

**DIGITAL COPYRIGHT ISSUES IN MOROCCAN SCIENTIFIC RESEARCH AND HIGHER EDUCATION: THE NEED FOR UP-TO-DATE LEGISLATION**

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**ABSTRACT**

In spite of being a developing country, Morocco has adopted a substantial number of intellectual property (IP) laws closely modelled on most international conventions and treaties that deal with copyright and related rights. In the last twenty years, Morocco has reinforced its legal framework with adequate legislation in the field of intellectual and industrial property. Yet, it is still in need of more efficient and up-to-date provisions on digital copyright protection in the field of scientific research. Passing new legislation to complement the existing laws will certainly fill the current legislative gap on the management of digital copyright in scientific research and higher education. The present paper intends to show how the adoption of this legislation will certainly strengthen the protection of the works of researchers and higher education institutions, especially in Morocco. The aim is to attract the attention of Moroccan policy makers to the urgent need to provide more robust and up-to-date legislation in matters of digital copyright management for Moroccan academics and scientific researchers, both as individuals and as institutions. Facilitating innovation and the effective protection of works in the digital realm will certainly empower researchers to publish their digital works and protect them against new forms of digital infringement.

**Keywords:** Copyright, IP, Morocco, Digital, Higher Education, Scientific Research, Academia.

**1. INTRODUCTION**

With the advent of the Internet and developments in information technologies, various issues related to copyright have arisen. Many of these issues are still

developing and have not yet been addressed by legislators at the national level. Though a developing country, Morocco has adopted a substantial number of IP laws closely modelled on most international conventions and treaties that deal with copyright and related rights. Yet, it is still in need of clear, efficient, and up-to-date provisions on digital copyright protection in the field of academic scientific research in particular.

The aim of this paper is to draw Moroccan policy maker's attention to the fact that there is an urgent need to provide more efficient and up-to-date legislation in matters of digital copyright management for Moroccan academics and scientific research both as individuals and as research labs and research centres. The paper also intends to address new forms of piracy and infringement that have emerged with the continuous advancements in digital and cyber technology. Some of the solutions suggested in this context would empower the Moroccan Copyright Office to reconsider copyright management and make it more efficient, especially in the context of academia.

These issues require the collaboration of many stakeholders, including Moroccan researchers and academics themselves as there is, indeed, a strong need for more dissemination of copyright culture and increased IP awareness amongst academics. At the regional level, Morocco is urged more than ever to opt for more collaboration with African countries in matters of copyright protection and innovation in a globalized world.

**2. COPYRIGHTABLE DIGITAL WORKS IN MOROCCO**

Morocco has a significant progress trajectory in recent years within the ranking of the Global Innovation Index 2015 where it currently ranks 72<sup>nd</sup> out of 141 countries. It is positioned as one of the highest ranked in North Africa. It is particularly distinguished for the protection of the results of university scientific research.<sup>1</sup> More recently,

contributed to national and international journals with papers on cross-cultural studies, film analysis, and travel writing.

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the US Chamber International IP Index ranked Morocco 21<sup>st</sup> among the 49 countries included in the report.<sup>2</sup> Based on 23 indicators, Morocco showed a remarkable progress in the areas of industrial patents and trademarks; its efforts to preserve intellectual and industrial property, at the levels of legislation and enforcement are also significant. These achievements indicate the potential of the Moroccan economy and underline the importance of scientific research and its results in the economic sector. Moroccan academia's entry into the global digital hub should be bolstered by the adoption of special IP management provisions. The protection of academic research in digital form is in need of efficient and up-to-date legislation more than ever.

### 2.1. Protection of scientific research and academic production

Scientific research and academic productions in Morocco are regulated and organized by the 01.00 framing Law (19 May 2000) on higher education. This text, however, says very little about the protection of university scientific research. The only mention of academic IP comes in the context of the relation between universities and the business sector. According to this law, universities can provide – by convention – services in return for remuneration; can create innovative business incubators; exploit patents and licenses; and commercialize the products of their activities.<sup>3</sup>

At the institutional level, Morocco has implemented a series of measures since the beginning of the 21<sup>st</sup> century to reform its academic research system. These have mainly included reorganizing the National Centre of Scientific and Technical Research (CNRST) in 2000, establishing the Permanent Inter-ministerial Committee for Scientific Research and Technological Development in 2001, creating the Moroccan Institute for Scientific and

Technical Information (IMIST) in 2001, establishing Hassan II Academy of Science and Technology in 2004, reorganizing the Higher Council for Education, Training and Scientific Research in 2006, as well as establishing the Moroccan Foundation for Advanced Science, Innovation and Research in 2007.<sup>4</sup>

At the level of national IP legislation, the protection of authors' rights in scientific research and academic production is mainly provided for in Law n° 2-00 (15 February 2000) on copyright and related rights, which was first amended by Law n° 17-97 (14 February 2006) and Law n° 79-12 (20 May 2014) on the right to make a private copy. According to these laws, the scope of protection includes all literary and artistic works as well as all intellectual creations, such as written works, oral communications, allocutions, sermons, dramatic, musical and audio-visual works illustrations, geographical maps and designs (Article 3 of Law 2.00/2000). As for remuneration, Article 48 stipulates that, with regard to copying carried out by bookstores, the first edition may be subject to a lump sum fee given an express written agreement with the author. That framework is permitted in the cases of scientific and technical books, anthologies and encyclopedias, prefaces, annotations, introductions, presentations, illustrations of works, and limited luxury editions.

Articles 7, 15, 17 and 23 provide for exceptions for particular matters in education and teaching, namely as regards use and reproduction of "lawfully published work such as illustration in publications, radio broadcast programs or sound or visual recordings, journal papers" as long as they are destined for teaching and scientific research. The arrangement under this law also allows

<sup>1</sup> Caroline Rolshausen, 'La Propriété Intellectuelle au Maroc', Institut National de la Propriété Industrielle (INPI), France. June 2017, 5. <<https://www.inpi.fr/fr/la-propriete-intellectuelle-en-afrique-du-nord-maroc>> accessed 27 March 2018.

<sup>2</sup> U.S. Chamber of Commerce's Global Innovation Policy Center, *US Chamber International IP Index – 6th Edition – February 2018*.

<[https://www.uschamber.com/sites/default/files/023331\\_gipc\\_ip\\_index\\_2018\\_opt.pdf](https://www.uschamber.com/sites/default/files/023331_gipc_ip_index_2018_opt.pdf)> accessed 25 March 2018.

<sup>3</sup> Article 07 of Law 01.00/2000.

<sup>4</sup> Conseil Supérieur de l'Éducation, de la Formation et de la Recherche Scientifique. *Rapport thématique. Évaluation du cycle doctoral pour promouvoir la recherche et le savoir*. Rabat, 2017, 9.

“public performance of a work when this is done within the framework of the activities of an educational institution, for personnel and students of such institution, if the audience is composed exclusively of personnel and the students of the institution, or the parents or the supervisors or other persons directly linked to the institution’s activities”.<sup>5</sup>

Patents can also be products of academic scientific research in Moroccan universities. They are regulated by Law n°17-97 (18 March 2004) on the protection of industrial property as amended and supplemented by Laws 31-05 (14 February 2006) and 23-13 (21 November 2014), with nearly 60 Articles (30-89 in Chapters II and III) on patent provisions.<sup>6</sup> Most of these articles conform to those of the Paris Convention for the Protection of Industrial Property (1883) and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement, 1994) on the scope of patent protection and patentability.

Though this law does not mention directly the university as a source of and incubator of patents, it organizes the relation between the creator of a patent and its user. Among the provisions that could be of relevance to universities' scientific research, this law stipulates that the inventions made by the employee in the performance of either an employment contract involving an inventive mission corresponding to his/her actual duties, or studies and research, belong to the employer. It also provides that the conditions under which the employee (the inventor of the invention) benefits from additional remuneration are determined by collective agreements and individual work contracts (Article 18 of Law 17-

97/2004). These and other provisions in this Article apply to cases where the inventor is an employee of a business from the public sector.

When it comes to university researchers, it is hard to determine whether this law applies because, in the Moroccan context, university staff are public sector employees. Moroccan university teachers and researchers have not the same status as employees in the private economic sector. As the Moroccan public university is not yet fully independent 'enterprises', further legislation is needed to provide for its researchers.

More recently, the role of the universities in increasing valorization of research results has been reconsidered. The recent National Strategy, issued by the Ministry of Higher Education, encourages universities to carry out research and development for the benefit of companies, especially small and medium-sized enterprises, in order to help them achieve innovation-based development.<sup>7</sup> The Strategy mainly calls for the building of a national system of research and innovation (SNRI) that would be equipped with the necessary capabilities to generate valuable research results, transform these into inventions or other intellectual works through R&D processes. The system also aims to valorize these inventions and intellectual works in innovations by incubation projects and innovating companies.<sup>8</sup> This implies that the relationship between university scientific research and the industrial sector is still at a phase of launching new strategic plans and programs. The situation is further worsened by the “absence of tax incentives for Moroccan companies to conduct R&D and innovation” which consequently means that “a long way is needed to move towards a knowledge-based economy”.<sup>9</sup>

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<sup>5</sup> Saïd Aghrib, Noufissa El-Moujaddidi and Abdelmalek El-Ouazzani, *ACA2K Country Report, Morocco* (African Copyright and Access to Knowledge Project 2009) 17 <<http://www.aca2k.org/attachments/ACA2K%20Morocco%20C.R.pdf>> accessed 28 April 2018.

<sup>6</sup> Law 31-05, amending Law 17-97 on the Protection of Industrial Property, promulgated by Dahir 1-05-190 of 14 February 2006, BO 5400/316; Law 23-13, amending Law 17-97 on the Protection

of Industrial Property, promulgated by Dahir n°1.14.188 of 21 November 2014, BO 6358/2885.

<sup>7</sup> Ministère de l'Enseignement Supérieur, *Stratégie nationale pour le développement de la recherche scientifique à l'horizon 2025*, 15.

<sup>8</sup> *ibid* 16.

<sup>9</sup> Conseil Supérieur de l'Éducation [4] 49.

Repositioning Moroccan universities within IP legislation and empowering their role within the economic sector pose indeed a challenge. Facilitating innovation and promoting patentability among researchers and academicians will certainly empower them to publish their works in digital form and to protect them from the new forms of digital infringement.

## 2.2. Protection of digital works in Morocco

Morocco has substantially developed the area of IP legislation, which is consistently updated to reflect most international conventions and treaties in copyright and related rights (since 1916), including the TRIPS Agreement, the WIPO Performances and Phonograms Treaty (WPPT, 1996) which Morocco acceded to in April 2011, and the WIPO Copyright Treaty (WCT, 1996), which Morocco signed in July 2011. The WCT, which deals with ‘the protection of works and the rights of their authors in the digital environment’, also provides legislation on some other subject matters to be protected by copyright: ‘computer programs, whatever the mode or form of their expression’ (Article 4), and ‘compilations of data (databases)’ (Article 5). The WPPT and WCT, known as the ‘Internet Treaties’, were designed to face the new challenges posed by the digital environment that began to influence the Copyright concept in the mid-1990s.

Authors’ rights in Morocco are also governed by most of the other international agreements such as the Berne Convention for the Protection of Literary and Artistic Works (1888), and its subsequent Acts. The country is also a signatory of the Anti-Counterfeiting Trade Agreement (ACTA), signed in Tokyo in 2011, designed to provide for more effective anti-counterfeiting measures on a global scale and to develop international standards and enforcement procedures of IP legislation especially in the digital environment. In 2013, Morocco hosted and signed (in 2014) the Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually

Impaired or Otherwise Print Disabled (Marrakesh VIP Treaty), which also includes provisions for the access of the ‘blind and visually impaired or otherwise print disabled’ to digital materials.

This long tradition in IP legislation was nationally commemorated by the IP week in Casablanca (13-18 May 2016) to mark the centenary of the first law on Industrial Property in 1916. Moroccan involvement in most of the treaties concerned with IP protection, on the one hand, and the significant legislative corpus that it has developed, on the other hand, attest to the importance that this country confers on the matter. Both facts have certainly been decisive tools in promoting innovation and facilitating Moroccan immersion in global economic networks. From a benchmarking perspective, Morocco has attained a good position among developing countries.

At the institutional level, two national bodies are concerned with the management and protection of intellectual and industrial property in Morocco: the Moroccan Copyright Office, known as BMDA (Bureau Marocain du Droit d’Auteur) and the Moroccan Office of Industrial and Commercial Property, known as OMPIC (Office Marocain de la Propriété Industrielle et Commerciale). The BMDA was created in 1965 as a replacement for the two former offices created during the colonial period.<sup>10</sup> The fact that this institution works under the Ministry of Culture and Communication is a very positive point, as it places this Moroccan CMO, the BMDA, at the heart of the communication hub. Yet, the project of transforming the Moroccan Copyright Office (BMDA) into a public autonomous institution might very well be a better solution as it will put it above the possible pressures and influences of organizational or political lobbying.

## 2.3. The rise of new digital materials

It goes without saying that information technologies have revolutionized not only education but the techniques of

<sup>10</sup> The two colonial-era offices were the ‘Bureau africain des droits d’auteurs’ and the ‘Bureau africain des gens de lettres et auteurs de conférences’, both created in 1943.

scientific research themselves. While these technologies have provided researchers with access to unprecedented amounts and systems of digital material, multimedia and information, they have exposed the results of their works to challenging modes of exploitation and use. Even the notion of authorship is under significant transformations with the unprecedented possibilities given to users and learners side by side with authors and creators, to the extent that the traditional division between them are more and more flimsy. Richard Hooper is right to observe that, in the analog world, “users and creators were two different species”, while “in the digital world those species have blended – users are creators and creators are users”.<sup>11</sup> In such a digital context, machine learning, for instance, involves using and analyzing data sets that may include in some cases material protected by copyright. So there should be sensible limitations as these “non-expressive and intermediate uses of copyrighted works cause no harm to the market for copyrighted works”.<sup>12</sup> This is rather a good example of “how well-designed limitations on copyright can and should help spur economic growth, competition and innovation.”<sup>13</sup>

In their efforts to profit from the growing scope of the digital economy, more particularly for the development of electronic commerce, some institutions of higher education have already established their own structures to be in tune with the rising demands of this digital hub. These include the National Institute of Post and Telecommunications, the International University of Rabat and its future Digital University, Ibn Zohr University in Agadir with its Moroccan Virtual Campus (known as CVM), higher Business Schools, in addition to the National Centre of Scientific and Technical Research (CNRST).<sup>14</sup>

Moreover, most of the Moroccan universities have now developed a digital campus that facilitates eLearning.

This proliferation of digital learning and the possibilities of connecting academia to industry are posing new challenges at the level of IP protection and management. Indeed, one of the reasons that pushed the Moroccan legislator to amend the 2000 law was the rise of some digital and internet issues at the beginning of the millennium. Though the amendments made to the 2000 law were mainly on the extension of the term of protection (70 years instead of 50), the electronic forms of certain objects of protection were also stressed. This is the reason why the clause “including the temporary storage in electronic form” is repeated in the amending law in Articles 10 (a), 50 (d), and 51 (a); the clause “electronic rights management information” comes to amend Article 65 (h); and the clause on an “e-mail and the electronic signature” is twice mentioned to amend and complete Article 65 (65.13 (6) and 65-14 (B.6)).

Moroccan academia is now producing copyrightable digital works in the form of literary and scientific works, including novels, theatre plays, illustrations, scientific papers and reports. Both national legislation and international treaties to which Morocco is a signatory (the TRIPS Agreement and the WCT, in particular) provide for the protection of computer programs and compilations of databases.<sup>15</sup> Yet, issues of authorship of certain computer outputs (whether in source code or in machine readable forms) need to be clearly defined, and their copyright ownership need to be assigned as an IP asset to professors-researchers, or to the university to which they belong, or to both of them. In addition, a plethora of other digital materials have emerged such as online applications (Apps), creative dynamic websites (either

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<sup>11</sup> Richard Hooper, ‘UK’s Copyright Hub: a license to create’ (2016) *WIPO Magazine* 2, 32.

<sup>12</sup> Fred Von Lohmann, ‘Google on what is driving creativity and innovation in the digital economy’ (2016) *WIPO Magazine* 2, 28.

<sup>13</sup> *Ibid.*

<sup>14</sup> Alain Ducass and Jean-Marc Kwadjane, *Le Commerce électronique en Afrique Maroc, Tunisie, Sénégal et Côte d’Ivoire. Recommandations pour l’intégration régionale en Méditerranée*. Institut de Prospective Economique du Monde Méditerranéen

(IPEMED), 2005, 34. <[http://www.ipemed.coop/adminlpemed/media/fich\\_article/1460888627\\_ipemed-commercen-en-afriquebd.pdf](http://www.ipemed.coop/adminlpemed/media/fich_article/1460888627_ipemed-commercen-en-afriquebd.pdf)> accessed 2 April 2018.

<sup>15</sup> Moroccan copyright Law n° 2.00 and its amendments provide for computer programs and compilations of data in Articles 3 (b), 5 (b), 10 (d), 12 (c,d), 16, and 21. TRIPS Agreement provides for them in Article 10, and WCT in Articles 4 and 5 respectively.

protected by password or not), and tutorials. At the level of teaching, a number of pedagogical methods and tutorials, in the form of machine learning, online courses and MOOCs, and Moodle platforms courses and media have also come to diversify the pedagogical activities of academia. Added to this, a set of modes and practices have arisen with the technical advancements in ICT, mainly having to do with downloading, uploading, and transforming copyrighted or copyrightable material. These new ‘derivative’ and ‘transformative’ works also need to be addressed in clearer legislative provisions that would meet the requirements and particularities of the Moroccan academic contexts.

#### 2.4. The need to update national legislation

Morocco has recently reinforced its legal framework with adequate legislation in the field of commercial and industrial property, but it needs more efficient and up-to-date legislation on digital copyright protection in the field of academic scientific research. There is a pressing need to adopt additional provisions to address digital matters in harmony with more recent international rules and standards. Providing new legislation to complement existing Moroccan law, and the setting of African frameworks in this sense, all in harmony with international legislation, will certainly fill the existing gaps in the national legislation on the management of digital copyright works on scientific research and higher education.

As a case in point, the Moroccan law on industrial property (17-79/2004) regulates the relation between the patent inventor and the institution to which they belong. However, the relevant provisions in Articles 18 and sub. can be more applied to the case where the patent inventor is an employee of a particular business; when it comes to the university researcher, this law cannot apply because, in this case, the inventor is at the same time an employee of the public sector and a functionary of the

university, which has not yet acquired all its financial independence and entrepreneurial autonomy. The possible solution, in this case, would be to provide special legislation that would ‘calculate’ the possible share of each (the university and the researcher) in the patent assignment or licensing revenue etc. A reconsideration of the way university patents are managed is also to be provided for.

New provisions on the rising digital issues will have to guarantee a possible reconciliation and more fluid connection between academia and the socio-economic sectors. In a rapidly-evolving digitized world, Morocco is called to adopt additional national legislation in digital matters in harmony with the international laws and conventions. For instance, according to the PCT Applicant’s Guide – International Phase – Annex B1, the Moroccan Copyright Office has not yet “accept[ed] the filing of documents by means of telecommunication” and has not yet “accept[ed] evidence of mailing a document, in case of loss or delay, where a delivery service other than the postal authorities is used”;<sup>16</sup> these are provisions pending to conform to PCT Rules 92.4 and 82.1 of the Regulations under the Patent Cooperation Treaty (as in force from July 1, 2017).<sup>17</sup>

What this country needs more urgently is a national updated legislative framework that is equivalent to the WCT in order to be in tune with more recent international legislation in matters of digital copyright, especially at the level of scientific research and academic production. Such legislation should, however, make provision for more extensive exceptions and limitations for the sake of research and innovation, especially in an emerging country like Morocco. A focus should be on striking a balance between the free and fluid circulation of academic knowledge and scientific findings, on one hand, and the protection of IP rightsholders, on the other hand. This balance between “the effective protection of the

<sup>16</sup> WIPO, *PCT Applicant’s Guide – International Phase – Annex B1* (2017) <[www.wipo.int/pct/guide/en/gdvol1/annexes/annexb1/ax\\_b\\_ma.pdf](http://www.wipo.int/pct/guide/en/gdvol1/annexes/annexb1/ax_b_ma.pdf)> accessed 3 June 2017.

<sup>17</sup> WIPO, ‘Regulations under the Patent Cooperation Treaty’ (2017) <[http://www.wipo.int/export/sites/www/pct/en/texts/pdf/pct\\_regs.pdf](http://www.wipo.int/export/sites/www/pct/en/texts/pdf/pct_regs.pdf)> accessed 3 June 2017.

rights of authors and the larger public interest, particularly education, research and access to information”<sup>18</sup> is also one of the main concerns of the Marrakesh VIP Treaty, which insists, among other things, on the “effective and timely access to works for the benefit of persons with visual impairments or with other print disabilities” as stated in the Marrakesh VIP Treaty.<sup>19</sup>

### **3. MEASURES IN THE MOROCCAN CONTEXT**

While urgent measures are to be given priority by Moroccan legislators, more particularly to catch up with the international legislation in the new digital environment, it is important to decide on a number of points of debate at the national level. Questions of who owns what, of the impact of digital globalization on university scientific research, and of the relation between academia and industry are to be decided and to be provided for with adequate legislation in the context of scientific research and higher education.

#### **3.1. The debate over ownership**

Teachers and researchers produce a set of copyrightable works that fall within the existing legislation on IP. A large part of this corpus is produced within the framework of scientific research subsidies that are allocated to research groups, labs and centers in the different Moroccan universities. The question raised here is about who owns the rights of scientific results and digital programs produced in this context: is it the researcher/teacher, the university, or both? This question should be clearly settled for the sake of a stronger protection of these works and their rights holders. Similar to this point is the question of fair use that should prevail in the academic context and the hitherto hardly-sought balance between the rights of researchers as copyright owners, and the requirements of economic and intellectual development of the country.

A particular point of debate has to do with the impact of globalization on the rights of authors and creators and

university researchers in Morocco, especially in the absence or lack of the necessary tools to make them competitive at the international level. The same thing can be said about the access of these researcher to the patenting process. In many cases, they find it difficult, if not impossible, to patent and thus protect their inventions because of difficulties, including the high cost of applying for a patent and, at times, complicated patenting procedures, while their peers in the developed world cherish more simplified modes of protecting their inventions thanks to the fluid legislation and to the technical and financial support provided by their universities.

Another point of debate is whether the university should be subordinated to economic and commercial demands or not. Some argue that if so, fundamental scientific research will be negatively affected and even undervalued as it has no direct impact on immediate patent filings and that, consequently, national applied scientific research will be subservient to global economic networks and agendas. This is, indeed, both a universal and a national debate, namely whether Universities should stick to their traditional tasks and roles or reinforce their position in industrial fields for the sake of more participation in the economic and intellectual development of the country.

This is, indeed, part of the present debate among academicians over the implications of industry-sustained scientific research, with the risk of putting scientific research at the service of the economic sector. Advocates of the reticent attitude argue that Morocco is bound by a number of agreements with international monetary funds and that any strategy of academic scientific research involving the relation of business and industry may affect the independence of academia at the level of applied scientific research. In the absence of more sensitizing campaigns on the vital role of academic scientific research

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<sup>18</sup> Preamble to Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired, or Otherwise Print Disabled.

<sup>19</sup> *ibid.*



in the development and promotion national economy, such fears will prevail.

The debate over this point should not be given much more importance than it deserves since digital developments have revolutionized even the relation between academia and the economic sectors. Universities in developed countries have already found ways to regulate this relationship. A case in point, in this regard, is the Lambert Toolkit “for universities and companies that wish to undertake collaborative research projects with each other.”<sup>20</sup> This British resource, which is widely used in Europe, proposes ways of negotiating industry-sponsored research and choices of possible agreements for both parties. Though Moroccan Universities have not yet reached the necessary degree of networking and collaboration with the industrial sector, compared to universities in developed countries, the new version (2016) of the Lambert toolkit, or a similar resource, could be of some help in the Moroccan context, especially at the technical and financial levels. It is up to the Moroccan decision-makers to opt for the most suitable agreement, among the different choices proposed by this toolkit, to help facilitate more collaborative networking and more fluid connectivity between academic research and industrial companies in the present Moroccan context.

### 3.2. Deciding on the new copyrightable digital material in academia

Higher education and academic scientific research in Morocco are faced, more than ever, with the challenges that have emerged with the revolutionizing developments in digital technologies. Most Moroccan universities are now using Moodle platforms for eLearning programs to face the growing number of students and to profit from the pedagogical possibilities offered by these technologies. The wide access to

information and communication technologies (ICTs) and the extensive use of digital resources and applications, such as MOOCs, in particular, are posing new questions and issues for copyright. Due to the proliferation of the digital economy, these new questions and cases, such as big data, data protection, cloud computing, governance of the internet in an academic context, etc. arise. These emerging issues must be addressed on an urgent and regular basis at the legislative level.

It is necessary to decide, in more detail, on new copyrightable and other digital issues at the levels of scientific research and higher education. *Shloss v. Estate of James Joyce*<sup>21</sup> is a famous example of how new and unpredictable digital practices and the unlimited possibilities they offer can affect even long-standing and well-established legislation. The case resulted in admitting Shloss’s right to use James Joyce’s published and unpublished works for critical purposes and to host them in a scholarly website despite the opposition of the author’s estate on copyright grounds. It has become a significant example of how fair use in education should be a right to be reconsidered at the legislative level in the light of the limitations that should be extended to academia with regard to the new digital environment. David Olson, supervising attorney on the case, commented: “It’s time that academics’ fair use of quotations from James Joyce in their scholarship become a practical right, not just a theoretical right that can only be claimed by those able to spend hundreds of thousands of dollars defending a lawsuit.”<sup>22</sup>

Another example has to do with the close relationship between scientific research and teaching activities, especially at the postgraduate levels. In Master programs, most of the teaching syllabi are closely related to scientific research findings. In this context, any eLearning process entails the use of scientific research works,

<sup>20</sup> ‘Master the details to effectively manage industry-sponsored research negotiations’ (2017) *ISRM* 1 (9) <<https://techtransfercentral.com/reprints/isrm/1217-industry-sponsored-research-negotiations/>> accessed 5 June 2018

<sup>21</sup> Shaheen E. Lakhan and Meenakshi K. Khurana, ‘Intellectual property, copyright, and fair use in education’ (2008) *JAL* 6(4) 9-10.

<sup>22</sup> Stanford Law School, ‘Shloss v. the Estate of James Joyce’. 12 June 2006 <<https://law.stanford.edu/press/shloss-v-the-estate-of-james-joyce/>> accessed 17 May 2018.



especially in their digital forms. Being encouraged to work in an environment of sharing/shared knowledge, any student may use their scanner or cellphone to scan a copyrighted work and share it among their peers by uploading it on the net. Hence, the necessity to address these practices in provisions on copyright related to the acts of 'downloading' and 'uploading' for scientific research and teaching activities. In the absence of clear national provisions on such issues, on one hand, and a lack of adequate enforcement of the existing legislation, on the other hand, the rights of authors, researchers and academics are infringed on a daily basis. The question of who has the right to upload a particular scientific work (the teacher/researcher, the student, or both?) is one of the issues that should be addressed. The hazy limits between fair use and unfair copying, rights and limitations, plagiarism and self-quoting, are further blurred by the lack of a copyright culture among some academic users themselves. Hence, these multiple perspectives underscore the necessity to act and address these issues.

These are important issues that are facing the whole world, and legislative reform has to be in pace with the ever-changing modes of eLearning, machine learning, ULearning, etc. Fred Von Lohmann argues that online techniques and applications of machine learning are services that are "compelling in their own right" and that "the value of that which has not yet been invented always exceeds the value of everything invented so far."<sup>23</sup> He even affirms that machine learning "may well be a key component of the next leap forward in innovation and economic growth."<sup>24</sup> In this regard, one of the important points of national debate in Morocco is the use of protected material in eLearning modes. Some advocate the necessity "to extend the limitations and exceptions relating to education and teaching for these new modes of learning."<sup>25</sup> This is one of the ways in which academia

can take advantage from the new digital techniques while protecting the rights of inventors and authors.

Other aspects that should be addressed in adequate legislation in Morocco include transformative works based on protected works of university teachers and researchers, copyright vesting in PhD theses, which can be publicized with or without the supervisor's consent, or the researcher's, and the making of a private copy in the context of the digital university.

### **3.3. Empowering the Moroccan CMOs: BMDA and OMPIC**

Though Morocco has considerable achievements at the legislative level, there are still to be made before reaching a more adequate, efficient management of rights. Granted, there are efforts to improve the collective management of rights (CMR) both at the institutional and the procedural levels, and BMDA and OMPIC are at the center of these efforts. However, the issues posed by the digital environment related to academia are not yet given due importance. IT Service and Information Systems, the only service that pertains to the digital management of rights in the Moroccan Copyright Office is unfortunately a minor subdivision of another branch, the Department of Perception and of Exploitation of the Repertoire. This position should be reviewed to be in line with the present legislative reforms on the nature and scope of copyrightable works. This scope should be reviewed to exceed the domain of musical and artistic works, which presently seems to be the main focus of the Moroccan Copyright Office activities.

What is needed, on the part of BMDA, is a more active approach that would promote and encourage creativity and innovation, instead of the present approach that is acting as post-fact actions mainly limited to licensing and the collection of royalties. To reach this phase, Morocco's IP offices, BMDA and OMPIC, should be empowered with both adequate legislation and efficient technology as regards the protection of academic works and the

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<sup>23</sup> Lohmann [11] 28.

<sup>24</sup> *ibid.*

<sup>25</sup> Aghrib et al [5] 17.

products of scientific research. This will undoubtedly help universities, academies, and research centers to secure and benefit from the results of their research. One of the main issues to address is making the collective management of digital copyright works more efficient, especially now that the advancement in digital and cyber technology is much faster than ever.

At the technical level, in addition to the improvements that are required at the hardware level, more technological know-how is needed to address the challenges posed to scientific research and academic knowledge by Big Data and open source digitized material. As a case in point, data mining algorithms are used to acquire knowledge and up to date information on the most recent scientific research findings; they can also be applied to Big Data. The efficient role of artificial intelligence applications and data analytics in analyzing large amounts of IP information is undeniable. Moroccan copyright offices are called on to take advantage of the different uses and applications that are proposed by these and other algorithms. The new applications related to data mining analytics are all susceptible to revolutionize the legal framework of IP and the management of its rights.<sup>26</sup>

The digital race is probably felt in the domain of IP more than in any other sector (after the military sector). The enhanced management of rights has resulted in an increase in profits from the new possibilities offered by the latest digital technologies. The legislature is trying to regulate these developments as those that infringe and circumvent are profiting from the same developments. In Morocco, it is now difficult to give a precise detailed account of the statistics and nature of piracy and plagiarism because of the possibilities offered by computer techniques to falsify, hack and plagiarise works.

Hence, the necessity of more sophisticated information technologies and programs to protect the different works of academia and the production of university scientific research.

In spite of efforts to fight against piracy and counterfeiting, such as the creation of special commissions on combatting these phenomena, the National Copyright Office (BMDA), the OMPIC, the Ministry of Communication, and the Ministry of Higher Education and Scientific Research<sup>27</sup> have not yet elaborated a clear strategy to fight against the new digital forms of copyright infringement in the fields of university scientific research and academic production. The focus on the fight against piracy in this field is justified by the drastic effects that this phenomenon leaves both on the researchers' economic and moral rights and on the quality and reputation of their works. Some of the possible repercussions of plagiarism and piracy on the academic level can be summarized in, first, the loss of efforts in legal actions and opposition procedures instead of focusing on the production of knowledge and scientific research per se and, second, in the disappointment of researchers and academicians, a fact which will discourage them from producing more academic and scientific works as there is little or no guarantee that their works will be recognized and protected.

The protection of younger researchers' works, especially in the form of PhD theses, should be provided for with utmost urgency. In its assessment of the doctoral cycle in Morocco, the Higher Council for Education, Training and Scientific Research notes in its 2017 Assessment Report that most leaders of the Centers for Doctoral Studies (CED) are attracting attention to the amount of plagiarism that is plaguing the scientific community: "Very few CEDs provide anti-plagiarism control once the thesis is

<sup>26</sup> On the possible uses of data mining analytics in the field of IP, cf. Jacob Arber, 'Machine Learning and Intellectual Property,' (2016) *CSTLR* April 10. <<http://stlr.org/2016/04/10/machine-learning-and-intellectual-property/>> accessed 2 June 2018 and Leonidas Aristodemou and Frank Tietze, 'A Literature Review on the state-of-the-art on Intellectual Property Analytics (IPA)' (November 2017) 2 *CTM*.

<[https://www.repository.cam.ac.uk/bitstream/handle/1810/268007/17\\_02\\_Aristodemou\\_et\\_al.pdf?sequence=6](https://www.repository.cam.ac.uk/bitstream/handle/1810/268007/17_02_Aristodemou_et_al.pdf?sequence=6)> accessed 2 June 2018.

<sup>27</sup> Since 2016 this Ministry has become part of the Ministry of National Education, Professional Training, Higher Education and Scientific Research.

submitted for defense. This task, which is so complex, demanding and cumbersome, is tacitly assigned to the rapporteurs of the thesis, because of the lack of software and of competent specialists to perform this task”.<sup>28</sup> However, instead of addressing the legislative side of this complex situation, this Assessment Report – emanating from a national advisory council on the matter – simply gives technical response by suggesting the two (commercial and free) categories of plagiarism checkers and anti-plagiarism online services that are available. In its efforts to secure more protection and a better management of Doctoral theses, the Moroccan Institute of Scientific and Technical Information (IMIST) has, on its part, launched an ambitious website (otrohati.imist.ma) that would be a watchtower of all Moroccan PhD theses registered and defended in Moroccan universities. Access to this website is, however, ‘temporarily unavailable’ to this date. In the absence of efficient coordination between the Moroccan Copyright Office and the concerned academic decision-makers, the management of IP in the Moroccan university will still suffer from the new forms of piracy and copyright infringement.

#### **3.4. A CMO for Moroccan academics and university researchers**

University researchers and academicians should be empowered with the necessary legislative and institutional tools to reach higher standards of competitiveness both at intellectual and economic levels. The aim is to enable them to make their research results more profitable and to provide effective protection both nationally and internationally and to create the adequate climate for the dissemination of their publications, patents, and innovative and creative works. One of the problems with Moroccan scientific research is the scarcity of ties between applied scientific research made in Moroccan universities and the business and economic sectors and “the difficulty of reaching the industrial stage of the products of research.”<sup>29</sup> Many reasons contribute

to this deficiency, but the absence of a clear national strategy on the issue seems to be the most prominent factor.

One of the possible solutions would be to endow university researchers and academicians with a specific collective management organization (CMO) that would act as the sole representative for all academicians and manage all matters of university IP and would, at the same time, act as a counselling body that helps link these researchers to the industrial sector. This will reinforce the two Moroccan existing offices, OMPIC and BMDA and will further act as the equivalent of what is known in some American and European universities as the ‘Technology Transfer Office’. This can play an important role in familiarizing university teachers and researchers with the related legal issues of copyright and, more particularly, in reducing and simplifying for them the procedures of drafting and filing patents. Among the suggestions related to these procedures, there is the creation of a patent service in each university, the rewarding of researchers who excel in patenting and inventive activities, and the payment of patent fees by the university according to clearly defined standards benefitting both the researcher and the university.

In the absence of this CMO, some universities, such as Mohamed V University and the International University of Rabat, created their own ‘Valorization Structures’, mainly designed to help protect and disseminate the results of scientific research, especially patents and inventions, and to promote the culture of IP among university researchers, students, and personnel. The aim, according to them, is to “gain a certain visibility at the national and international levels, attract and secure academic and industrial partnerships, and to ensure a return on investment by creating wealth and added value”.<sup>30</sup> In addition to a national CMO for university researchers and academicians, every university should have its own CMO, which would be concerned with the follow-up of all IP

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<sup>28</sup> Conseil Supérieur de l’Éducation [4] 23-24.

<sup>29</sup> Rolshausen [2] 5.

<sup>30</sup> International University of Rabat, ‘Valorisation Et Transfert’ <WWW.UIR.AC.MA/Valorisation-Et-Transfert> Accessed 27 May 2018.

issues of the university and the transfer and marketing of research results in socio-economic areas.

In this digital environment, both national copyright offices and university decision makers are called to leverage the up-to-date technologies for their effective use in the management of rights in academia, which is the space par excellence of knowledge and information. Considerable research is being done on decision-aid systems in the field of information management. Bibliometrics, as a case in point, is an invaluable research tool that would help profile and classify university researchers and teachers with their copyrightable works and creations. The new technical devices should also be adopted as necessary tools in the management of rights and in the protection against all forms of infringement.

#### 4. RECOMMENDATIONS FOR POLICYMAKERS AND RESEARCHERS IN MOROCCO

In the process of reviewing legislation, the TRIPS Agreement can be a good example of how legislation should rather not be “envisage an entirely static legal instrument” since its negotiators “included several provisions within the Agreement that set out a work programme for the future – the so-called “built-in agenda””.<sup>31</sup> Within the review process of Moroccan legislation on matters of digital copyright and the related rights issues, the guiding spirit is rather to be one of positive exceptions that would prevail over provisions narrowing the scope of free access to knowledge and scientific creativity. Both present and future developments should be considered, especially that technology is challenging legislation on a daily basis.

##### 4.1. More legislation and more sensitization

###### More legislation

Morocco is currently restructuring the bodies of the collective management of intellectual and industrial rights. A greater need is the codification of all laws and fragmented provisions related to IP into one

Mudawwana, an IP special code that would encompass all national IP legislation pertaining to academia, including new legislation relevant to the current changes brought about by digital technologies. There is a persistent need for more IP protection of academic and scientific research productions in the digital environment, but at the same time more limitations and exceptions are expected in favor of academia as regards the use of materials for teaching and scientific purposes. The spirit that is supposed to govern future provisions regarding academia should be more in favour of safe-harbor legislation as long as the aim is to facilitate research and the access to knowledge in this emerging country. Other possible solutions and choices should also be offered to university researchers in line with the digital changes and challenges; open-source platforms and resources, for instance, can at the same time satisfy the needs of students, teachers, and other researchers while a minimum of rights is retained by owners.

On private copying, academia-related exceptions are recommended. The adoption on 26 April 2013 of the 79-12 law completing the 02-00 law on copyright and related rights, was primarily meant to establish the legal provisions regulating the right to remuneration for private copying. This law aims to promote creativity and protect the interests of various stakeholders, and to repair the damage caused to authors and rightsholders due to increased forms of reproduction of works fixed on phonograms and on video for personal use. While this law focuses on the rights of singers, performers and artists, it does not stipulate clearly the rights of writers, researchers and all the authors of electronic publications. This law may also be criticised nationally because it may limit the individual’s right to make a personal copy of works in a digital format. Works in digital form fosters access to knowledge.

<sup>31</sup> Antony Taubman, Hannu Wager and Jayashree Watal (eds), *A Handbook on the WTO TRIPS Agreement* (Cambridge University Press, 2012) 196.

### **More sensitization**

In addition to the need to enact adequate legislation, there is a need for an enhanced IP culture and awareness amongst Moroccan academics: teachers, researchers, students, and university decision makers. While the IP system is increasingly efficient and protection mechanisms are there to defend these rights, enforcement is slower due to a lack of familiarity with IP law. In addition to the main issues of copyright, teachers and researchers are to be sensitised about the close relation between IP and innovation, the importance of patents and clusters, and the potentials of university scientific research and academic production in profiting from IP services to protect, value, and promote and disseminate their works both at the national and international levels. Attention should be drawn to acceptable standards of citation to protect authors' paternity rights and to the revolution of big data. IP culture will certainly be an important preventive tool against the pitfalls of plagiarism and a helpful companion to foster respect, consideration, and recognition of copyright as a full legal property right. The challenge is not only to protect IP but also to protect students from plagiarism, which is the 'academic' form of IP infringement.

Both BMDA and OMPIC, the national institutions of intellectual and industrial property, can play great roles in raising awareness among academicians and encouraging them to profit from their IP rights as a strategic tool not only for IP protection but also for the promotion of creativity and innovation. These institutions can promote IP expertise amongst university scholars and researchers, and can also disseminate the culture of industrial property rights within Moroccan enterprises as well. The Moroccan Academy of Intellectual and Commercial Property, the AMAPIC,<sup>32</sup> can play a major role in this awareness raising by organizing campaigns for Moroccan universities. Universities should also include in their

syllabi the new challenges posed to IP teaching by the digital environment.

The role of NGOs in these campaigns is no less important. The Moroccan Coalition of Intellectual Property, as a case in point, was mainly created to provide both government institutions and the private sector with proposals and programs in matters of IP protection and management. Its scope of action, which is presently mainly focused on the cultural and artistic fields, should also include academia and target researchers and teachers as well.

The teaching of IP at Moroccan universities is mainly entrusted to the Faculties of Law. Some private institutions of higher education and business schools also give some courses on more business-related aspects of IP: patents, models, designs, trademarks etc. AMAPIC offers a more detailed program of teaching and training sessions. In fact, IP is now touching all fields of academic and scientific creativity; and all the components of academia are concerned, in one way or another, with IP issues. It is high time to generalise IP syllabi to all the other fields of learning and research. The introduction of a transversal, cross-disciplinary course on IP for all disciplines, with a focus on issues related to each academic/scientific field, will be a highly practical contribution in the dissemination of IP culture amongst students as future authors, artists and inventors. More focus will be on the respect of others' intellectual and moral rights since law enforcement has become very difficult in a digitally subverted and challenged academia. In the fields of science and technology, this special course on IP may focus on patents, industrial designs, the protection of integrated circuits, and trademark protection, while in the fields of human and social sciences the course may focus more on authors' rights, the public domain, copyright infringement, limitations, exceptions, the three-step test, etc. Needless to say that scholars in the branches of computer science and

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<sup>32</sup> Academie Marocaine de la Propriété Intellectuelle et Commerciale.

cybernetics need to acquire IP notions related to data analytics and new digital copyright issues.

#### 4.2. The role of WIPO and WTO

International IP organizations such as WIPO and the WTO can play an important role in backing the efforts made at the national level in the promotion of IP. In addition to the follow-up of all treaties and agreements, these institutions can facilitate and foster the introduction of new tools in the management of digital copyright in the academic context of developing countries like Morocco. This can be done, for instance, by training sessions conducted by the WIPO academy and the WTO, in collaboration with OMPIC and BMDA, for the benefit of teachers, researchers, academia personnel, and future patent examiners.

The Moroccan IP academy, AMAPIC, is bound with a series of partnerships with the WIPO Academy, and organises workshops in collaboration with different participants, including experts from OMPIC and university professors. Furthermore, following a Memorandum of Understanding between Morocco and WIPO, in November 2016, the Moroccan Copyright Office (BMDA) launched WIPOCOS<sup>33</sup>, a database for collective management organizations or societies, developed by WIPO. The latter is currently developing a new set of resources to support academic institutions in their use of intellectual property, the IP Toolkit for Academic Institutions – Connecting Academic Research with Economy and Society. This represents a “comprehensive set of documents and training support tools for those involved in drafting institutional IP policies, technology managers, and IP professionals engaged in asset management and knowledge transfer.”<sup>34</sup> Similar partnerships, databases and software, and toolkits are to be extended to academia.

#### 4.3. African Perspectives

In recent years, Moroccan foreign policy has reoriented its focus on African countries for the sake of fostering collaboration and exchange at the economic and cultural levels. It has re-joined the African Union Organisation and is part of the African Economic Community (1991). The Charter of this Community calls for the adoption of a common policy in scientific research (Article 6 (2) (e)) and invites its Member States to “harmonize their national policies on scientific and technological research’, “coordinate their programs in applied research’, “carry out a permanent exchange of information and documentation and establish community data networks and data banks”.<sup>35</sup> At the level of IP, the Charter stipulates clearly that any Member State “may impose or continue to impose restrictions or prohibitions affecting the protection of national treasures of artistic or archaeological value or the protection of industrial, commercial and intellectual property”.<sup>36</sup>

However, little is done on the part of Morocco at the level of IP cooperation with African countries. This country is neither a member of the African Regional Intellectual Property Organization (ARIPO) nor of the African Intellectual Property Organization (OAPI). This is not a normal situation in the age of clustering and global networking. Morocco is called on more than ever to opt for more south-south IP collaboration at the African level to promote cooperation and exchange with African countries in matters of copyright protection and more protected innovation in a globalized world. Joining these regional organizations will definitely help pool resources and contribute to African programs of development and research and development policies.

Systems of collaboration and coordination should also be established between African CMOs themselves to achieve their mutual interests and face common challenges. Once

<sup>33</sup> Software for Collective Management of Copyright and Related Rights.

<sup>34</sup> WIPO, ‘Upcoming IP Toolkit for Academic Institutions’ (2017) <<http://www.wipo.int/about->

[ip/en/universities\\_research/news/2017/news\\_0001.html](http://ip/en/universities_research/news/2017/news_0001.html)> accessed 25 March 2018.

<sup>35</sup> Article 51 (1) (a, c, and e) of the *Treaty Establishing the African Economic Community* 1991.

<sup>36</sup> *Ibid*, Article 35.

again, the roles of regional IP organizations, such as ARIPO and OAPI, and international ones, WIPO and the WTO in particular, are vital in this context. The aim is to capitalise on the new opportunities of African and regional free trade agreements, on the one hand, and more particularly, to harmonise national IP systems as regards the promotion and protection of scientific research and academic works and agree on African standards in the ways of managing IP rights in the digital academic context. One of the possible suggestions in this regard is the creation of an African IP structure similar to the British 'Copyright Hub', which emerged in Great Britain in the early 2010s as a reaction to "the immense difficulty of IP management in the digital age".<sup>37</sup>

The collaboration between African universities is further dictated by the fact that this continent abounds in rich traditions and folklores whose protection is at stake in this digital age. But the new digital environment can be turned into a positive tool to bring incremental change in the ways of managing and preserving these traditional cultures. As early as the mid-1970s, the Cultural Charter for Africa (1976) of the Organization of African Unity (now the African Union) called African governments to "develop the exchange of information, documentation and cultural material" by "strengthening the Association of African Universities" and by "university and specialists exchange".<sup>38</sup> Universities can play a prominent role in this regard as they can contribute in transforming these cultures into digitally accessed forms, which will have highly rewarding impacts both on academicians and on entrepreneurs: "The digital revolution will grant Africa's creative entrepreneurs a unique opportunity to translate Africa's folklore traditions into engaging, creatively packaged digital content which can be shared with millions of consumers around the world at the click of a button."<sup>39</sup>

The notion of territoriality is one of the issues to be reconsidered in the African context because of the common challenges the World Wide Web has posed to this concept, which must be reviewed in the national laws of African countries with the aim of greater harmonisation between these laws. Some measures proposed by the European Parliament on this matter can be highly inspiring in this context. Their approaches are "to foster cross-border online access and the portability of content across borders and to prohibit some specific territorial restrictions (for instance, the unjustified practice of geo-blocking).<sup>40</sup> The latter practice, which is very common among some African nations, takes the form of blocking all websites that bear the Internet country code top-level domain of a potential 'undesired' country. This may seriously affect the fluid exchange of academic and scientific research results and interests. On the contrary, common provisions should make of the current digital environment a golden occasion with undreamt-of possibilities for African researchers and academics to do research on common issues posed to Africans.

## 5. CONCLUSION

Certain provisions of Moroccan legislation on university scientific research and academic production need to be reviewed on a continuous basis to face the new digital issues posed by ever-changing technologies and to help academia engage in, and profit from the new forms of the digital economy. The rising challenges of piracy and IP infringement, on the one hand, and the need for a safer and fluid immersion of Moroccan academia into the global digital hub, on the other hand, are pressing factors for an urgent updating of some national laws. Nevertheless, more participatory approaches are to be followed in the processes of suggesting and drafting new laws, especially when it comes to elaborating provisions

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<sup>37</sup> Copyright Hub, 'History of the Copyright Hub' <<http://www.copyrighthub.org/about/history/>> accessed 14 June 2018.

<sup>38</sup> Article 31 (b) of the *Cultural Charter for Africa* (1976).

<sup>39</sup> George Twumasi, 'Building an African digital content industry' *WIPO Magazine* (2016) 2, 35.

<sup>40</sup> Tambiama Madiaga, 'EU copyright reform: Revisiting the principle of territoriality', European Parliamentary Research Service. September 2015, 1 <[http://www.europarl.europa.eu/RegData/etudes/BRIE/2015/568348/EPRS\\_BRI\(2015\)568348\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2015/568348/EPRS_BRI(2015)568348_EN.pdf)> accessed 12 May 2018.



pertaining to cyber activities and the digital environment. This is of necessity due to the growing particularity and complexity of these domains and the wide spectrum of the involved stakeholders and target groups. Also, one of the possible remedies is the codification of all the scattered and fragmented IP provisions related to university and scientific research into one legal code.

Raising more awareness on IP issues among Moroccan teachers, researchers, students, and academic decision-makers is a must in this context. A deeper understanding, on these parts, of IP issues both at the national and international levels will certainly help establish the ever sought-after balance between the rights of owners, on one hand, and the research and intellectual needs of academia in the new digital context, on the other hand. IP culture can be best disseminated in the academic and scientific sectors by the introduction of a special complementary course on the different aspects of IP in all disciplines. These pedagogical and provisional regulations can certainly be best implemented in collaboration with African countries. More practical African networking and collaboration are needed to cope with the new legal and technological issues posed by the digital environment to the countries of this Continent.

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