The elimination—or the minimization—of competitive barriers is fundamental for developing countries with Brazilian specificities, which are altogether different from those of a developed country. Such characteristics are used in favour of adopting free software in the country, a few of which are low computerization of national companies in general, the restricted availability of financial resources, the strong social inequalities, which entail structural obstacles for technical training and access to computerized resources.

This scenario is favourable to the strengthening of FS in developing countries. Thus, a survey conducted in Brazil by Salles and Stefanuto (2004) to determine the modes of technical and economic organization of the FS industry, to which there were 3657 respondents—developers, specialised companies, consumers, users—has indicated the main threats and opportunities for Brazilian companies regarding the use and the development of free software.

⁶ Shapiro and Varian (1999) propose that technological imprisonment may be described by the dependency upon the technology chosen by a certain company due to the difficulty to change this technology for another one.

The survey suggested that the threats lie in the development of software components because this is a market that can be disputed by the emergence of free-access component banks. Customisable products are threatened to a lesser degree because they have a certain specificity that is not threatened by FS. The opportunities given by free software lie in the services sector (of low or high value)⁷ and in embedded software. Embedded software does present opportunities due to its very specificity and the low requirements for appropriability (related to the equipment and because it can do without legal systems that are restrictive to property).

The low requirements for appropriability of embedded software point at opportunities for the national software industry. As opposed to this, high-priced software displays just as many signs of threats and opportunities because they are highly specific and have a medium degree of appropriation.

We thus see that the appropriability requirement is a relevant factor for the definition of opportunities in the FS segment because it represents a barrier to entry that can be minimized or strengthened according to degree and costs.

Besides threats and opportunities, the study mentioned above has also suggested the motivations for the development and use of FS, which are of various natures, technical, economic-financial, ideological and related to training, with a superposition of the technical issues. These issues are related to flexibility, safety, power of adaptation, and interoperability of programmes. We thus see that technical motivations are related to the protective system for intellectual property applicable to free software —*copyleft*—, which allows the user to study, adapt, change and redistribute the software. Those of an economic-financial nature refer to the reduction of operational and capital costs —eliminating the payment of licenses and reducing the fee for renewing the hardware. Those of training relate to the possibilities of shared learning, which may extend the conditions of employability of developers. And, finally, ideological reasons are manifest in principles contrary to the restriction of use and of the advancement of knowledge and to the economic concentration by oligopolies and monopolies as well as principles favourable to social inclusion.

Salles and Stefanuto (2004) state that the actors involved with free software —large national corporations from various sectors, small businesses, hackers, governmental agents, major consultants, universities, research organizations—have different motivations for developing free software, and technical advantages are an appeal to the different perspectives that coexist in the world of free software, its development depending on all such actors.

The conclusion of the empirical study is that the segment of FS may strengthen the Brazilian software industry. According to the authors, “although this is not a technological breakthrough, it is a new way of developing and licensing software, thus breaking with some structural models of appropriability in this industry” (Salles-Filho and Stefanuto, 2005:71). The potential of this protective system lies more in the savings in the productive process, in the innovative business model and in the creation of

⁷ The categories pointed by Stefanuto et al (2003) are: low-value services, high-value services, customized products, components, embedded items and parcels.

opportunities to enter onto the market than in the possibility for radically new products' innovation. The growing professional attitude and concurrent overcoming of ideological disputes in the industry are contributing towards the expansion of business based on free software.

5. Conclusions

The new millennium, known as the “millennium of the economy of knowledge”, is marked by significant changes in the economic structure of many industrialized countries. Economy, which was previously based on land, capital, and labour—as a result of the Industrial Revolution—is currently based on new intangible assets, knowledge, innovation and creation. In this context, the ownership of these assets becomes at once important and controversial. If institutional barriers imposed by developed countries—such as the extension of global patents—get harsher and consolidate themselves, developing countries will remain marginalized and doomed in the global economy.

The granting of patents to computer programmes may entail a complete inversion of the basis that supported the contemporary intellectual property system, whose aim was to protect the asset and promote the free circulation of ideas in order to foster inventiveness and innovation.

The promotion of the free software environment may become a factor for strengthening the national software industry and become an advantageous business model. This challenge involves the coordination of efforts and forces of the different actors of the process to foster the free software industry in Brazil. The current scenario, with the strengthening of the movement in favour of free software, proves that this can be an efficient instrument of technological innovation, as state Buainain and Mendes (2004:80): “The emergence of free software and *copyleft* propose a new approach for giving more flexibility to the exercise of the intellectual property right, in the field of authorial rights, which may become an efficient instrument to promote technological innovation in this sector.”

The protection of intellectual property can be conciliated with the organization of free rights, which in practice gives the holder many different possibilities to use his work (Colares, 2004). The emergence of free software and *copyleft* propose a new approach for giving more flexibility to the exercise of the intellectual property right, in the field of authorial rights, which may become an efficient instrument to promote technological innovation in this sector. Far from denying intellectual property, the granting of more flexible conditions attempts to preserve the rights—it is the author, as owner, who defines the use conditions of the software—and facilitate economic exploration of the authors' right through a modality that is different from the traditional license sale.

The emergence of the free software has triggered a debate about the urgent need to adjust the regulatory standards of intellectual property to the real conditions of contemporary economy, and particularly to the need to promote the spread and innovation of

technology in developing countries and the balance between the degree of legal protection and social interest.

6. Bibliography

ASCENSÃO, J. O. **Direito Autoral**. 2^a. ed.. Rio de Janeiro: Renovar, 1997.

BALÇA, J.M. **Patentes de Software: sim ou Não?** Comunicação & Profissão. Universidade de Coimbra. 2004/2005.

Available at: <<http://deinix.dei.uc.pt/zine/3/01-PatentesdeSoftware.pdf>>

Accessed on: 6 May, 2005.

BUAINAIN, A.M.; MENDES, C.I.C. **Software livre e flexibilização do direito autoral: instrumentos de fomento à inovação tecnológica?** Brasília: Parcerias Estratégicas. No. 19, 2004. pág. 55-85.

BUAINAIN, A.M.; MENDES, C.I.C. **Software livre e flexibilização do direito autoral: pontos para o debate atual**. X Encontro Nacional de Economia Política. Universidade Estadual de Campinas, Instituto de Economia: Campinas, 2005.

CASTELO BRANCO, R. **Relevância dos sistemas de propriedade intelectual para o Brasil**. Revista Parcerias Estratégicas, no. 19, 2004.

CORIAT, B. **O novo regime global da propriedade intelectual e sua dimensão imperialista: implicações para as relações “Norte/Sul”**.

Available at: <http://www.bndes.gov.br/conhecimento/livro_debate/1-DesafiosCres.pdf>

Accessed on: 8 May, 2004.

COLARES, R. G. **Copyleft x copyright: fundamentos jurídicos e entraves da flexibilização dos direitos autorais na TI**. III Congresso Internacional de Direito da Informação.

Available at: <<http://www.internetlegal.com.br/artigos/>>

Accessed on: 10 November, 2004.

GROSSI, B.M. **Introdução às patentes de software**.

Available at:

<http://www.ibdi.org.br/index.php?secao=&id_noticia=239&acao=lendo> Accessed on 8 December, 2004.

GUTIERREZ, R.M. V.; ALEXANDRE, P.V.M. **Complexo eletrônico: introdução ao software**. BNDES Setorial, Rio de Janeiro, no. 20, p. 3-76, set. 2004.

INOVAÇÃO. **Software livre x software proprietário**.

Available at:

<<http://inovação.unicamp.br/report/le-eurosoftware.shtml>>

Accessed on 5 August, 2004.

ORSI, F., CORIAT, B. e WEINSTEIN, O. **From Marrakech do Doha: Some Reflexions on the Foundations of Patent Regimes in the Pharmaceutical Industry**. Artigo apresentado no XIV Congresso Internacional sobre a AIDS, Barcelona, junho de 2002.

POLI, L.M. **Direitos de autor e software**. Belo Horizonte: Del Rey, 2003.

SALLES, S. e Stefanuto, G. **Impacto do Software Livre e de Código Aberto na Indústria de Software do Brasil**. Campinas: Instituto de Geociências/Unicamp e Softex, 2004 (Relatório de Pesquisa).

SALLES, S. e Stefanuto, G. **Impacto do Software Livre e de Código Aberto na Indústria de Software do Brasil**. Campinas, Softex, 2005.

SILVEIRA, S.A. **Software livre representa avanço na sociedade democrática**.

Available at:

<<http://www.consciencia.br/200406/entrevistas/entrevista1.htm>>

Accessed on 15 July, 2004.

STEFANUTO et al. **A indústria de software no Brasil – 2002: Fortalecendo a economia do conhecimento**. Capítulo Brasil da Pesquisa Slicing the knowledge-based economy: a tale of three software industries do Massachussts Institute of Technology. Sociedade SOFTEX, Campinas, 2003.

SHAPIRO, C., VARIAN, H. A. **Economia da informação: como os princípios econômicos se aplicam à era da Internet**. Rio de Janeiro: Campus, 1999.

TORVALDS, L. COX, A. **Inovação**.

Available at: <<http://www.nosoftwarepatents.com/pt/m/dangers/innovation.html>>

Accessed on 4 May, 2005.