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**CREATION OF SOFTWARE WITHIN THE ACADEMIC
CONTEXT: KNOWLEDGE TRANSFER, INTELLECTUAL
PROPERTY RIGHTS AND LICENCES**

Paolo Guarda

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CREATION OF SOFTWARE WITHIN THE ACADEMIC CONTEXT: KNOWLEDGE TRANSFER, INTELLECTUAL PROPERTY RIGHTS AND LICENCES

ABSTRACT

Using the method of comparative analysis, this paper explores different legal issues related to software management within universities. It is organized in two sections. The first section will deal with the crucial issue of ownership of intellectual property rights in copyrights and patents, outlining the discussion with reference to the specific objective of this review. The regulatory framework in this field, which is often opaque due to the different regulations that characterize the diverse forms of intellectual property rights, is made even more incomprehensible by providing different legal regimes according to the status of the person who has carried out the research (professors, lecturers, fellows, graduate students, etc.). The second section provides an explanation of the role that contract law, and specifically licensing, has in the exploitation of software. Finally, considerations of a general nature will be developed and some operational solutions proposed, primarily aimed at emphasizing the importance of a systematic approach to the transfer of knowledge in a university environment.

KEYWORDS

Intellectual property rights - Knowledge transfer – Software – Licences – Ownership
- University

ABOUT THE AUTHOR

Paolo Guarda (email: paolo.guarda@unitn.it - Personal Web Page: <http://www.lawtech.jus.unitn.it/index.php/people/paolo-guarda>), PhD in Comparative Private Law, is Post-doc Researcher of Private and Comparative Private Law at the University of Trento (Italy) – Faculty of Law – The Trento Law and Technology Research Group. He teaches “Information Technologies Law” and “Comparative ICT Law” and is the author of several articles about issues related to Digital Age Law (Privacy, Copyright, Technology Transfer, etc.).

CREATION OF SOFTWARE WITHIN THE ACADEMIC CONTEXT: KNOWLEDGE TRANSFER, INTELLECTUAL PROPERTY RIGHTS, AND LICENCES

SUMMARY: 1. Introduction: A Problematic Issue in a Complex Scenario – 2. Ownership of Intellectual Property Rights in the Academic Environment – 2.1 Copyright in Software: General Allocation Rules – 2.1.1 A Comparative Overview – 2.2 Patentability of Software: General Allocation Rules – 2.2.1 Premise – 2.2.2 A Comparative Overview – 2.3 Issue Variables, Problematic Matters and Contractual Solutions to a Nebulous Scenario – 3. Software Exploitation and Licences – 3.1 The Role of Contract Law in the Digital Age - 3.2 Software Licences: Proprietary and Open Source Models – 4. Conclusions: Operational Solutions and Proposals for a More Efficient Management of Intellectual Property Rights

Introduction: A Problematic Issue in a Complex Scenario

Until a few years ago universities rarely pursued a structured policy of knowledge and technology transfer. Moreover, most universities showed little attention to crucial issues such as intellectual property, cooperative research, and approaches and strategies to the business world. Since the beginning of this century, we have heard more and more about “knowledge transfer”, “technology transfer” from academia to the market, “commercialization of scientific research results”, university spin-offs and start-ups, and integration between business and universities¹. These are expressions that describe a process that reverses the traditional scenario and is aimed at marketing products of scientific research².

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¹ See C. Howell, “Extra Compensation for Inventive Employees: Is our System Equitable, Unbiased and Motivating?”, 2011 *Intellectual Property Quarterly* 371: “*In the past, university technologists were interested only in “blue sky” research. There was no expectation that what they worked on should have a clear goal or end result. As long as their work related to an unresolved issue or point of curiosity this basic research was regarded as worthwhile and a valuable contribution to the building blocks of their disciplines. A great deal of university research is government funded and traditionally was owned by the funder, the Government. Much of this potentially valuable research was left unexploited and unprotected*”.

² For further details on this phenomenon see, *ex plurimis*, M. Granieri & A. Renda, “Innovation law and policy in the European Union: towards horizon 2020” (Springer, Milan

From a legal point of view, this phenomenon mainly involves two legal categories: intellectual property rights (IPRs) and contract law³. The core of IP is a right, limited in scope and time, of exclusive economic exploitation of inventive or creative ideas. Intellectual property is embodied in the following instruments: patents for industrial inventions, copyrights of intellectual works and related rights, trademarks, and other lesser derivative forms. A contract is the primary legal instrument through which IPRs are transacted. In this regard, contracts are, for the most part, concluded to “assign” (full and final transfer) or “licence” (limited and temporary transfer) IPRs⁴. Market exploitation of university research usually occurs in two ways: (1) either by indirect exploitation via proprietary or open source licensing (e.g., GNU General Public Licence) of IPRs (especially patents and copyrights); and (2) by direct exploitation of the research results on the market via spin-offs or start-ups.

The problems that characterize this area of investigation are due to a number of factors. First of all, the legislative framework is inadequate compared to the technological evolution that has so deeply changed not only the tools used by people to express their ideas and creativity, but also, and most of all, their results. Software is probably the most emblematic example of this transformation. The legal panoply of a regulatory framework that has its origin in a technological context (the paper era) quite different from the current one is in crisis and shows its inefficiency when applied to profoundly different situations, scenarios and products of human creativity. In addition, some legal systems lack an organized institutional policy for managing these issues: regulation that are often difficult to enforce are sometimes followed by a lack of preparedness in dealing with phenomena such as knowledge transfer. Universities are too often influenced by expediency rather than structural reforms, with a direct impact on the organizational structure itself. Finally, the cultural and value aspect is even more deficient in today's universities. Academies are being shaken by forces and interests that increasingly compel them to chase the market with reference to the research areas to be explored, and leave them less free to choose which scientific fields to develop, perhaps because they could be considered economically fruitless.

2012); G. Libecap, “University Entrepreneurship and Technology Transfer: Process, Design, and Intellectual Property (Advances in the Study of Entrepreneurship, Innovation and Economic Growth” (Elsevier, Oxford 2005); R. Caso (ed.), “Ricerca scientifica pubblica, trasferimento tecnologico e proprietà intellettuale” (Il Mulino, Bologna 2005).

³ For further details on the relationship between IPRs and knowledge transfer, see S.D. Anderman & H. Schmidt, “EU competition law and intellectual property rights: the regulation of innovation” 2nd ed. (OUP, Oxford 2011); M. Granieri, “La gestione della proprietà intellettuale nella ricerca universitaria. Invenzioni accademiche e trasferimento tecnologico” (Il Mulino, Bologna 2010); P. David & B.H. Hall, “Property and the pursuit of knowledge: IPR issues affecting scientific research”, 35 *Research Policy* 767 (2006); A. Monotti & S. Ricketson, “Universities and Intellectual Property. Ownership and Exploitation” (OUP, Oxford 2003).

⁴ See I.B. Ørstavik, “Technology Transfer Agreements: Grant-Backs and No-Challenge Clauses in the New EC Technology Transfer Regulation”, 36 *IIC* 83 (2005).

These pressures do not help to identify what should be the first mission of the University and its role in the changed social context.

Interests and values, sometimes conflicting, are interrelated. On the one hand, we are witnessing a whole series of pressures to make universities, and the activity performed there, cater to the needs of the market. This results in a focus on the economic value of its products and on the teaching of professionalism and skills directly exploitable in the professional context. Some trends of this approach are driving an increasing closure of access to information, if such a strategy is seen as the most effective way to “monetize” the research. On the other hand, given that for the most part public funding allows universities to operate, the role that they have traditionally played in society, and new technologies that permit innovative and efficient forms of sharing, many scholars and other people working at the university are fighting a daily battle to open access to the results of academic research and to facilitate their easy dissemination. These are the interests and values that characterize options aimed at managing IPRs in academia and, more generally, that affect the process of knowledge transfer. It is self-evident that to resolve this issue it is first necessary to establish which model of values to pursue.

This paper focuses on software and aims at providing a systematic analysis of the issues related to its management within the university context⁵. Software presents important aspects of heterogeneity compared to other intellectual works protected by IPRs. Actually, it is a presentation of technical information, i.e. instructions given to a computer to perform its various tasks. Like other works protected by copyright, a computer program can be represented by means intelligible to humans (so-called “source code”) which is suitable to communicate (at least to an expert audience) ideas and information. In order to be used, this peculiar product needs to be decoded and understood by a machine (so-called “object code”). Unlike any other presentation of information, software is made available to users in ways (object code) which typically conceal the ideational and informative content. The choice made initially by the international legislators, and then gradually by more local ones, was to protect this new form of creativity through an instrument which until then had managed other forms of “human” creation: copyright⁶. Debate

⁵ Actually the concept of “software” would cover much more than the simple “computer program”, since it contains other further components (program description, accompanying material, etc.). However I will use both expressions as synonyms in this paper, since I am focusing on the phenomenon itself going into the semantic details and differences only when and if it will be deemed as necessary.

⁶ The origin of the debate was due to the separation between hardware and software that had raised the issue of the appropriate form of protection for software that could easily be copied without the author’s consent. Several solutions were made available: providing a framework specifically for this new product; protecting it through the patent system; considering it as a literary work and then protecting it under copyright law. When the debate on the form of protection for computer programs started in the 1970s, the position of the international community, within the “World Intellectual Property Organization” (WIPO), was to recognize a sui generis right, able to cover all the specific characteristics of this new

regarding the benefits of copyright versus patent as the best form of protection has characterized years of academic discussion⁷.

Specific attention is given to the rules governing ownership regimes, and to the exploitation of research results by contract (assignments and licences)⁸. The regulatory framework in this field, which is often opaque due to the different regulations that characterize the several forms of IPRs, is made even more incomprehensible by providing different legal regimes according to the *status* of the person who has produced the research (professors, lecturers, fellows, graduate students, etc.).

The lack of clarity of the current approach with regard to the management of software influences and, sometimes, causes malfunctions in the process of knowledge transfer from university to the market of this unique and new research product. Poor organization of the creative process of computer programs, especially with regard to the role and legal *status* of those involved, combined with the often unenlightened management of IPRs, especially with with reference to valorization through licensing, results in inefficient economic exploitation of the product and the dissemination of knowledge to the community of programmers and to society as a whole.

From this perspective, a comparative study provides a crucial methodology: European legislation will constitute the main point of reference; details concerning the legislation of some European countries or the U.S. model will be provided in order to compare different solutions. This will allow the main issues to be highlighted.

product of human creativity. The WIPO Model Provisions on the Protection of Computer Software, however, was at the end not the choice of the national legislators. In that period the U.S. legal system was moving to protect software by copyright, codifying this rule in the “Computer Software Copyright Act” of 12 December 1980. Then, this (new) approach to software protection began to prevail and was codified both at the European level, through the Directive 91/250/EEC (art. 1), and at the International level, via the TRIPs Agreement (art. 10), establishing that computer programs are protected as literary works in accordance with the Berne Convention.

⁷ See G. Ghidini & E. Arezzo, “Patent and Copyright Paradigms vis-à-vis Derivative Innovation: The Case of Computer Programs”, 36 IIC 159 (2005) (describing how patent and copyright law address the case of derivative innovation in the software market and the likely consequences that the coexistence of the two paradigms would have on derivative innovations). See also R.M. Hilty & C. Geiger, “Patenting Software? A Judicial and Socio-Economic Analysis”, 36 IIC 615, 619-622 (2005); S.J.H. Graham & D.C. Mowery, “Software Patents: Good News or Bad News?”, in: R. Hahn (ed.), “Intellectual Property Rights in Frontier Industries: Software and Biotechnology” 45 (Aei Press, 2005).

⁸ An interesting sociological approach to the issues that the computer software ownership raises can be read in D.M. Douglas, “The Social Disutility of Software Ownership”, 17 Sci. Eng. Ethics 485 (2011). See also *id.*, “A bundle of software rights and duties”, 13 Ethics Inf. Technol. 185-197 (2011) (arguing that the topic can be understood as concern over how various rights and duties over software are shared between owners and users). For a first study, full of references and details, on the structure of IP ownership in software technologies see E. Harison, “Intellectual Property Rights, Innovation and Software Technologies. The Economics of Monopoly Rights and Knowledge Disclosure” 137-191 (Edward Elgar, Cheltenham, UK – Northampton, MA (USA) 2008).

Following this introduction, the remainder of this paper is organized into two sections. The first section will deal with the crucial issue of ownership of IPRs on copyrights and patents, outlining the discussion with reference to the specific objective of this review. The second section provides an explanation of the role that contract law and specifically licences have in the exploitation of software. Finally, in the conclusion, considerations of a general nature will be developed and some operational solutions proposed, primarily aimed at emphasizing the importance of a systematic approach to the transfer of knowledge in a university environment.

2 – Ownership of Intellectual Property Rights in the Academic Environment

2.1 – Copyright in Software: General Allocation Rules

This section aims to provide a systematic reconstruction of the issue of ownership of copyright arising from the creation of software in an academic context⁹. In particular, while acknowledging the inherent complexity of the subject though without being exhaustive, I will seek to outline the legal and organizational landscape with reference to the activities engaged in by professors, researchers and also by “non-employees” (e.g. research assistants, PhD candidates, Post-doc researchers, etc.), within the research groups of various departments and faculties. The goal is to propose some feasible solutions to simplify the framework and to ensure that the university can exploit its scientific research products in the most efficient and effective way.

The transfer of knowledge from universities to the society has emerged over these last few years as a fundamental phenomenon to be taken into account in predicting the paths that academics will choose to embark upon in the near future and to address the concerns to which these new scenarios give rise.

In this context, technological change has undoubtedly played a crucial role. Advances in technology have brought about a distinct transformation in the field of scientific production, not only modifying the distribution and dissemination of contents, but also “impacting” traditionally protected works, which have thus begun to take on a new “form”. This in turn has led to the creation of new categories of protected works, of which software represents a paradigmatic example. The impact of digital technologies has seen the emergence of new problems and the need to identify new instruments for the protection and management of rights.

When discussing the issue, there are essentially three areas of law which come into play: (1) IPRs, which are used to determine, among other things, who is the author of the intellectual work and who is the owner of the rights

⁹ See C. Long, “Proprietary rights and why initial allocations matter”, 49 Emory L.J. 823 (2000), arguing that initial allocations of property rights matter because who starts out holding the rights helps determine who ends up holding the rights.

relating to it, the form of protection and its limits, etc.¹⁰; (2) labour law, which governs the relationship between employer-employee, defining in more details who is the employee and, in our case, if these assumptions are or are not applicable to the particular context of the academic world; and (3) contract law, which establishes rights and obligations with respect to the parties involved, and sometimes the rules for the allocation of IPRs.

The following pages will provide a comparative overview, albeit schematic, to highlight convergences and divergences among the models used by some relevant legal systems (Germany, Italy, and the USA)¹¹. I will also verify the justifications underlying the choice to allocate the ownership to a university or a researcher or professor, emphasizing the importance in this context of the principle of academic freedom.

I will follow a general approach concerning the rules for allocation of copyright in the work-for-hire context in order to better understand the important aspects of this issue. These rules will then be analyzed in the context investigated in this paper and their criticalities emphasized¹².

2.1.1 - A Comparative Overview

At the European level, the reference rule can be found in art. 2 of Directive 91/250/ECC of 14 May 1991 on the legal protection of computer programs (repealed by Directive 2009/24/EU of the European Parliament

¹⁰ It does not represent the main focus of this study, but a mention must be made on the issue of “moral rights”. In addition to the economic exploitation of the intellectual rights several Countries, and the EU Software Directive as well, also recognize this category: it may include the right to be known as the author of the work (right of paternity), the right to prevent others from distorting the work (right of integrity), the right to control publication of the work (right of disclosure) and the right to withdraw, modify or disavow a work after it has been published (right of withdrawal). The scope of these rights varies among the countries. The Berne Convention recognizes only the first two moral rights above (art. 6-bis). In most such jurisdictions, agreements to waive or transfer moral rights are not enforceable (this happens in European countries; moral rights have, indeed, had a less robust tradition, and protection, in the United States). In those countries where moral rights are protected, such rights may restrict the transferee of the software (such as the party who commissioned the work) from making changes to the software without the express consent of the original author.

¹¹ For a schematic reconstruction of the comparative analysis of copyright law applicable to university scholarship *see* K.D. Crews & J. Ramos, “Comparative Analysis of International Copyright Law Applicable to University Scholarship”, November 2004, available at: <http://copyright.surf.nl/copyright/files/International_Comparative_Chart_Zwolle_III_rev071306.pdf>. *See also* S. Wolk, C. Kirchberger, U. Nyh, S. Penalzo, H. Seppänen & K. Tults, “Ownership of the Copyright in Works and the Patent Right in Inventions Created by Employees in Finland, Sweden, Germany, Austria, the United Kingdom, Estonia and Argentina”, 2002, available at: <www.juridicum.su.se>. Interesting suggestions and thoughtful analysis of the possible benefits of complete abolition of copyright are found in S. Shavell, “Should Copyright of Academic Works Be Abolished?”, Harvard Public Law Working Paper No. 10-10, available at: <<http://ssrn.com/abstract=1525667>>.

¹² *See, at first glance*, C. Wilton, “Copyright and Computer Software: An International Analysis of Work for Hire and Ownership Issues”, 15 I.P.J. 271 (2000/01) (with particular attention to common law countries).

and of the Council of 23 April 2009 on the legal protection of computer programs (codified version))¹³: “1. *The author of a computer program shall be the natural person or group of natural persons who has created the program or, where the legislation of the Member State permits, the legal person designated as the rightholder by that legislation. Where collective works are recognized by the legislation of a Member State, the person considered by the legislation of the Member State to have created the work shall be deemed to be its author.* 2. *In respect of a computer program created by a group of natural persons jointly, the exclusive rights shall be owned jointly.* 3. *Where a computer program is created by an employee in the execution of his duties or following the instructions given by his employer, the employer exclusively shall be entitled to exercise all economic rights in the program so created, unless otherwise provided by contract*”¹⁴.

The first national legal system within the EU to be considered is that of Germany¹⁵. Pursuant to Sec. 7 of the Copyright Act (*Urheberrechtsgesetz - UrhG*), the author or creator of an intellectual work of creative character is the owner of these rights. This is by virtue of what is defined in the German context as *Schöpferprinzip* (creation principle). There is not an ad hoc rule with respect to works created under an employment relationship. The only provisions useful for reconstructing the regulatory framework in this area are found in Sec. 43 Copyright Act: “*The provisions of this subsection shall also apply if the author has created the work in execution of his duties under a contract of employment or service provided nothing to the contrary transpires from the terms or nature of the contract of employment or service*”. By virtue of this paragraph, the rules relating to the rights of use (Secs. 31-43, *Nutzungsrechte*) also apply when the author has created the work in fulfillment of his/her obligations arising from a contract of employment or service, unless anything different is set out in the terms or nature of the employment contract. For a long time, scholars have therefore discussed whether this paragraph indicates the presence of compulsory licences in academy which, resulting from the nature of the relationship between universities and professor/researcher employees, require the latter to provide for the allocation of certain rights of economic use in favour of the university (also referred to as “implied grants”). Even in this legal system, the informal rules that confer the ownership of intellectual rights on the author or

¹³ For further details see W. Blocher & M.M. Walter, “Computer Program Directive”, in: M.M. Walter & S. von Lewinski (eds.), “European Copyright Law” 81-248 (OUP, Oxford 2010).

¹⁴ For further analysis and for a historical overview of the genesis of the rule, see M.M. Walter & S. von Lewinski (eds.), “European Copyright Law. A Commentary” 109-119 (OUP, Oxford 2010). A comparative study on this point in J.C. Ginsburg, “The concept of authorship in comparative copyright law”, 52 *DePaul L. Rev.* 1063 (2003).

¹⁵ As references to this part devoted to the description of the German solution see S. Nérison, “Propiedad Intelectual y Universidad: la experiencia alemana. Congreso Universidad y Propiedad Intelectual”, 25 November 2011, University of Valencia, publication upcoming; J.R. Herrera Diaz, “Ownership of Copyright in Works Created in Employment Relationships: Comparative Study of the Laws of Colombia, Germany and the United States of America”, 2010 *Revista la Propiedad Inmaterial* No. 14, 91, 95-113 (available at: <<http://ssrn.com/abstract=1705516>>); Wolk, Kirchberger, Nyh, Penaloza, Seppänen & Tufts, *supra* note 11, *passim*.

professor by virtue of the above mentioned privilege would seem to apply and are often integrated in university regulations and contracts.

Finally, with regard to software, Sec. 69(b) Copyright Act reflects the EU rule (Art. 2(3) of Directive 91/250/CEE) and thus states: “*Where a computer program is created by an employee in the execution of his duties or following the instructions given by his employer, the employer exclusively shall be entitled to exercise all the economic rights in the program, unless otherwise agreed*”.

The Italian legal system provides a rule similar to the German one with regard to the allocation of copyright ownership¹⁶. The general rule establishes that the author or creator is the holder of the copyright on creative intellectual works (Art. 6 of Law 22 April 1941, No. 633 “*Protezione del diritto d'autore e di altri diritti connessi al suo esercizio*” (Italian Copyright Law)). With regard to the regulation of ownership rights resulting from intellectual property created in the course of an employment relationship, according to the general rule, where the creative activity of the employee is within the scope of the employment relationship, and is, therefore, carried out in the performance of contractual obligations, property rights arising from such creative activity belong to the employer, while the author is only entitled to moral rights. This is analogous to the treatment of inventions in the field of art. 64(1), Italian Industrial Property Code. Indeed, where an original work is created, it is believed that the property rights accrue to the author, even if the creative activity was carried out by the latter during working hours and using the firm’s facilities.

The first regulation covering these interests is contained in Art. 11(2), Italian Copyright Law, which grants universities the copyrights in collections of documents or publications made on their behalf and at their expense. This rule applies unless there is an agreement to the contrary with the authors of the published works. It must also be pointed out that the provision in question must be coordinated with the provisions of Art. 29 Italian Copyright Law, which, in this regard, allows for two distinct cases. In the case of documents and publications that relate to the normal undertakings of the public administration (communications on activity progress, reports of results, proceedings), the economic rights of the latter continue for a period of twenty years after the first publication. If, on the other hand, the university undertakes at its own expense the publication of original works created independently by persons belonging to it - for example, researchers and professors - Art. 29 provides that the related property rights are retained by the public administration for only two years, after which the author is free to

¹⁶ General references to the Italian model can be found in F. Lorenzato, “I modelli contrattuali per l’accesso aperto alla conoscenza”, in: R. Caso, F. Puppo (eds.), “Accesso aperto alla conoscenza scientifica e sistema trentino della ricerca. Atti del Convegno tenuto presso la Facoltà di Giurisprudenza di Trento il 5 maggio 2009” 85-123 (Università degli Studi di Trento, Trento 2010); M. Borzaga, “Ricerca scientifica pubblica, proprietà intellettuale e rapporti di lavoro”, in: Caso (ed.), *supra* note 2, at 125-179; F. Ronconi, “Attribuzione e circolazione dei diritti di proprietà intellettuale sui risultati della ricerca scientifica pubblica: i margini dell’autonomia”, *id.*, 181-293.

exploit her writings in full. This set of rules only applies when the public entity undertakes publication and assumes the costs. The sum of these rules shows that the allocation of ownership to the university of “humanistic” works is realized only under the two conditions mentioned above (published by and at the expense of the university), but an employment relationship among the author and the university – with respect to literary, scientific, visual or musical works - is not sufficient. There is therefore an obvious difference in regulating the subject of the inventions, which determines (actual or potential) ownership in favour of the employer¹⁷. Currently it seems to operate according to an informal rule, also called “humanistic privilege” (or “professor privilege”, or “teaching exception”), which recognizes the ownership of such rights by the creator. This exception to the ordinary rule would be justified by the desire to ensure, through recognition of ownership of copyright on behalf of the professor or researcher, the academic freedom that would otherwise be strongly influenced by the economic and cultural choices of the university¹⁸.

These rules are sometimes expressed in the university regulations that handle the topic of scientific publications.

With regard to the ownership of software, implementing Art. 2(3) of Directive 91/250/CEE, Art. 3 of Legislative Decree No. 518 of 1992 introduces Art. 12-*bis* of the Italian Copyright Law, which states “*unless otherwise agreed, the employer is the owner of the exclusive right of exploitation of the computer program or database created by the employee in the execution of his duties or following the instructions given by the employer of work*”. The rule is generally considered applicable to the software created within a university context.

An analysis of the rules operating in the U.S. legal system can only start from the premise that we are here dealing with a common-law country, characterized by a case-by-case approach to the legal phenomenon and therefore strongly determined by case law. Here, I will draw a quick picture of the problem¹⁹.

Under Sec. 201 of the U.S. Copyright Act the ownership of IPRs is automatically granted to the author or creator of the work. Thus, the rule is

¹⁷ The rationale underlying the diversity of regulation is undoubtedly due to the following considerations: while in the realization of an invention the fundamental contribution of the business organization assumes relevance, for the creation of an intellectual work, that is not the subject of the employment relationship, the employee is acting in full autonomy.

¹⁸ See J. Pila, “Who Owns the Intellectual Property Rights in Academic Work?”, 2010 European Intellectual Property Review 609, also available at: <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1618172>, at 10-12.

¹⁹ As references for this part and for further details with respect to the US system see E. Priest, “Copyright and the Harvard Open Access Mandate”, 2012 Northwestern Journal of Technology and Intellectual Property in part. 32-67, publication upcoming, available at: <<http://ssrn.com/abstract=1890467>>; S.W. Halpern, “Copyright Law. Protection of Original Expression”, 2nd ed., in part. 350-390 (Carolina Academic Press, Durham, North Carolina, 2010); R.P. Merges, P.S. Menell & M.A. Lemley, “Intellectual Property in the New Technological Age” 487-496 (5th ed., Aspen Publishers, New York 2010); A. Packard, “Copyright or Copy Wrong: An Analysis of University Claims to Faculty Work”, 7 Comm. L. & Pol’y 275 (2002).

perfectly in line with the other two national experiences described above. A hotly debated and intensively analyzed issue in the U.S. is the so-called “work-for-hire” concept, whereby the work is created by a person “*within the scope of his or her employment*”. The Sec. 201(b) Copyright Act (1976) states that “*In the case of a work for hire, the employer or other persons for whom the work was prepared is the author considered for purposes of this title, and unless the parties have agreed otherwise expressly in a written instrument signed by them, owns all of the rights comprised in the copyright*”.

Copyright Law provides no definition for key terms such as “employee” or “scope of employment”. Case law has intervened on this point, providing a number of decisions suitable for identifying the standard to be applied in the event that you should decide whether a particular intellectual work was or was created in a work-for-hire situation²⁰.

At the university level it is disputed whether the “work-for-hire” concept is applicable or not, and, if so, whether the criteria that the courts have devised for its definition could be used. Even in the U.S. legal system an informal rule, termed “teaching exception” seems to be in force²¹. This exception finds its rationale and legal basis in the fact that it would be a sort of bastion for the “academic freedom” of professors and researchers²². This

²⁰ See, *ex plurimis*, *Community for Creative Non-Violence v. Reid*, 490 U.S. 730 (1989) (the Supreme Court held that one should consult agency law rules, as summarized in the Restatement (Second) of Agency, to determine whether to classify an individual as an employee); *Williams v. Weisser*, 78 Cal. Rptr. 542 (Ct. App. 1969) (the court ruled that if a professor writes his lecture during business hours and without any kind of supervision, that work is not considered to be for hire, despite the fact the professor is an employee of the University). Regarding software, see *MacLean Associates Inc., v. Mercer-MeidingerHansen*, 10 U.S.P.Q.2d1985 (S. Ct. 1989), where the court stated that the writer of the software was at the relevant time working on a single project for the party that claimed ownership, that the writer had absolute discretion over how long and when to work, that he was paid on delivery of a product rather than given a salary and that he did much of the work involved on his own equipment in his own facilities and concluded that the work in question was not a work for hire; on this issue see also *Kirk v. Harter*, 51 U.S.P.Q.2d 1853 (8th Cir, 1999); *Avtec Systems Inc. v. Peiffer*, 30 U.S.P.Q.2d 1365 (4th Cir 1994).

²¹ The so-called “teacher exception” arose under the former act in force, the Copyright Act of 1909, which provided that the word “author” shall include an employer in the case of works made for hire. This exception rested on an implied agreement between university and professor, informed by custom, reserving copyright in the latter. Since the 1976 Act amended the work for hire rules, requiring a writing signed by both parties to reserve copyright ownership in the employee (see 17 U.S.C § 201(b) (2011), and since Congress did not expressly incorporate a teacher exception into the amended 1976 work for hire rules, commentators and courts have debated whether the exception survived the amendment. See Priest, *supra* note 19, at 38-44 and all the cases listed there; Merges, Menell & Lemley, *supra* note 19, at 495-496.

²² See Packard, *supra* note 19, at 287-315, in part. 314: “*When universities own the copyrights to faculty work, they possess the corollary right to suppress that work and to prevent faculty from revising it or producing derivatives from it. The fact that universities have that power, whether they choose to exercise it or not, weakens the very foundation of academic freedom and freedom of speech*”. See also Priest, *supra* note 19, at 48-59 (arguing that vesting in the university legal authorship of scholarship, and the associated legal control, is repugnant to academic freedom principles even if universities are

privilege has often found expression in the precedents of U.S. courts, and even when its real applicability is doubted (as in the recent case with regard to ownership of teaching materials), currently the case law does demonstrate the presence of such an informal rule²³.

There is not an ad hoc rule with regard to the allocation of property rights in software. The problem is solved by using the general regulation described above, and often by implementing regulatory or contractual tools that establish ownership of such rights by universities. Within this scenario, policies concerning copyright ownership of software have evolved to address the practical issues unique to the university setting. This is the case of Harvard University²⁴. If software is created by faculty members who are not being paid specifically to create software, a formal assignment to the University is required when the faculty member and the university have agreed, or the university and a sponsor have agreed, that the university will own the software. Ownership of software created by a student as part of her Harvard activity using resources or facilities generally available to students as part of their education activities shall remain with the student unless (1) the software is created as part of the student's employment by Harvard (whether paid by stipend or salary); (2) the software is created during work subject to a sponsored research agreement; (3) the software is created as part of work within a program, laboratory or department which has a specific policy that software will be owned by the university (this policy must be communicated to the student before work begins); or (4) the software is created with the use of substantial university resources or facilities. Unless the university has some obligation or special investment in regard to the work leading to the development of the software that would make university ownership appropriate, the intent is to confer ownership on the student of any software that was created as part of the student's classwork or as part of normal extra-curricular activities²⁵.

presently inclined to transfer most rights in scholarship back to faculty); Monotti & Ricketson, *supra* note 3, at 491 *et seq.*

²³ See, *ex plurimis*, *Shaul. V. Cherry Valley-Springfield Central School District*, 363 F.3d 177, 180-81 (2d Cir. 2004) (the Second Circuit considered the teacher exception in connection with tests, quizzes, and homework problems created by a high school teacher, distinguishing teaching materials that “were never explicitly prepared for publication” from “published articles by university professors”); *Weinstein v. University of Illinois*, 847 F.2d 412 (7th Cir. 1988) (where Judge Easterbrook wrote that it “has been the academic tradition since copyright law began” for professors to own the initial copyright in their “scholarly articles and other intellectual property”); *Williams v. Weisser*, *cit.* (the court held that the professor's exception, in the form of lectures, was *sui generis* and “should not be blindly thrown into the same legal hopper with valve designs, motion picture background music, commercial drawings”).

²⁴ See the rules set at the Harvard University Office of Technology Development: “OTD and University-owned inventions” available at: ><http://www.techtransfer.harvard.edu/inventions/ip/software/ownership/>>. Obviously, faculties and the central administration could also provide rules more consistent with that particular academic mission.

²⁵ Closing rules are established with respect to administrative staff, where ownership is clear if a staff member who is not a faculty member creates software as part of his or her normal

Let us to pull the threads of this comparative investigation together. In all of the situations analyzed, we find some constants. First of all, the legal framework is not clear in terms of statutory law and case law. Along with some often unclear statutory rules a kind of “professor’s privilege” seems to apply, which determines the allocation of the ownership of copyright in intellectual works. This informal rule thus characterizes the application of the rules of intellectual property in the academic context.

There is, also, a tendency that sees universities applying for ownership of works created by their professors or researchers, which results in some tension between IP rules. The university’s interest in the acquisition of the traditional intellectual works created by its employees may be at issue both in relation to the possibilities of economic exploitation and to the cultural interest in representing a sort of reference institution of attribution of ownership of cultural works created by its professors and researchers for direct publication (see, for example, mandatory rules regarding open access deposit) or for negotiation with third parties.

With regard to software, at least in the European context, the allocation rule is established by statute. This leaves, however, several problems unresolved, such as the remuneration for such activities, especially with reference to a possible discriminatory treatment when compared to the case of inventions.

The final section of this paper will attempt to envisage a constructive approach to IPRs within the university, which will provide some possible paths of development in the management of these problematic issues.

2.2 – Patent in Software: General Allocation Rules

2.2.1 - Premise

Every legal system has its own rules with respect to the allocation of IPR ownership. These are certainly more detailed with reference to patents and often profiled in the academic context. The choice is between the allocation of rights to the researcher or inventor, or directly to her university or research institution. Both possibilities have pros and cons. As will be seen, allocation can fluctuate over the years and therefore recognition of the exploitation rights can pass from the inventor to her prospective employer and *vice versa*. This is also an expression of the policy choices that influenced the legislature at that time. In the academic sphere, the situation is even more varied due to the possible presence of rules tailored to a specific context.

duties: U.S. Copyright law, as seen below, provides that the employer, in this case Harvard University, automatically owns the copyright (however, if such a staff person creates software that is not part of his or her normal duties, the ownership would remain with the individual); and consultants, i.e. non-Harvard faculty, staff, or students on a contract or consulting basis, where the copyright is owned by the consultant unless there is a prior written agreement between Harvard and the individual to the contrary.

Although software from a theoretical-dogmatic point of view is protected by copyright, it is also notable that the debate on the possible applicability of patent protection is still active: in fact, there are solid operational rules moving towards the patentability software (albeit with various limitations)²⁶. Furthermore, computer programs are granted patent protection by many national and supranational patent offices (e.g. European Patent Office (EPO) and United States Patent and Trademark Office (PTO)). This section is devoted to providing some points of reference with regard to ownership allocative rules of patents in certain national contexts. The two forms of protection afforded to software carry the possibility of an overlapping of rules on the allocation of rights, which may lead to problems with product management. A patent also represents an important asset in the discussion relating to knowledge transfer (and technology transfer in particular). I will address this issue by giving a brief description of the rules involved in some legal systems (Germany, Italy, and United States).

2.2.2 - A Comparative Overview

Starting at the European level, it is relevant to mention that the “European Patent Convention” (EPC) contains no harmonized rules on the allocation of rights in cases where an invention has been created by an employee²⁷. Article 60(1) EPC only refers to a rule on the conflict of laws: *“The right to a European patent shall belong to the inventor or his successor in title. If the inventor is an employee, the right to a European patent shall be determined in accordance with the law of the State in which the employee is mainly employed; if the State in which the employee is mainly employed cannot be determined, the law to be applied shall be that of the State in which the employer has the place of business to which the employee is attached”*. The question is decided according to the law of the Member State where the employee resides. There are no specific provisions with respect to universities.

In Germany, prior to 2002, university researchers and professors held the rights to any inventions they produced²⁸. This was seen as a sort of

²⁶ See Hilty & Geiger, *supra* note 7.

²⁷ The EPC was signed in Munich on 5 October 1973 and entered into force on 7 October 1977 (the official EPO Web site: <<http://www.epo.org/>>). The European Patent Office (EPO) represents the executive arm of the “European Patent Organization”, which is an intergovernmental body set up under the EPC. It provides a legal framework for the granting of patents via a single, harmonized procedure: a single patent application may be filed at the EPO at Munich, at its branches at The Hague or Berlin, or at a national patent office of a contracting State, if the national law of the State permits so. Currently, there are thirty-eight contracting States.

²⁸ With reference to the German legal system, see A. von Falck & C. Schmaltz, “University Inventions: Classification and Remuneration in Germany, the Netherlands, France, the UK, the U.S. and Japan”, 36 IIC 912, in part. 913-919 (2005); M. Leistner, “Farewell to the “Professor’s Privilege” – Ownership of Patents for Academic Inventions in Germany Under the Reformed Employees’ Invention Act 2002”, 7 IIC 859 (2004) (making a parallel analysis of ownership of patents for academic invention between Germany and the United Kingdom and arguing that both legislators can learn from each other: the German one about the importance of the fundamental right of academic researchers to place their results in the

privilege enjoyed by professors and researchers (*Hochschullehrerprivileg*), the same one we have seen to be in force with respect to copyright and based on the protection of academic freedom. On 7 February 2002, Sec. 42 of the German Employee Inventions Act (*Arbeitnehmererfindungsgesetz* - ArbEG) was amended: inventions of all staff at universities are now subject to the same regulations as inventions by employees and allocation now depends on whether such an invention is a “job-related invention” (*Diensterfindung*) or an “independent invention” (*freie Erfindung*). The rationale behind this change was due to the desire to stimulate patent activity at universities by providing the legal means to claim inventions and exploit them commercially.

Obviously, a key role is played by the interpretation of the term “job-related inventions”, since only these belong to universities. Section German Employee Inventions Act defines them “job-related inventions” as inventions made during the term of the employment relationship and either arising from the duties carried out by the employee in private employment or in public service, or those largely attributable to the experience or work of the business or public administration. All other inventions are to be considered just “independent inventions”²⁹. There are no special regulations in the academic field³⁰. Thus inventions can only be considered independent if the professor or researcher makes them within the scope of authorised secondary activity or privately.

There is a debate in Germany regarding to the legitimacy of this kind of regulation. University lecturers complain that their inventions cannot be directly qualified as job-related inventions, since the principle of freedom of research (also recognized and guaranteed by Sec. 5(3)(1) of the German Basic Law (*Grundgesetz* – GG)) should apply, and that their work is largely independent. They argue that a case-by-case approach should be followed in order to evaluate whether an invention is assignment-related (pursuant to Sec. 4(2)(1) German Employee Inventions Act), based on a certain R&D mandate or corresponding activities³¹.

The German Employee Inventions Act also contains some special provisions for universities, which recognize some rights of university staff³².

public domain, and the English universities about the advantages and the widespread use of university ownership schemes regarding IPRs); C. Heath, “Remuneration of Employees’ Invention in Europe and Japan, 27 AIPPI: Bimonthly journal of the International Association for the Protection of the Industrial Property Japan 398 (2002): here you find also an interesting analysis of the Japanese system, where the revised in 1959 Japanese Patent Act has been considerably influenced by the German Employees’ Inventions Act of 1957 (pp. 9-12). For further details on the Japan *see* also M. Mori & C. Heath, “Employees’ Inventions in Japan”, 36 IIC 663-682 (2005).

²⁹ Pursuant to §§ 18 and 19 ArbEG these must anyway be notified and offered to the employer/university.

³⁰ Even when the research has been done with third-party funding, it can also lead to job-related inventions.

³¹ *See* von Falck & Schmaltz, *supra* note 28, at 914-915.

³² *See id.*, 915-919.

Section 42 No. 1 of the Act states the freedom of publication as part of the freedom of science. The problem related to the possibility that a prior publication could complicate the university's application for a patent since the subject matter of the application would no longer be new is well known³³. The provision tries to solve the question by balancing the interests involved and shortening the period within which universities have to claim an invention. Section 42 No. 2 of the Act provides for the "freedom not to publish work" of the university employee. If an employee decides not to publish her invention, this decision determines the fact that there will be no notification obligation pursuant Sec. 5 of the Act. A right to use the invention in research and teaching is furthermore recognized in Sec. 42 No. 3 of the Act. A scientist has the right to continue using her invention within the scope of teaching and research activity after it has been claimed by the university. This is known as the "research exemption" (*Versuchsprivileg*) provided for in Sec. 11 No. 2 of the German Patent Act (*Patengesetz* – PatG). As to remuneration for exploitation, Sec. 42 No. 4 of the German Employee Inventions Acts provides for a flat rate of 30% of the exploitation proceeds (without deduction of the patent costs)³⁴. Finally, Sec. 42 No. 5 precludes the application of Sec. 40 No. 1 of the Act to university inventions and, then, states that inventor and university may not agree that the university can participate in the exploitation of the invention instead of laying a claim to it (this agreement could make sense in some cases, e.g. in the case of "spin-offs").

The Italian example is interesting, since it also shows the legislators' oscillation on the allocation rules according to the policy context³⁵. In Italy during the 1990s, the financial needs of universities were progressively accentuated. Insufficient government grants to universities led to the adoption of university statutes which explicitly extended to the university the rule that grants the (private) employer the inventive results of its employees (established by art. 23(2), of the old law on inventions (r.d. 29 June 1939, No. 1127)). This approach continued until the adoption of the Law 18 October 2001, No. 383 ("Early action to boost the economy"), which in Art. 7, titled "New rules on intellectual property to industrial inventions", added a new Art. 24 to the law on inventions, now transposed in Art. 65 of the Industrial Property Code. Article 65 provides that: "*in derogation of Art. 64, when the employment relationship exists with a university or a public body which has research among its institutional purposes, the researcher is the holder of exclusive rights under patentable invention he has authored*". In regard to remuneration, the provision states that universities and public

³³ In most of the countries the so-called "grace period" is not working, except in U.S.A. and Japan.

³⁴ This rule is based on the "one third" regime customary in research and also in use by the Max Planck Society.

³⁵ For the academic inventions and ownership models within the Italian system, see Granieri, *supra* note 3, at 159-200; Borzaga, *supra* note 16, at 136-157. See also A. Bellan, "Prospettive di modifica per la disciplina delle invenzioni universitarie", 2009 Dir. ind. 213; G. Floridaia, "Le invenzioni universitarie secondo il pacchetto Tremonti", 2002 Dir. ind. 9.

administrations establish the maximum amount of the royalties, relating to licences to third parties, (para. 2) and fix at 50% the minimum amount of income in favor of the inventor (para. 3). To make the picture even more complicated, and therefore subject to differing interpretations, the fifth paragraph of Art. 65 also provides that “*The provisions of this Article shall not apply in the case of research funded, in whole or in part, by private persons or implemented within specific research projects funded by public bodies other than the university, institution or administration of the researcher*”.

The new provision of the law has caused highly critical reactions³⁶. This choice differentiates among the faculties with regard to the rights on the invention, in direct contrast to the principles of the IP system and triggers a proliferation of transaction costs. Even with reference to commissioned research or research project, apparently saved from the irrationality of Art. 65 (see para. 5), the ambiguity of the formulas used and the lack of clarity of the legal framework are likely to perpetuate doubts about interpretation³⁷. Thus, it is highly disputable whether these types of legislative “raids” respond to the real need to foster inventive activity within universities³⁸. Instead, far-reaching regulatory intervention is desirable in order to raise the capacity of institutions to exploit the results of their research. Finally, the ambiguity of the formulas used by the Italian legislator in the constellation of sources to which must be referred in order to understand the regulatory framework of this topic as well as the lack of clarity of the legal framework are likely to perpetuate the same doubts about the actual applicable rules and their practical interpretation³⁹.

In the U.S. system it is worth starting from a basic assumption: inventors are by rule entitled to their inventions, provided there are no contractual provisions to the contrary⁴⁰. As we have already seen with respect to copyright, however, there are some statutory provisions that derogate from this principle with respect to the ownership of employee inventions. The most famous and most cited statute, at the federal level, is without any doubt the Patent and Trademark Law Amendments Act (the Bayh-Dole Act), in force since 12 December 1980⁴¹. It was created in order to foster the technology

³⁶ For further details see R. Caso, “La commercializzazione della ricerca scientifica pubblica: regole e incentivi”, in Caso (ed.), *supra* note at 2, at 47-52; Granieri, *supra* note 3, at 159-193.

³⁷ On the several doubts with regard to the rules for the allocation of IPRs in the field of commissioned research, see Ronconi, *supra* note 16, at 228-236.

³⁸ See, *ex plurimis*, L.C. Ubertazzi, “Le invenzioni dei ricercatori”, 2003 *Contratto e impr./Europa* 1109.

³⁹ For further details see M. Granieri, “La disciplina delle invenzioni accademiche nel Codice della proprietà intellettuale”, 2005 *Dir. ind.* 29.

⁴⁰ See von Falck & Schmaltz, *supra* note 28, at 293-294; Caso, *supra* note 36, at 29-47.

⁴¹ 35 USC 200-212. On the legislative process leading to the approval of the Bayh-Dole Act see A.J. Stevens, “The Enactment of Bayh-Dole”, 29 *Journal of Technology Transfer* 93 (2004). See also D.C. Mowery & B.N. Sampat, “The Bayh-Dole Act of 1980 and University-Industry Technology Transfer: A Model for Other OECD Governments?”, working paper 2004, available at: <http://siepr.stanford.edu/programs/SST_Seminars/HBSemulationtalk.pdf>; D.C. Mowery, R. Nelson, B.N. Sapat & A.A. Ziedonis, “The Growth of Patenting and Licensing

transfer between universities and industry, and regulates the ownership inventions made by small companies or non-profit organizations (especially universities) within the scope of federally funded research projects⁴².

At the basis of the system created by the Bayh-Dole Act, there are the “funding agreements”, i.e. agreements, covering all research, in full, or in part, funded by the federal government, including funding federal agencies and organizations that receive the money⁴³. These agreements include certain provisions for the dissemination, protection and commercialization of any invention resulting from supported research, which include the following: (1) the funded organization must notify the lending agency of the invention made within a reasonable period; (2) the funded organization has two years from the communication of the invention to notify the federal agency in writing of its decision to reserve for itself the ownership of the invention; (3) the lending agency has the right to request periodic reports concerning the exploitation of the invention; (4) the patent application and any patent must contain a formulation in which it is noted that the invention was made with federal funds, and that the government retains some rights in the invention itself. These are the general rules. When, as in cases relevant for this study, the funded body is represented by a non-profit organization, there are specific clauses: (1) selling the rights in the invention is prohibited without the special consent of the funder; (2) any profits, after expenses, be utilized for scientific research or education; and (3) preference be given to small U.S. in licensing the rights to the invention.

Next, with respect to the allocation rule, universities may claim the inventions of their employees made within the scope of federally funded research project. Rights not claimed by the university may be claimed by the federal government. In any case, the federal government receives a worldwide royalty-free licence for the relevant IPRs

The remuneration of the employee is usually regulated by contract. For the university in the case of Bayh-Dole Act, the award to the inventor (i.e. researcher or professor) of a portion of the profit gained by exploitation of the rights to the invention must be recognized. Concerning this issue, most universities have a patent policy that regulates the attribution of all employee inventions created within the sphere of academic activity.

Concluding this section, it is worth noting that in all the experiences taken into account the employers are usually entitled to the inventions, but employees can have some access rights to inventions created within the scope of the employment relationship (see the “work made for hire”, “job-related inventions”, etc.). There is often an ad hoc legislation with reference to

by U.S. Universities: An Assessment of the Effects of the Bayh-Dole Act of 1980”, 30 Res. Pol’y 99 104 (2001).

⁴² For a summary of the contents of the Bayh-Dole Act, see Monotti & Ricketson, *supra* note 3, at 239-241.

⁴³ Sec. 200 ff. Title 35 USC.

universities (Germany, Italy, USA). We can also observe a variation among countries that allocate quite precisely the ownership of rights to invention to the university (Germany), countries that cede ownership to the inventor/researcher (Italy, when Art. 65(5) of Italian Industrial Property Code does not hold), and common-law countries where the issue is resolved by contract or university policy, obviously in accordance with the provisions of the federal legislation (USA). On this point, at least at the European level, a harmonized regulation could reduce transaction costs related to the management of IPRs. Finally, with reference to the remuneration issue, this is always provided even if calculated in an uneven manner.

2.3 – Issue Variables, Problematic Matters and Contractual Solutions to a Nebulous Scenario

The issue of software management within the scenario we are dealing with often required a forced interpretation of a regulation in order to fix it to a complex reality. Not every problem, however, can be solved *ex ante*. The problem here further highlights the need to provide, at least initially and as a sort to medium-term solution, contractual schemes that bind all participants, whatever their *status*, to transfer the rights arising from their intellectual property, while of course preserving their moral rights.

As we have already seen, software is certainly a paradigmatic example of the management of intellectual property rules within the area of knowledge transfer from a university to the market and society. Software has, *inter alia*, by virtue of its particular nature, been explicitly regulated by the European legislator with reference to the rules of allocation of exploitation rights that relate to it. This is probably due to the fact that software can potentially be exploited commercially⁴⁴. This would justify shifting the rights to the work from the creator/employee to the institution⁴⁵.

Furthermore, the issue presents intrinsic, though not yet fully investigated, problems related to the overlapping of different forms of protection that arise and that have a direct impact on the regulation outlined here. I refer, of course, to the possibility that software could be subject to protection not only by copyright but also, under the conditions described above, by patent law.

The last section of this study will be devoted to more detailed examination of some pivotal issues regarding the need for a systematic and reconstructive approach to the management of all IPRs within the academic scenario. I begin by highlighting some fundamental aspects with reference to

⁴⁴ Apparently unlike other works protected by copyright and originated in a university context. Actually, even the publications, that at a first glance seem to not carry a direct economic return to the researchers, produce other kinds of incentives that often resolve in (even) economic value.

⁴⁵ See Monotti & Ricketson, *supra* note 3, at 495: “*software offers greater potential for lucrative licensing arrangements and may therefore justify the transaction costs involved in setting up an administrative structure to assess and manage the works that an author seeks to licence commercially to third parties*”.

the specific subject under investigation in this section, providing a useful basis for the final considerations of this work.

First of all we must remember that, regardless of the regulatory framework, IPR ownership allocation rules are often set by the regulative framework governing the funding that will then give rise to a product. This is a crucial point with respect to the management of this issue at universities (and workers at the Technology Transfer Offices know this very well) and, indeed, happens with respect to many calls for projects set at the national and international level. As an example we could cite the Regulation (EC) n. 196/2006 of the European Parliament and of the Council of 18 December 2006 laying down rules to participate in Seventh Framework Programme. Article 39 expressly provides that the ownership of foreground (results of the project) belongs to the participant in the project, namely the university in our case, which is committed to ensuring that any right on the part of others (e.g. its employees) are compatible with the obligations arising from Consortium Agreement and Grant Agreement signed with the financial institution (the Commission).

These final obligations bring us to another problematic issue related to this topic. The regulatory framework, often vague and unenlightening, is made even more incomprehensible by the presence of persons who have diversified *status* within the university (employees, fellows, graduate students, undergraduates, Ph.D. candidates, staff, etc.) and are subject to different legal regimes. In the academic context, the situation that most often arises is the development of software by a number of persons who may participate in the creation with different roles and functions. Thus, we are in most cases dealing with a “joint ownership” situation. The European legislator defines the category without giving any detailed indication with respect to its management, actually referring to the rules related to the “tenancy in common”. Article. 2(2) Directive 2009/24/EC states: “*In respect of a computer program created by a group of natural persons jointly, the exclusive rights shall be owned jointly*”. We can start from some basic assumptions: the software is automatically protected from the moment of its creation, and the holder of moral and exploitation rights is the author, usually coinciding with the creator (Art. 2(1) Directive 2009/24/EC). If there is, as seen above, an employment relationship, the rights of economic exploitation are allocated *ex ante* to the employer (art. 2(3) Directive 2009/24/EC). It is therefore necessary to devote an, albeit brief, analysis to the most relevant hypothesis that may occur and to the rules, of a general nature, that can help to interpret the problematic situation. Every legal system could have its own specific regulation; some basic principles can, however, be summarized and described, having as a reference point the application scenario. The sense of what follows is to demonstrate the complexity of the matter and the need for flexible solutions.

On the one hand, there can be equal creative participation, characterized, then, by a subjective point of view. In this situation, joint-

ownership rules apply, dictated by a work inseparable by nature (communion: it is assumed that the rights belong equally to all authors unless proven otherwise). On the other hand, creative participation can be delineated, but in a system of relationships characterized by a “top position”. In this case, the exclusive rights are attributed to the creator of the collection, preserving the autonomous rights of the other authors in their independent part of the work⁴⁶. Here are some possible practical scenarios. One that might arise in the activities engaged in by a research group at the university is a situation in which all parties have contributed equally to a task, collaborating in the creation of a computer program that includes different lines designed and written by the various parties involved. This scenario would be very difficult to manage, since it requires an accurate reconstruction of the list of persons involved in their various functions. Pursuant to the joint-ownership regime, if the final work results inseparable and there is no agreement to the contrary, or with reference to the regime applicable to the separate pieces of software, we would consider them as owners of the several, separable parts of the code. Numerous difficulties derive from this situation concerning management and negotiation of the rights involved, which are only partly resolved by the rule laid down in Art. 2(2) Directive 2009/24/EC. This rule permits granting the employer/university at least the ownership of its employees’ IPRs (professors, researchers, formal employees in general), reducing the number of co-owners and ensuring the university the possibility of managing a single relationship with its external partners. The problem of non-employees would, however, still be on the table.

Another scenario that could emerge is that of “collective work”. The activity can be initiated under the close direction and coordination of a “manager”, who in our case would always be represented by an employed researcher or professor. In this case, ownership of exploitation rights of the entire collective work would automatically pass to the University (see Art. 2(2))⁴⁷. This framework (if it were always easily applicable to software) could provide a regulatory scenario in which the individual members of the collective work could exercise their rights separately with respect to the individual works, unless otherwise agreed.

⁴⁶ In T. Margoni & M. Perry, “Ownership in Complex Authorship: A Comparative Study of Joint Works”, January 2012, available at SSRN: <<http://ssrn.com/abstract=1992610>>, you find a very interesting analysis of the IPRs applicable in the case of joint ownership, that follows a comparative approach taking into account the Italian and the U.S. legal system. For a study on joint ownership issue within the more general context of contracts relating to research and to international law regulation, see G. Westkamp, “Research Agreements and Joint Ownership of Intellectual Property in Private International Law”, 37 IIC 637 (2006). See also M. La France, “Authorship, dominance and the captive collaborator: preserving the rights of joints authors”, 50 Emory L. J. 193 (2001). As regarding the U.S. system, at first glance, see Merges, Menell & Lemley, *supra* note 19, at 497-498; Halpern, *supra* note 19, at 375-390.

⁴⁷ With respect to the U.S. system see, at first glance, Merges, Menell & Lemley, *supra* note 19, at 504-512; Halpern, *supra* note 19, at 390-407.

Whatever model we consider, the fact cannot be avoided that an interpretation of the legislation is always required in order to make it fit a complex reality, where in any case not all problems can be solved *ex ante*. The case under analysis highlights once again the need to provide solutions now, despite the silence of the legislature. A contractual solution could be a way to bind all participants, regardless of their qualifications, to a prior assignment to university of exploitation rights arising from their intellectual works (maintaining of course their moral rights). This would surely facilitate IPRs and make them less difficult to manage by universities. In the conclusion of this paper, I will analyze the pros and cons of an *ex ante* allocation of rights to institution with respect to the comprehensive approach that will be proposed in the management of these rights.

Finally, there is one last issue to be addressed related to the recognition of fair remuneration from any possible royalties deriving from the commercial exploitation of software. Economic recognition for the allocation of IPRs established by Art. 2(2) works automatically. In this context, one should evaluate the statutory and accounting feasibility, especially in the absence of a legal obligation to do so. If the unique nature of software, as compared with traditional intellectual works protected by copyright, justifies this reallocation of rights, then something similar to what happens with invention should apply. Universities should therefore regulate the allocation of a percentage of the royalties deriving from any sale or licensing of software product in academia⁴⁸.

3 – Software Exploitation and Licences

2.1 – The Role of Contract Law in the Digital Age

As part of a more general phenomenon of the digital age law, contract law is assuming a growing role. It emerges as supranational, often drafted with reference to the U.S. system and in the English language, and tends to apply legal rules in ways not always conducive to a well-balanced IPRs-oriented approach (at least with regard to the protection of the weaker part of the agreement). Contracts increasingly represent “a source of law” to which the interpreter must refer to analyze and understand the legal framework.

The processes of deterritorialization and the loss of centrality of the role of the state have a direct impact on the traditional structure of the system of sources of legal rules⁴⁹. Since we are witnessing a decline in the importance of the laws enacted by the state as an instrument able to regulate new phenomena, the function of negotiation has strengthened and is acquiring a crucial position. In many cases, a contract determines the rules applicable in practice. Globalization of the economy fosters this important role.

⁴⁸ Given the impossibility of an application, also only by analogy, of the provisions established for that purpose in relation to inventions in many legal systems (for example, see art. 65 of the Italian Industrial Property Code).

⁴⁹ See G. Pascuzzi, “Il diritto dell’era digitale” 297-298 (Zanichelli, Bologna 2010).

Specific interests are effectively regulated by negotiation among the holders of those interests. Relationships that are born on the network are governed by the agreements concluded by the parties.

Within the software context, a contract is the legal instrument by which the “assignment” (full and final transfer) and “licensing” (limited and temporary transfer) of IPRs are transacted. Indeed, the author has the exclusive right to decide upon the distribution strategy of her work and to indicate the authorized conditions of use. This indication occurs via the “licence”⁵⁰.

A licensing agreement is the most common legal instrument used for disseminating and exploiting software. The distribution and direct marketing of IPRs on software ensue through forms of proprietary licensing. The licensor grants the licensee the right to use the program for a definite or indefinite period upon payment of an annual fee; or it can be based on “Free / Libre and Open Source” (FLOSS) (e.g. GNU General Public License (GPL), European Union Public License (EUPL)), by which the licensee has some rights (freedoms) with regard to access to the software’s source code and its possible modification to create additional programs and copies⁵¹. These legal tools will be investigated in the following paragraph.

3.2 – Software Licences: Proprietary and Open Source Models

Enforcement of the copyright endorsed by the licence raises issues that, from a legal point of view, are linked to copyright law and contract law⁵².

Regarding software, a model contract designed to provide the licensee the right to use the software for a period of time and under specific conditions has evolved: “user licence”. The user licence allowed the software manufacturer (licensor) to retain ownership, and therefore control, of its product, thereby attempting to skirt the “first-sale doctrine”⁵³. A study of this problematic aspect is beyond the scope of this paper. It is only necessary to state here that the issue is still strongly debated and it is often enlivened by judgments that seem to finally favour the thesis that sees this model more akin to a contractual sale rather than a licence to use. A flexible definition of this

⁵⁰ Licence has imposed itself in a surprising manner as the reference contract for the supply of goods and services in the global digital environment. In the United States, for example, over one-third of all the goods and services offered are covered by a licence: see J. Braucher, “Contracting Out of the Uniform Commercial Code: Contracting Out of Article 2 Using a ‘Licence’ Label: A Strategy That Should Not work for Software Products”, 40 *Loy. L.A. L. Rev.* 261, 266 (2006)

⁵¹ See D. Lorenzi, “Innovation in the software sector: comparing proprietary vs. free/open source solution”, in: C. Franzoni & C.R. Lamastra (eds.), “Open knowledge and the cooperative approach to the production of research and innovation” 30-47 (Franco Angeli, Milano 2007).

⁵² See D. Nimmer, E. Brown & G.N. Frischling, “The Metamorphosis of Contract into Expand”, 87 *Calif. L. Rev.* 17 (1999).

⁵³ See R.T. Nymmer, “Licensing of Intellectual Property and Other Information Assets”, 3, 2d ed. (Lexis-Nexis, New York 2004).

negotiating tool would be that it is a contract between two parties, the licensor and the purchaser, which establishes the right to the latter to use the software and the ways in which the copy can be used.

The category that has been used for this type of market concerns so-called “End User License Agreements” (EULAs)⁵⁴. EULAs represent contracts between a software vendor and the end user designed to govern the rights of use of the latter with respect to the software. They have quickly become a standard and an icon for so-called “proprietary licensing” (although they could also affect the relationship between software firms or a defined number of users or licencees). The earliest EULAs were box-top licences that provided a consumer the right to use the software subject to the software publisher’s terms and conditions. Software makers include shrink-wrap licences in the jewel case or slip under the plastic wrapping. One of the most famous standard references is that used by Microsoft for distributing its operating system. This company includes it with each copy of its software, granting its customers the right to use the software on a computer. The typical features are: (1) the clear statement that the software producer is not selling the computer program but rather licensing it; (2) the fragmentation of different bundles of rights with respect to the software; and (3) that the rights bundled together represent the “licence” itself and are the only products the software publisher is conveying.

In detail, the software licence can be subdivided taking into account the group of terms that it characterizes⁵⁵. We then have so-called “transactional clauses” which express the central terms of the agreement and are the key terms in most technology contracts, providing for the fundamental transaction. The so called “general clauses” which are related to: (1) the technical specifications; (2) the possible set of clauses addressing the performance of machine-based services; (3) rules regarding the documentation; (4) regulation with respect to updates and upgrades of software; (5) schedules and milestones; (6) delivery, acceptance and rejection; (7) nondisclosure and confidentiality; (8) data management and security; (9) warranty; (10) indemnity; (11) limitation of liability; (12) use of trademarks (when applicable); (13) alternative dispute resolutions, etc. Finally the so-called “supporting clauses” include introductory material like recitals and definitions.

The exploitation model based on Open Source (OS) licences, which is emerging as the preferred choice for universities, research centres and the public sector in general, is surely more interesting from a point of view that

⁵⁴ See M.J. Madison, “Reconstructing the Software Licence”, 35 Loy U. Chi. L.J. 275 (2003).

⁵⁵ For a first analysis of the software licence clauses, see D.W. Tollen, “The Tech Contracts – Handbook. Software Licences and Technology Services Agreements for Lawyers and Business people” *passim* (ABA Publishing, Chicago, Ill. 2010); M.L. Rustad, “Software Licensing. Principal and Practical Strategies” 1-47 (OUP, Oxford 2010).

takes into account the knowledge transfer within the academic context⁵⁶. It should be noted here that this expression refers to the particular form of distribution of computer programs that carried out without keeping secret the so called “source code” (as is currently done for the proprietary licences). There are at least two pillars in the F/LOSS concept. Reference is made to the term “Free Software”, to indicate a category of licences initially prepared by Richard Stallman and adopted by the Free Software Foundation (FSF), which are characterized by the fact that they provide the end user the freedom to run, copy, distribute, study, change and improve the software. These assumptions are expressed in the renowned four freedoms: to run the program, for any purpose (freedom 0); to study how it works and adapt it to your needs (freedom 1), where the access to the source code is a precondition; to redistribute copies so you can help your neighbor (freedom 2); to improve the program so that the whole community benefits (freedom 3), again where access to the source code is a prerequisite⁵⁷. The latter freedom concerns the so-called “viral effect” (copyleft). If a second user decides to redistribute the work, she must do so under the same legal regime (and generally under the same licence) under which she got access to the original source code, without arbitrarily restricting the rights granted by the original author⁵⁸. We do, indeed, make reference to the term “Open Source Software” (OSS) to emphasize the requirement of access to computer programs in source format, as a necessary condition for properly understanding their operating logic in order to study and possibly to undertake any improvement. This approach is the result of a review of the proposals of the FSF made in 1988 by some experts (among them Eric Raymond) with the scope of bringing the development of free software to the commercial enterprises.

The F/LOSS can be seen as a strategic choice precisely for the beneficial effect that it is capable of triggering⁵⁹. This approach can offer a range of opportunities and benefits:

- free licences or, otherwise, a cost-savings trend related to the acquisition of licences for use of software;
- reduction in the cost of development, through which you will be able to create a true collaborative environment;

⁵⁶ An interesting analysis of the OS licensing phenomenon and the various types of licences and terms in L. Rosen, “Open Source Licensing. Software Freedom and Intellectual Property Law” (Prentice Hall, Saddle River (New Jersey) 2005). Focusing on the German legal system, see A. Metzger & T. Jaeger, “Open Source Software and German Copyright Law”, 32 IIC 52 (2001).

⁵⁷ Definition of free software has been drawn up by the Free Software Foundation; it is available at: <www.fsf.org/philosophy/free-sw.it.html>. FSF website: <www.fsf.org>.

⁵⁸ With respect to the “viral effect”, see H.J. Meeker, “Open Source Alternative: Understanding Risks and Leveraging Opportunities” 13 (John Wiley & Sons, Inc., Hoboken (New Jersey) 2008) recommends the use of the term “hereditary”: “*because the terms of the licence initially applied to the software are “inherited” by all subsequent licencees of the same code, subsets of it, or variations of it*”.

⁵⁹ See Meeker, *supra* note 58, at 136-139.

- increases in the efficiency of the development and maintenance of software that the OS approach can result, compared to the proprietary model;
- increases in the security levels with reference to source code accessibility;
- the possibility of seeking the aid of the OSS development and user community along with a wealth of knowledge shared over time;
- the possibility of reducing the risk of technological dependency with respect to the other software firms that market their products by means of proprietary licences.

These interesting (positive) aspects are, however, associated with some critical concerns which must be addressed and solved if one chooses to follow the path of OS licences to market a product. These include:

- the need for the development of specific contractual clauses with reference to the OSS in connection with the economic and legal operation one intends to put in place;
- a lack of clarity and distance among the doctrinal interpretations with regard to the legal framework applicable to public licences, to their legal status and interpretation of individual provisions, as well as definitions of responsibility;
- difficulties in managing the ownership of modifications that could result from contributions by users/licencees.

To conclude this section, at least one of the most problematic aspects of the joint use of codes derived from software licence distributed in different ways deserves to be mentioned. This issue is surely present at the stages where software is produced, in particular at university, although it is not always fully studied or fully and consciously taken into account. The process of creating the software is mostly incremental and cumulative in nature. Nothing is written *ex novo*. The possibilities of exploitation of the software product, according to a contractual instrument that follows the intended business model, may be severely limited by the types of licences through which the software in the background is accessed. The proprietary and OS software mixture in the writing activity of new lines of code leads to a problem which is not easily solvable at the exploitation stage if, from the beginning, the creators have not paid attention to the possible intersections between these two methods of software distribution⁶⁰.

⁶⁰ On the problem arising from combining software licences see Meeker, *supra* note 58, at 53-82, in part. 53: “Putting different kinds of software together is like holding a dinner party for my relatives. Maybe, if I go to a lot of work, I can serve food everyone will eat: My middle-age uncle on his low-carb diet wants meat and fish; my sister the vegan wants only locally grown vegetables; and my teenage nephew will eat anything as long as it come from McDonald’s. But what if all the dinner guests have not only their own preferences, but a vehement, polemical disgust for the foods the others eat? It is hard to bring everyone to the same table. That is what the software world can be like today”.

4. Conclusions: Operational Solutions and Proposals for a More Efficient Management of Intellectual Property Rights

Efficient knowledge transfer in European research institutions is hindered by a range of factors including: lack of incentives, legal barriers, and fragmented markets for knowledge and technology, etc. All of these factors adversely affect European growth. The uncertain ownership of research results and the lack of specific and harmonized intellectual property rules in academia give rise to uncertainty and therefore to higher transaction costs that surely affect the entire system.

After describing the relevant issues concerning the management of creation of software in the academic environment - with the inherent difficulties and simplifications needed in a paper aiming to provide a systematic reconstruction of the problem - in these concluding remarks I attempt to make some broader considerations. The goal is to provide future guidelines in light of a systematic and reconstructive approach to these issues.

This is a pivotal field of research in which to test problems brought about by technological development in reference to the relationship between science and law, problems that are exacerbated by difficulties on the part of the traditional IP regime in managing these issues.

The field of software highlights a series of critical points in the changing technological environment, which are undermining the traditional legal instruments. Software is, as mentioned above, a new product that does not fit traditional patterns⁶¹. This is reflected in the fundamental characteristics of IP: the evolution of the concept of work, the changing concept of originality, and the altered idea of authorship. With reference to the latter, the issue becomes even more critical as we increasingly encounter a team of authors, often with different background knowledge (taking into account, for instance, the several types of expertise required to create media content) with respect to a work in which it is often difficult to determine exactly who has created what, and if it is a truly original creation. The phenomenon of OS is merely the extreme landscape of these issues.

These problematic aspects are expressed in the difficulty of devising a system of protection that is truly adequate to the subject matter and in the rules relating to ownership of the economic exploitation rights. This is especially the case in complex areas (from the point of view of participation of various actors involved and the legal nature of their relationship with the institute of reference) which are often characterized by conflicting missions (dissemination of knowledge and economic exploitation of the results of scientific research). In the course of this study, I have devoted attention to the question of what should be the proper allocation of ownership of exploitation rights in scientific products in order to create an effective and efficient system of diffusion, dissemination and exploitation of these products. I have also

⁶¹ See Pascuzzi, *supra* note 49, at 207-218.

ascertained that the different nature of the products involved (including all IP and inventions) sometimes determines different allocations that can also be justified from an ideological and value-oriented point of view. It is necessary to understand what the best model of initial ownership is and to reduce the burden of mandatory rules. With this background in mind, the requirement is to balance values and interests: freedom of research, sustainability, efficiency, etc. There is a “choice” that can be evaluated in the light of the (sometimes contingent) interests involved. With respect to the intellectual works (in our field basically publications) it is hard not to agree with the solution to recognize the ownership in the hands of the author/researcher (perhaps with a provision for compulsory licences to enable the institution to use these works for internal purposes). With regard to inventions, on the other hand, a university’s entitlement to these rights is acceptable for reasons related to the diversity of the nature of the product, to the attempt to reduce transaction costs associated with its exploitation in the market, and to the various interests involved. Software, in all its different forms, shares some of the reasons why most of the legislators have chosen to allocate the rights to institutions.

At the university level, especially with regard to software, the situation is still very nebulous and intricate, either because of the undeniable lack or inadequacy of regulation, or because of the involvement of individuals who have different relationships with the university (employees but also collaborators, post-doctoral researchers, etc.), or finally because of the lack of a unified and comprehensive view with respect to the management of IPRs arising from scientific research products.

There is therefore the need to provide, with the same care and precision occurring in Anglo-Saxon contexts, university policy measures to manage the IPRs of the entire panorama of results that academic research involves. Attention must be paid to some elements that should be considered essential: the disclosure of the result by the researcher to the university, the ownership issue, the exploitation, and the management of remuneration⁶². The assignment of exploitation rights through university regulation (or by contract) would reduce inefficiencies due to the difficulty of reconstructing the system of affiliation of intellectual works - particularly of software - within a confusing regulatory environment and could avoid possible future conflicts “downstream”. This solution would also endow more confidence and flexibility in contexts in which the university assumes obligations with third parties for products for which it is not, at the present time, the only holder of the related rights (we have already mentioned above the regulation with regard to the participation to FP7).

⁶² For further details on the enforceability of university intellectual property policies (profiled on inventions actually), see K. LaRoche, C. Collard & J. Chernys, “Appropriating Innovation: The Enforceability of University Intellectual Property Policies”, 20 I.P.J. 135, in part. 139-174 (2006/07).

We must not forget that the prime mover of the researcher or professor is not (or should not be) the economic component, but rather the increase of her prestige in the community of peers to which a scientific work leads⁶³. Even in cases where the invention and/or ownership of exploitation rights is in the hands of a university, recognition of the authorship of the work always constitutes a key incentive in research activity. A correct policy on the dissemination of knowledge, regardless of the systems of ownership, would satisfy the interests of individuals and of institutions, recognizing the fundamental principle of academic freedom⁶⁴.

Science should not in any way be confused with technique. The first has knowledge as its goal (characterized by certain principles: universalism, communism, disinterestedness, systematic criticism)⁶⁵; the second, however, has economic gain as its goal. Though scientific results are often translated into technological innovations and techniques, they are quite distinct, and freedom is peculiar only to science. Freedom is expressed in the ability to choose the topics of investigation and the mode of dissemination. We certainly cannot disregard the financial and human difficulties in academia and do not dispute that research requires large public and private investments. Although ideally free, the researchers, in fact, depend on those willing to provide funds. In this field we can observe an initial divergence of interests: the researchers are (or should be) interested in knowledge (as such); industry and the state which finances their activities only look at the possible application of technology, thereby affecting researchers' activities and motivations. Freedom of research also means freedom from (passive) conditions of technology and the possibilities it offers⁶⁶.

⁶³ In Howell, *supra* note 1, at 387: “*There is an assumption that inventors as creative people prefer promotion, greater autonomy in what they do or an enhanced opportunity to share ideas with colleagues at conferences or seminars rather than being granted a direct share in the value of their invention. This assumption was verified in the finding of a survey of inventors of 9,017 patents granted by the European Patent Office between 1993-1997*”.

⁶⁴ In Monotti & Ricketson, *supra* note 3, at 491 *et seq.*; Packard, *supra* note 19, at 314-315.

⁶⁵ See R.K. Merton, “The normative structure of science” (Chicago 1942); *id.*, “Science and Technology in a Democratic Order”, 1 *Journal of Legal and Political Sociology* 115 (1942). See also M. Polanyi, “The Republic of Science: Its Political and Economic Theory”, 1 *Minerva* 54 (1962).

⁶⁶ In order to ensure that the system operates correctly, it is therefore necessary that all stakeholders are properly informed and aware of the legal instruments to be used and the goals as individuals and as an institution/community set out to achieve. The role of technology transfer offices should be emphasized and their activities greatly enhanced: the collaboration and sharing of ideas, interests, goals upstream of the creative process, even before beginning the research and development, and that this one results in creating a product, protectable and exploitable through the tools provided by IPRs, is of crucial importance and it is vital for the success of correct exploitation activities. IP should be taught at all levels of study and specialization; even more the “culture” of IP and the rationale underlying it, sometimes difficult and intricate, rules must be transmitted. See L. Manderieux, “La proprietà intellettuale nelle università. Guida pratica alla creazione e gestione di uffici di trasferimento tecnologico” (Università degli Studi di Trento, Trento 2012).

What is actually missing in the university management is a systematic and constructive approach to intellectual property rules related to the various products of scientific research⁶⁷. Too often, action is taken based on the peculiarities of the product itself; there is not unifying idea or reason to justify the choices that the university takes (and hopefully sooner or later the legislature). A vision, a common and shared goal, would simplify exploitation strategies and indicate more clearly the problems to be solved, such as: (1) a clear identification of the rules determined by the specific nature of the possible funding entity; (2) an unambiguous distinction among different scientific products (a problematic aspect due to the advent of digital technologies that heavily impact the landscape of traditional works); (3) a proper management of the participants involved with reference to the nature of their “working relationship”; and (4) the provision of compulsory licence to balance the allocation choices.

Open access (OA) to knowledge could be a good reference model, since it reflects the fundamental mission of the university, namely the creation and the most direct and effective dissemination of knowledge to society⁶⁸. OA allows the university to achieve the goal of preserving the existing knowledge and disseminating it, along with the new, in an effective and potentially free manner⁶⁹. It gives lecturers the opportunity to increase their prestige in the academic context. Finally OA makes possible for the university system to “break the (technological and economic) chains” of the centralized control of scientific knowledge⁷⁰. OA can be a landmark, perhaps even that common and overall vision that is lacking in a university increasingly stressed by centrifugal forces and the demand of the market⁷¹. An extremist approach to this issue

⁶⁷ With specific attention to ownership but stating principles applicable also to the entire IPRs system, see Monotti, Ricketson, *supra* note 3, at 504: “*A constructive approach to ownership is therefore to focus upon the distribution of rights that comprise ownership instead of upon ownership per se. It is preferable to strive for a clear and relatively simple formula for establishing ownership to maximize certainty*”.

⁶⁸ OA means open access to intellectual productions of research in the digital environment. The final goal is to remove all economic, legal and technical access barriers to scientific information in order to ensure scientific and technological progress in favor of the social, cultural and economic collective. This vision aims to encourage scientists and scholars to disseminate their works, making them freely available on the net for the whole community, not only for the community closely involved in the research. The logic of OA is echoed by some (solemn) statements and guidelines. Among the many: the “Budapest Open Access Initiative” in 2002, and the “Berlin Declaration on Open Access Publishing” in 2003.

⁶⁹ In Monotti & Ricketson, *supra* note 3, at 545: “*Despite these changes in university roles and missions and the wide differences that exist among modern universities, they continue to share a continuity of meaning that makes them ‘special’ and distinguishes them from other social and economic institutions. Above all, they remain, at their core, institutions that foster free and open intellectual inquiry*”.

⁷⁰ See R. Caso, “Open Access to Legal Scholarship and Copyright Rules: A Law and Technology Perspective”, in: G. Peruginelli, M. Ragona (eds.), “Law via the Internet: Free Access, Quality of Information, Effectiveness of Rights” 97-109 (EPA, Firenze 2009) (also available at: <<http://eprints.biblio.unitn.it/1609/>>).

⁷¹ In Monotti & Ricketson, *supra* note 3, at 551: “*All interviews felt that it was ultimately worthwhile for a university to engage in some commercialization of its IP, if only to gain the many net benefits that were likely to flow from the practice: increased research funding, enhanced university and staff profiles, enhanced*

cannot, therefore, be justified. Enhancement should also be made against the background of a lower economic contribution to research by the state and, therefore, by a frantic search for funding. As noted above, this often determines the rules relating to the protection and ownership of the results of that research (or, increasingly in the field of European funding, aimed at the use of results in the creation of academic spin-offs that have IP as a fundamental asset). Furthermore, the patent itself, which can be seen in a simplistic way as the antithesis to an approach characterized by openness, can represent a useful instrument for this purpose. A patent allows for the disclosure of information that often, unfortunately in the field of academia, would remain restricted to small groups of researchers. This same tool, if well balanced with the exceptions already provided by regulations with reference to the possible use for research purposes and with compulsory licences that allow for effective management of the relevant knowledge, thus becomes a fundamental element of a process of dissemination that should characterize the activities of a university⁷².

The OA “ideology” historically draws inspiration from the OS movement. Currently both emphasize that the digital environment has certain technical and social characteristics, reminiscent of the rules proposed by Robert K. Merton as regulating scientific production⁷³: science is characterized by a core of social elements, values and norms, so that it makes a subsystem in relation with the rest of society and, at the same time, has its own autonomy. The principles of universalism and communitarianism are of particular interest: universalism emphasizes fairness in judging scientific results and statements, to be considered only on the basis of the results obtained and not on the subjective characteristics of the scientist; communitarianism argues, however, that the results and scientific discoveries belong to the community and are not the property of the individual who carried them out. Knowledge is therefore the product of a cumulative effort by the scientific community. Individual recognition is not so important: what matters is the advancement of knowledge, which must be critically evaluated by both individuals and the community.

As OA has as its goal to ensure open access to the publications, following an approach based on OS in the field of software means allowing access to the source code, legitimized by the desire not to create barriers to the movement of knowledge (in this case codified in software). Both cases represent an attempt to break down the economic and legal barriers that hinder distribution of the products of scientific research.

industry-university interactions, access to increased resource capability (for example, personnel and research infrastructure), return of benefits to the community, increased flow of knowledge from and into the university, and educational opportunities for staff and students”.

⁷² *Id.*, 552: “However, when the commercial interests threaten to displace principles of academic freedom and integrity of research, the passion should be pursued in an environment outside the university”.

⁷³ *See supra* note 65.

Legislators should take an interest in all of these issues. Their silence, or sometimes inability to update and simplify the rules, heavily influences the resolution of the issues highlighted above. It is worth concluding with some remarks concerning the role that the jurist should have in governing the phenomena that are affecting the university and modern-day society. This issue increasingly affects the method by which activities take place in scientific research. It alters the boundaries, forcing us to think about how the social impact of technological innovation arising from scientific research can be evaluated and managed. The current state of affairs presents us with a wide range of examples: “biolaw”, environmentally sustainable development in the context of energy resources, and drug testing, etc. In a debate where the choices on the lawfulness of certain scientific methods are increasingly only a matter for experts or technicians, we must not forget that one issue is to guarantee freedom of demonstration and discussion of all point of views in order to reach consensus, another is to assume that the parties responsible for democratically implementing the choices of the community (the parliaments) should be replaced by technical committees constituted for this purpose. Such a replacement would be based on an alleged neutrality of technical knowledge and indifference by its members, who will often make choices aimed at increasing their role and prestige in society, if not directly influenced by the economic interests that finance their activities. Choices with reference to values aiming to direct the development of social life should not be taken only by the custodian of technical knowledge, but must be the result of reflection and evaluation by persons able to balance a more global view⁷⁴.

The information gathered in the course of this research is only a first attempt - harbinger of further study - to analyze the issue of managing IPRs arising from the creation of software within the academic context. Like all research works in the field of legal science, this modestly aims at adapting law to a changing society, so that it can continue to perform the function for which it was designed, namely the discipline of human cohabitation.

⁷⁴ See P. Sylos Labini, “Progresso tecnico, società e diritto”, in: AA.VV., “Studi in onore di Giuseppe Chiarelli” 4224 (vol. IV, Giuffrè, Milano 1974) (in English translation of the Italian text): “*The protagonists, so to speak, of technical progress in the strict sense are experimental scientists; the protagonists of organizational progress are lawyers, managers, specialists in organizational techniques, and politicians, who in certain conditions (but not always) can play a leading or directional role*”.