

Copyright regimes in the European Union. An analysis of the Directive about the harmonisation (2001) effectiveness

Noemí Pulido Pavón · Luis Palma
Martos · Diego V. Borrero Molina

From 06/21/2016 to 06/24/2016

Abstract Present paper is framed within copyright economics through the analysis about the effectiveness of the Directive on the harmonisation of certain aspects of copyright and related rights in the information society. Is the copyright protection uniform between the European Union countries? A cluster analysis has been applied in order to analyse the existence of different copyright regimes in the 28 member of the EU through variables related to copyright in 2013. According to empirical results three models of copyright protection exist in the European Union, these results encourage the debate about the no effectiveness of the Directive and consequently the creation of a Digital Single Market in which the copyright reform is a priority.

Keywords Copyright economics · Copyright · Directive on the harmonisation of certain aspects of copyright and related rights in the information society · Cluster analysis

Noemí Pulido Pavón
University of Seville
E-mail: npulido@us.es

Luis Palma Martos
University of Seville
E-mail: lpalma@us.es

Diego V. Borrero Molina
Pablo de Olavide University
E-mail: dvbormol@upo.es

1 Introduction

Copyright is the institution par excellence for the creative industries and aims to reward and encourage creativity, at time that this category of intellectual property represents one of the main sources of funding for the creative and cultural sectors. The analysis and implications of the copyright forms the basis of so-called "copyright economics" (Landes and Posner, 1989; Liebowitz, 1985; Plant, 1934; Posner, 2005; Varian, 2005; Watt, 2011).

The present paper is framed within this discipline, concretely on the approach that applies economic instruments to the analysis and design of efficient copyright regimes from a social welfare perspective (Towse *et al.*, 2011). The latter answers to the dispute, which has been developed in the last years, about the effectiveness of the Directive on the harmonisation of certain aspects of copyright and related rights in the information society (the Directive) and also about the reform of this category of intellectual property right (IPR) that European Commission, against the most of creators, is promoting with the aim of creating an European Digital Single Market ¹. Is there an uniform implementation of copyright in the different countries of the European Union (EU)?

Our paper focuses on the comparative study of the copyright implementation that each member country of the EU applies with the aim of characterizing and analyzing the different copyright regimes which can exist in this group of countries. In line with the goal pursued, the present work is structured as follows.

In section 2, the current debate about copyright in the EU will be exposed through the study of the role that copyright plays in the digital context and, consequently the challenges of the EU (from this perspective) in order to achieve a Digital Single Market.

The effectiveness of the Directive will be studied from an empirical framework in section 3. In this regard, we will apply a multivariate analysis, specifically a cluster analysis, in order to classify the member countries of the EU in accordance with the level of copyright protection for the year 2013.

Finally, we expose the main results and outline several final conclusions.

According to empirical results three models of copyright protection exist in the EU: (1) countries which implement a high intellectual protection and have low piracy rates; (2) countries with medium intellectual protection and piracy rates; (3) countries in which intellectual protection is low and piracy rates are high. It is necessary to highlight countries with the lowest piracy rate (cluster 1) have a greater wealth, investment on R&D and government expenditure on education and health with regard to countries of clusters 2 and 3.

¹ "A Digital Single Market is one in which the free movement of goods, persons, services and capital is ensured and where individuals and businesses can seamlessly access and exercise online activities under conditions of fair competition, and a high level of consumer and personal data protection, irrespective of their nationality or place of residence" COM(2015) 192 final, 3.

These results encourage the debate about the no effectiveness of the Directive and consequently the creation of an European Digital Single Market where the copyright reform is a priority.

In this sense, the main contribution of this paper is the analysis of the copyright implementation that each country in the EU applies and its classification within the different copyright regimes that we have determined.

2 Harmonisation of copyright in the EU

In the last few years a discussion on the effectiveness of the Directive on the harmonisation of certain aspects of copyright and related rights in the information society (2001) has been held.

The Directive was formulated in order to adapt the copyright laws to the technological progress, specifically to the emergence of digital environment, and jointly to harmonize certain aspects of copyright laws in the internal market. However, the current reality has little in common with the reality in which copyright laws entered into force.

For this reason, one of the proposed challenges by the European Parliament and the European Commission for some time is the modernization of legal framework of copyright with the aim of creating an European Digital Single Market.

In the following sections main problems involved in adapting copyright regimes to the digital era (section 2.1) and the challenges of the EU to solve it (section 2.2) will be exposed.

2.1 Copyright in the digital era

Based on the approach of Demsetz (1967)² digital technologies in Internet can be said to spark a paradox in the world of copyright (Michel, 2011; Peitz and Waelbroeck, 2011; WIPO, 2013). Internet allows the cost of creating, reproducing, and distributing to be slashed, thereby facilitating access to a wider range of creative goods and enhancing social welfare. Likewise, it enables performers and creators to reduce their dependence on intermediaries in such areas as the music and publishing companies, thereby achieving greater competitiveness. This is counterbalanced by the ever-growing unauthorised use of copyrighted works, which entails a greater cost in copyright protection.

The conclusion is that there is a relation between the growth of the Internet and piracy. Bomsel and Ranaivosson (2011) base said connection on network effects. In other words, new technologies increase the network effects and with this the possible unauthorised use of copyrighted material.

² This author states that *"if the main function of allocating property rights is to internalize the beneficial and harmful effects, then the appearance of property rights can be better understood due to their link with the appearance of new beneficial or harmful effects"* (Demsetz, 1967: 350).

In this context, associations of authors, performers, and writers as well as the music and film industry, and publishing companies are fighting to further copyright protection in the face of the threat posed by Internet and the digital world. At the other end of the scale, some users call for an end to IPR.

Faced with this new situation, intellectual property regimes need to be redefined. The context in which these have developed is not the same as was true for the industrial era. Internet has crafted a new philosophy of intellectual property. Listed below are the main consequences which, according to Garrote (2001: 10), digitisation has had on copyright:

1. Easy reproduction (in time and cost).
2. Easy distribution of reproductions.
3. High quality reproductions.
4. Equivalence of works in digital format, facilitating the convergence of works (literary, musical, audiovisual) as they are defined in the same means of transmission.
5. Malleability of works in digital format by users who need have only basic IT skills.
6. Ease with which copies may be distributed without this involving the transferring party having to release a copy.

The problems involved in adapting copyright regimes to the digital era have been pointed out. In this sense, many authors have voiced their views as to how such problems should be addressed. According to Garrote (2001: 67), these authors may be classed into three groups: neo-classicist, minimalist, and eclectic. Listed below are the main ideas each group expresses.

a) **Neo-classical**

Comprising mainly members of industry and US politicians, neo-classicists advocate toughening up copyright so as to prevent it being destroyed by the Internet. Under the doctrine of economic liberalism, neo-classicists feel that copyright not only encourages intellectual creation but that it also generates wealth. To achieve this, the market will efficiently handle the creation and destruction of intellectual production. Authors such as Gordon, Posner and Landes are followers of said doctrine, which influenced the 1996 WIPO Treaties (WIPO Copyright Treaty and the WIPO Performances and Phonograph Treaty) as well as the European Union (DASI³ and the Green Paper on Copyright in the knowledge economy⁴).

b) **Minimalist**

This stream of thought is deemed to comprise authors who react against

³ European Parliament and Council Directive 2001/29/CE of 22 May 2001 addressing the harmonisation of certain aspects of copyright and rights related to copyright in the information society seeks to harmonise member state regulations concerning copyright and related rights as well as implement a system to ensure respect for property rights, freedom of expression, and the general interest.

⁴ The Green Paper aims to respond to the role played by copyright in the knowledge economy. In this sense, it faces the challenge of merging strict copyright protection, aimed at encouraging creativity, and the dissemination of knowledge.

any toughening of copyright proposed by neo-classicists, as they feel that it restricts access to works. The most relevant mechanisms to emerge are copyleft⁵ and Creative Commons licences⁶. This approach encompasses alternative business models to copyright when the latter is not effective (Varian, 2005).

c) **Eclectics**

This group of authors express a range of ideas on the issue, yet concur on one point: they defend the essence of copyright but are aware that it needs to undergo certain changes if it is to adapt to technological progress. Within this stream, three positions may be highlighted. The first views copyright as part of the right to information. Copyright would only be one area of digital network law. A second stream of thought expresses its faith in the flexibility of copyright to adapt to the new digital reality. The principles on which intellectual property is based would therefore be valid. This is a purely European notion. The third stream holds that copyright is a tool of the state to bolster democracy, which is achieved by economic rewards, encouraging the creative force of a sector that remains independent from state subsidies, and fostering individual creativity which favours the expressive diversity of creators.

2.2 The challenge of the EU: the Digital Single Market

The launching of a public consultation about the review of copyright law in the EU has represented one of the main actions that European Commission has developed with the aim of adapting and harmonizing copyright law in the EU⁷. This consultation was in place from December of 2013 to March of 2014; guidelines can be divided into seven blocks:

1. Rights and the functioning of the Single Market
2. Limitations and exceptions in the Single Market
3. Private copying and reprography
4. Fair remuneration of authors and performers
5. Respect for rights
6. A single EU Copyright Title
7. Others issues raised in the responses

⁵ Copyleft licences are those which allow users to use, copy, change, and distribute a work freely as well as any modified versions thereof, under the sole condition that the same rights which protect the original work should be preserved in modified versions.

⁶ The role of Creative Commons licences vis--vis author and user is to mediate between the two, in the sense that they authorise all the exploitation rights held by the owner of the right. It is up to the author to authorise or not the commercial use as well as modification and transfer of the work, such that it entails creator control over their work

⁷ It should not be forgotten the Green Paper on Copyright in the Knowledge Economy (2008) and the Communication on Copyright in the Knowledge Economy (2009).

The importance of this consultation arises from the massive response it got, over 11.000 responses; which is a record in terms of history of consultations proposed by the Commission. This high participation reflects the importance of this issue for all European citizens. From all participants, which can be classified into nine groups ⁸, authors (24.8%) and consumers (58.7%) represented more than 73%; these groups are which have a wide range of opinion on the proposed questions of the consultation. Figure 1 shows the position that different groups have about one of the most controversial issues, the need (or not) to reform copyright law in the EU; while users and most institutions are in favour of reform, publishers are the main opponent and artists are in a more neutral position.

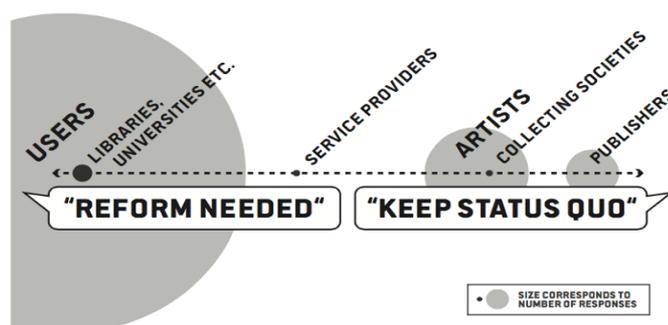


Fig. 1 Consultation about the reform of copyright. Responses by groups. Source: Reda, 2015

On the basis on the consultation, the Commission concluded that legislative framework for copyright in the EU had to be modernised. On the document entitled "A new start for Europe: My agenda for Jobs, Growth, Fairness and Democratic Change", Jean-Claude Juncker highlighted the importance and need to harmonize copyright, among others intellectual property rights, with the aim of achieving an European Digital Single Market. "To make better use of the opportunities offered by digital technologies, national silos in telecoms regulation, in copyright and data protection legislation, in the management of radio waves and in the application of competition law need to be broken down" (Juncker, 2014, 4).

In this regard, the Committee on Legal Affairs of the European Parliament has created a working group about intellectual property rights and the copyright reform ⁹. The most outstanding areas of this group is necessary to

⁸ (1) Users and consumers; (2) authors and performers; (3) institutional users; (4) publishers, producers and broadcasting companies; (5) service provides and y distributors; (6) collecting societies; (7) member states; (8) public authorities ; (9) others.

⁹ The working group about intellectual property rights and copyright reform is formed by seven members of the Committee on Legal Affairs and the Committee on Culture and

emphasize the Reda's Report ¹⁰(this is derived from the one of the members of the working groups surname, Julia Reda; she is a Germany MEP -Member of the European Parliament- of Piratenpartei and European Pirates) about copyright reform, which was published in January of 2015.

In her Report, Reda examines "whether a directive from a time before Facebook and YouTube is still sufficient in providing legal certainty to all people who create and exchange cultural works over the internet" (Reda, 2015). In accordance with Reda, Directive of 2001 has failed in its attempt to harmonise copyright from an European framework, she also ask for a common law on copyright which raises the harmonisation of copyright concept and its exceptions in the EU.

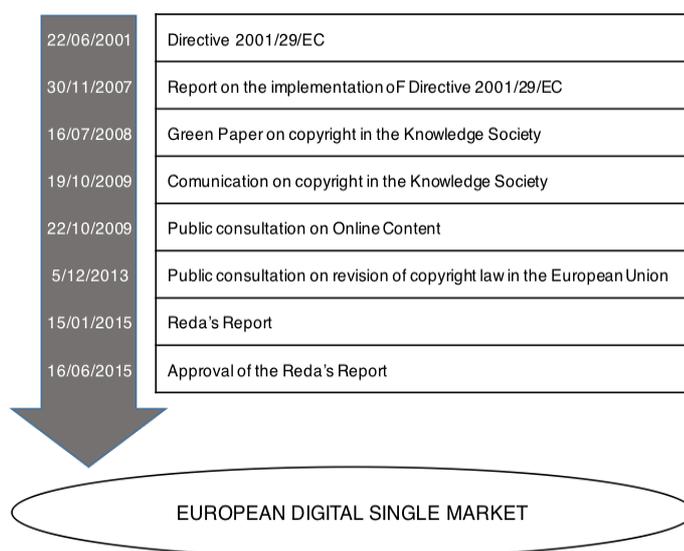


Fig. 2 Modernization of copyright: towards an European Digital Single Market. Source: Author's own

One of the main dispute of the Reda's Report is the option to change, or not, the principle of territoriality of copyright ¹¹; likewise, this Report raises the degree exceptions and limitations must extend to online environment and change.

Education, Internal Market and Consumer Protection and Industry, Research and Energy representatives.

¹⁰ Report on the implementation of Directive 2001/29/EC of the European Parliament and the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society.

¹¹ Regarding with this principle, rights are acquired and applied country by country.

Reactions of national and European lobbies did not wait, the goal of these was to prevent this Report succeeded. Creators of all sectors and countries have joined against the Report because of they think market realities are ignored for creators in the Report.

Finally, Reda's Report was passed by the Committee on Legal Affairs in July of 2015, after consulting the Committee on the Internal Market and the Consumer Protection and Committee on Industry, Research and Energy.

The road to the reform of copyright law is still in progress; figure 2 reflects actions related to copyright executed by the EU with the aim of creating an European Digital Single Market.

3 Copyright regimes in the EU. An application of cluster analysis

With the goal of studying the existence of different behavioural patterns for countries of the EU from a copyright framework, it will apply a multivariate analysis, specifically a cluster analysis.

In order to develop the cluster analysis, variables related to copyright will be used for countries of the EU during 2013.

Sequence of analysis is the following: first, study variables will be presented; secondly methodology will be exposed and finally it will expose results obtained.

3.1 Study variables

We use two variables: BSA and IPP. Table 1 provides a statistical description of the variables.

- BSA: The proportion of pirated software, published by the BSA (Business Software Alliance) each year.
- IPP: The level of IPR protection. This indicator is a part of the Global Competitiveness Index (GCI), developed by the World Economic Forum. It ranges from 1 to 7, where the highest score is evidence of a strongly enforced protection.

Table 1 Study variables. Statistical description

Variable	Obs	Mean	Std. Dev	Min	Max
IPP	28	4.575546	.964067	2.898753	6.24107
BSA	28	39.78571	13.59291	20	63

Source: Own calculation with data from World Economic Forum, and Business Software Alliance

3.2 Methodology

The analysis cluster to execute has the following features (see figure 3):

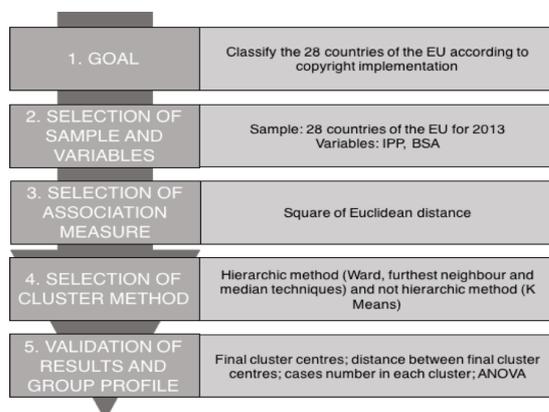


Fig. 3 Methodology of cluster analysis. Source: Author's own

a) Goal of the analysis

It consists of classifying the 28 countries of the EU according to copyright implementation and, consequently to study the existence (or not existence) of different regimes.

b) Selection of sample and variables

As it was said previously, we will work with IPP and BSA that each country of the EU reaches for 2013. Table 2 shows values of study variables for the members of the EU in 2013.

c) Selection of association measure

With the aim of developing a correct classification of the countries, it is necessary to determine the similarity (similarity measure) or divergence (distance measure) that could exists between them ¹².

In this case, because of the analysis will be developed by individuals or cases (we must remember the goal is to cluster countries into groups), dis-

¹² Similarity or proximity measures evaluate the level of similarity between two items so that, the highest (the lowest) the value of these measures, the highest (the lowest) the level of proximity between items and so, the highest (the lowest) the likelihood of classification methods to order (the items) into the same group. Dissimilarity or distance measures gauge the gap between two items so that, the highest (the lowest) the value of these measures, more (less) differences will be between the items and so, the lowest (the highest) the likelihood of classification methods to order (the items) into the same group.

Table 2 Study variables in the EU

Country	IPP	BSA	Country	IPP	BSA
1. Austria	5.4837	22	15. Italy	3.7247	47
2. Belgium	5.2434	24	16. Latvia	3.9565	53
3. Bulgaria	3.0431	63	17. Lithuania	3.7430	53
4. Croatia	3.5277	52	18. Luxembourg	5.9439	20
5. Cyprus	4.3814	47	19. Malta	4.8766	44
6. Czech Republic	3.8196	34	20. Netherlands	5.7477	25
7. Denmark	5.0111	23	21. Poland	3.6533	51
8. Estonia	4.8067	47	22. Portugal	4.4975	40
9. Finland	6.2411	24	23. Romania	2.8988	62
10. France	5.6791	36	24. Slovak Republic	3.7444	37
11. Germany	5.5551	24	25. Slovenia	4.1908	45
12. Greece	3.7001	62	26. Spain	3.9758	45
13. Hungary	3.8512	39	27. Sweden	5.5237	23
14. Ireland	5.4473	48	28. United Kingdom	5.8481	24

Source: Own calculation with data from World Economic Forum and Business Software Alliance

tance measures will be used¹³; in accordance with the features of study variables (these are continuous quantitative variables) we will apply the named "the square of Euclidean distance"¹⁴.

d) Selection of cluster method

The following step is to select the method to be used in order to form the groups.

Because of the existence of two techniques, namely hierarchic and not hierarchic methods¹⁵, both methods will be applied in parallel. This means that, first, hierarchic method will be used, which will offer a guidance on the optimal number of groups; second, based on the solution of the hierarchic method, not hierarchic method will be applied to fine results.

¹³ If it is a cluster analysis by variables, similarity measures must be selected; while, if it is a cluster analysis by cases, it must select distance measures. Nonetheless, every measures can be used in both cases from a technical perspective.

¹⁴ The square of Euclidean distance between two individuals $i, j = 1, \dots, n$, is: $d(x_i, x_j) = \sum_{c=1}^p (x_{ic} - x_{jc})^2$, where x_{ic} = value of variable x_c for i -th individual, $c = 1, \dots, p$.

¹⁵ Hierarchic method groups cluster to form a new cluster or to separate an existing cluster and create two clusters with the aim of maximizing or minimizing a similarity or distance measure respectively. The dendrogram or boosted tree is the main instrument. The not hierarchic method classifies individuals in K groups (which are known). This method selects a share of individuals in K groups and exchanges membership of clusters to have a bigger share.

While the Ward¹⁶, furthest neighbor¹⁷ and median clustering¹⁸ techniques will be selected for developing hierarchic method, not hierarchic method will be executed through k-means method¹⁹.

e) Validation of results and groups profile

Finally, four procedures will be used to confirm that the solution is representative of general population:

- Final cluster centres: these gauges if the averages of each cluster vary in each variable.
- Distance between final cluster centres: it explores if formed clusters have an enough distance between themselves.
- ANOVA: in this analysis the equality of averages of clusters is contrasted for study variables.
- Cases number in each cluster: it studies if there are a lot of clusters with small observations or if size of clusters varies greatly from cluster to cluster.

3.3 Results

Regarding with said methodology, first, we execute cluster analysis through hierarchic technique by applying the furthest neighbor, Ward and median clustering methods.

Dendrogram (figure 4) and cluster membership (table 3, column which corresponds to hierarchic technique) reflect the most relevant and representative results.

Dendrogram shows the cluster process which has been by applying the Ward method²⁰ and the square of Euclidean distance.

Whereas small distances suggest homogeneous clusters and big distances mean that clusters are heterogeneous, it is appropriate to stop joining process when horizontal lines are long.

So, if the process is stopped in distance 10, it would get two clusters; if distance 5 is selected, it would form three clusters; finally, four clusters would

¹⁶ Because of two clusters are linked variance increases, the Ward method links cases to minimize variance within each group, consequently this method provides more homogeneous groups. Following Kuiper and Fisher (1975), this method is closer to optimal classification than others methods.

¹⁷ This method groups the furthest cases. Once two cases are linked, the third cluster is formed by looking for the furthest distance between the three cases.

¹⁸ Median clustering technique gauges proximity between two groups through the distance between their centroids by applying the average of centroids of linked groups.

¹⁹ With the K-means method individuals are divided into a series of groups which has been randomly set.

²⁰ We have included dendrogram of the Ward method because of results obtained in this method are equal to results of the furthest neighbor and median clustering methods. Analysis of cluster membership reflects this.

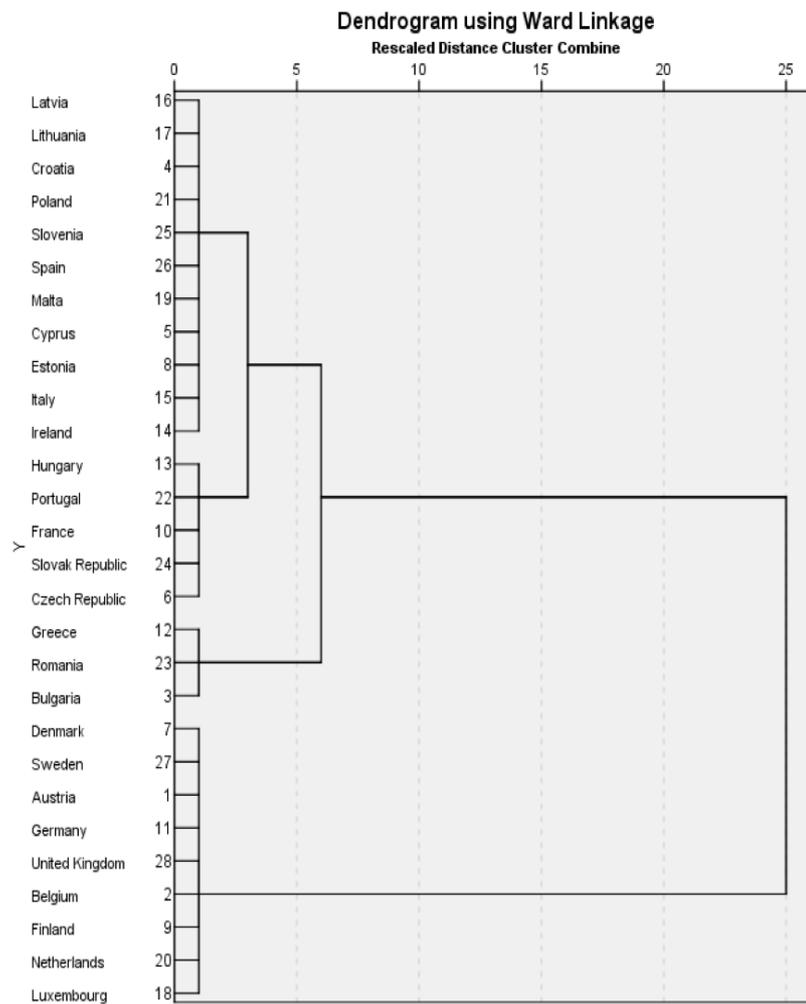


Fig. 4 Dendrogram. Source: Author's own

conform if we consider distance 2. According to dendrogram, selection of three clusters would be an optimal²¹ solution.

²¹ First, we are going to select three clusters. In successive steps of cluster analysis, we will study properties of these clusters and also gauge their robustness.

Table 3 (in columns which correspond to hierarchic technique) reflects cluster memberships of countries of the sample for the furthest neighbor, Ward and median clustering methods²².

Table 3 Cluster membership

Country	Hierarchic						Not hierarchic	
	The furthest neighbor		Ward		Median clustering		K-Means	
	3 Clusters	2 Clusters	3 Clusters	2 Clusters	3 Clusters	2 Clusters	3 Clusters	Distance
1:Austria	1	1	1	1	1	1	1	1.230
2:Belgium	1	1	1	1	1	1	1	.865
3:Bulgaria	2	2	2	2	2	2	2	6.445
4:Croatia	3	2	3	2	3	2	2	4.571
5:Cyprus	3	2	3	2	3	2	3	4.583
6:Czech Republic	3	2	3	2	3	2	3	8.438
7:Denmark	1	1	1	1	1	1	1	.650
8:Estonia	3	2	3	2	3	2	3	4.600
9:Finland	1	1	1	1	1	1	1	.994
10:France 6	3	2	3	2	3	2	3	6.540
11:Germany	1	1	1	1	1	1	1	.781
12:Greece	2	2	2	2	2	2	2	5.432
13:Hungary	3	2	3	2	3	2	3	3.463
14:Ireland	3	2	3	2	3	2	3	5.678
15:Italy	3	2	3	2	3	2	3	4.635
16:Latvia	3	2	3	2	3	2	2	3.600
17:Lithuania	3	2	3	2	3	2	2	3.579
18:Luxembourg	1	1	1	1	1	1	1	3.238
19:Malta	3	2	3	2	3	2	3	1.649
20:Netherlands	1	1	1	1	1	1	1	1.782
21:Poland	3	2	3	2	3	2	2	5.573
22:Portugal	3	2	3	2	3	2	3	2.418
23:Romania	2	2	2	2	2	2	2	5.462
24:Slovak Republic	3	2	3	2	3	2	3	5.458
25:Slovenia	3	2	3	2	3	2	3	2.593
26:Spain	3	2	3	2	3	2	3	2.621
27:Sweden	1	1	1	1	1	1	1	.243
28:United Kingdom	1	1	1	1	1	1	1	.810

Source: Author's own

As can be looked in table 3, composition provided by the furthest neighbor, Ward and median clustering is the same. Consequently, composition of clusters is the following:

- Cluster 1= 1, 2, 7, 9, 11, 18, 20, 27, 28
- Cluster 2=3, 12, 23
- Cluster 3=4, 5, 6, 8, 10, 13, 14, 15, 16, 17, 19, 21, 22, 24, 25, 26

These clusters have statistical features which are shown in table 4. This means that countries of cluster 1 implement a strong IPR protection and have low rates of piracy; members of cluster 2 have the lowest IPR protection and the highest rates of piracy. Finally, cluster 3 is characterized by medium values on IPR protection and piracy.

The not hierarchic analysis through the K-means method will allow to verify the stability or robustness of cluster solutions. So, in accordance with hierarchic results, we select the option of three clusters in the K-means method.

²² For executing the analysis through SPSS software, it has asked that a range of solutions are provided to know how composition of groups vary according to the final number of clusters. In this case, it has selected a range of two and three clusters.

Table 4 Statistical description of results obtained by hierarchic technique

Statistician	1		2		3		Total	
	IPP	BSA	IPP	BSA	IPP	BSA	IPP	BSA
Mean	5.621978	23.22	3.214000	62.33	4.242225	44.88	4.575550	39.79
Obs	9	9	3	3	16	16	28	28
Std. Dev	.3714210	1.481	.4271130	.577	.6548006	6.120	.9640613	13.593
Min	5.0111	20	2.8988	62	3.5277	34	2.8988	20
Max	6.2411	25	3.7001	63	5.6791	53	6.2411	63

Source: Author's own

Through table 3 (in columns which correspond to not hierarchic technique) it can be looked that composition of clusters obtained by the K-means method is not equal to composition of the hierarchic technique:

- Cluster 1=1, 2, 7, 9, 11, 18, 20, 27, 28
- Cluster 2=3, 4, 12, 16, 17, 21, 23
- Cluster 3=5, 6, 8, 10, 13, 14, 15, 19, 22, 24, 25, 26

The last step of cluster analysis is to validate final results. Figure 5 represents results of employed proceedings.

- Final cluster centres: (figure 5.a). It can be looked that centroids of clusters are very similar to represented into table 4 (see mean of variables).
- Distances between final cluster centres (figure 5.b). If it compares distance between groups with inter-groups distance (shown in table 3), it seems that election of three clusters is correct because the between groups distance (19.232, 33.416, 14.184) is higher than any inter-groups distance (is the case of Bulgaria with 12.439).
- ANOVA (figure 5.c). The high value of F statistic of this test indicates that selected clusters are homogeneous. This means that variability between groups is much greater than variability into inter groups.
- Number of cases in each cluster (figure 5.d). There are three clusters which size is not disproportionate (with 9, 7 and 12 members).

According to the executed analysis (by applying hierarchic and not hierarchic techniques), countries of the EU can be classified into three cluster, from a copyright perspective.

- Cluster 1: IPR are implemented strongly and piracy rates are low:
 - Austria, Belgium, Denmark, Finland, Germany, Luxembourg, Netherlands, Sweden and United Kingdom.
- Cluster 2: members implement the lowest protection on IPR and they have the highest piracy rates.
 - Bulgaria, Croatia, Greece, Latvia, Lithuania, Poland and Romania.
- Cluster 3: protection on IPR and piracy rates have medium values.
 - Cyprus, Czech Republic, Estonia, France, Hungary, Ireland, Italy, Malta, Portugal, Slovak Republic, Slovenia and Spain.

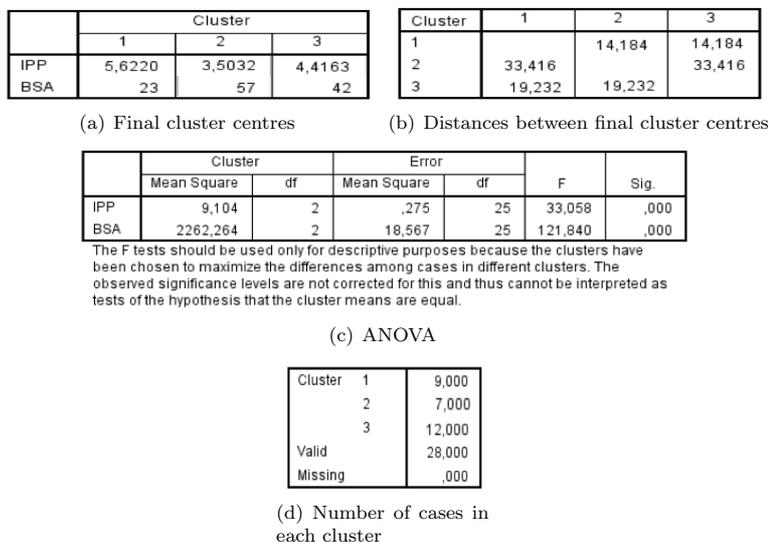


Fig. 5 Proceedings of assessment of results. Source: Author's own

3.4 A comparative analysis of copyright regimes in the EU

Because of one of indicators to evaluate the effectiveness of a copyright regime is piracy rates (Pulido, 2015), we can suppose that, according to empirical results, cluster 1 would be the most effective copyright regime.

It would be desirable to gauge the social-economic profile of countries classified into cluster 1 in order to design an optimal regime from a copyright perspective. Table 5 shows some social-economic indicators of cluster 1 for 2013²³. Taking into account average values, countries of this cluster have a GDP per capita of 57380\$ (GDPpc), an investment on R&D of 2.5% over GDP (RD), a government expenditure on health of 8.4% over GDP (HEALTH) and a government expenditure on education of 6.2% over GDP (EDUC).

Next step is to study the gap of members of clusters 2 and 3 regarding to this optimal profile. Which are the social-economic differences between cluster 1 and clusters 2 and 3? Figure 6 reflects these differences on the basis of values of cluster 1, as can be looked indicators value of cluster 2 and 3 are below values of cluster 1. However, cluster 3 is the nearest to cluster 1 with the exception of EDUC, in which cluster 2 obtains a very similar value to cluster 1 (99.4% of cluster 1).

²³ With the exception of government expenditure on education (EDUC), which values are for 2011.

Table 5 Social-economic indicators of cluster 1

Variable	Obs	Mean	Std. Dev	Min	Max
GDPpc	9	57380.39	20875.48	41776.76	110664.8
RD	9	2.486297	.7679147	1.15514	3.30904
HEALTH	9	8.372533	1.301765	5.9392	10.052
EDUC	8	6.199596	1.109173	4.81496	8.5471

Source: Authors own based on the World Banks World Development Indicators

This analysis suggests that it is necessary to improve investment on R&D, education and health (and consequently encourage wealth) in order to reduce piracy rates and, so achieve a more effective copyright regime.

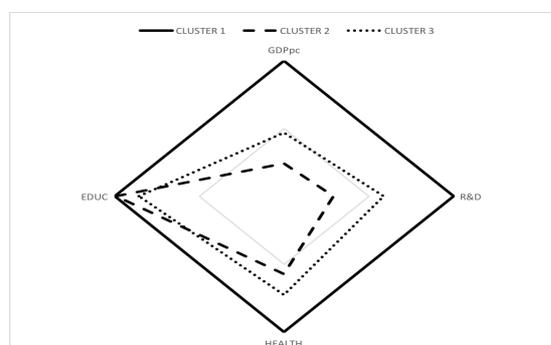


Fig. 6 Social-economic gap of cluster 2 and 3 regarding to cluster 1 (values of cluster 1=100). Source: Author's own

4 Conclusions

Economic analysis of elements which form copyright regimes constitute one of the mission of copyright economics. This paper has focused on this area as an instrument to gauge the effectiveness of regime of this category of IPR.

A debate about the effectiveness of the Directive has been developed in the last years. The current reality is never related to the scenario in which the Directive was passed; technological development has challenged this reality by creating a very large amount of access barriers to essential services for society. The failure to access to the same digital content in the EU is just one example.

In this context, the effectiveness of the Directive as instrument to harmonise copyright in a digital society has been studied from an empirical perspective. Specifically, a cluster analysis has been applied in order to analyse the

existence of different copyright regimes in the 28 member of the EU through variables related to copyright in 2013.

In line with the developed analysis, it can say that copyright implementation is not uniform in the EU, in particular there are three behavioural patterns: countries in which intellectual protection is strong and piracy rates are low (cluster 1); countries with low intellectual protection and high piracy rates (cluster 2); and countries with medium values on intellectual protection and piracy rates (cluster 3).

Through an analysis of social-economic profile of countries with the lowest piracy rates (countries of cluster 1) it was found that these countries have the greatest wealth, investment on R&D and also the highest government expenditure on education and health. These results could provide suggestions to design more uniform and efficient copyright regimes in the EU.

Nonetheless, with the aim of achieving a further development in cultural and creative industry, it is necessary to remove the physical and non-physical barriers between countries; in this regard, creation of an European Digital Single Market stands as the best of solutions.

References

1. Bomsel, O. and Ranaivoson, H. (2011). La Reducción de los Costes de la Protección Efectiva de Los Derechos de Autor: el Alcance de una Respuesta Gradual. Watt, R. (Ed.): *Teoría Económica y Derechos de Autor* (pp. 325-349). Madrid: Dataautor.
2. BSA (2014). BSA Global Software Survey. Document resource. http://globalstudy.bsa.org/2013/downloads/studies/2013GlobalSurvey_Study_en.pdf Accessed 16 January 2016.
3. Demsetz, H. (1967). Towards a Theory of Property Rights. *American Economic Review*, 57, 347-359.
4. European Commission (2008). Green Paper on copyright in the Knowledge Society. COM (2008), 466. Brussels, 16.7.2008.
5. European Commission (2014). Report on the responses to the Public Consultation on the Review of the EU Copyright Rules.
6. European Commission (2015). A Digital Single Market for Europe. COM (2015), 192. Brussels, 6.5.2015.
7. European Union. Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society. *Official Journal*, 22 June 2001, 167, pp. 10-19.
8. Garrote Fernández-Díez, I. (2001). *El Derecho de Autor en Internet: la Directiva sobre Derechos de Autor y Derechos Afines en la Sociedad de la Información*. Granada: Camares.
9. Juncker, J. C. (2014). A New Start for Europe: My Agenda for Jobs, Growth, Fairness and Democratic Change. President Junckers Political Guidelines.
10. Kuiper, F. K. and Fisher, L. (1975). A Monte Carlo Comparaison of Six Clustering Procedures. *Biometrics*, 31, 777-783.
11. Landes, W. M. and Posner, R. A. (1989). An Economic Analysis of Copyright Law. *The Journal of Legal Studies*, 18 (2), 325-363.
12. Liebowitz, S. J. (1985). Copying and Indirect Appropriability: Photocopying of Journals. *Journal of Political Economy*, 93, 945-957.
13. Michel, N. J. (2011). Intercambio Digital de Ficheros y Contratos de Derechos de Autor en la Industria de la Música: un Análisis Teórico. Watt, R. (Ed.): *Teoría Económica y Derechos de Autor* (pp. 131-155). Madrid: Dataautor.
14. Peitz, M. and Waelbroeck, P. (2011). El Efecto de la Piratería en Internet sobre las Ventas de Música: Evidencias de Sección Cruzada. Watt, R. (Ed.): *Teoría económica y derechos de autor* (pp. 307-324). Madrid: Dataautor.

15. Plant, A. (1934). The Economic Aspects of Copyrights in Books. *Economica*, 1, 167-195.
16. Posner, R. A. (2005). Intellectual Property: The Law and Economics Approach. *Journal of Economic Perspectives*, 19(2), 57-73.
17. Pulido Pavón, N. (2015). Explorando el vínculo entre la Economía del Copyright y la Política de Competencia. Implicaciones para el bienestar general. Doctoral thesis. University of Seville.
18. Rapp, R. T. and Rozek, R. P. (1990). Benefits and costs of intellectual property protection in developing countries. *Journal of World Trade*, 24(5), 75-102.
19. Reda, J. (2015). Reda Report. Resource document. https://pub.juliareda.eu/copyright_evaluation_report-explained.pdf Accessed 15 October 2015.
20. Towse, R. *et al* (2011). La Economía de la Ley de Propiedad Intelectual: Inventario de Publicaciones. Watt, R. (Ed.): *Teoría Económica y Derechos de Autor* (pp. 15-56). Madrid: Datautor.
21. Varian, Hal R. (2005). Copying and Copyright. *Journal of Economic Perspectives*, 19(2), 121-138.
22. Watt, R. (2011). El Pasado y el Futuro de la Economía de la Propiedad Intelectual. Watt, R. (Ed.): *Teoría Económica y Derechos de Autor* (pp. 57-94). Madrid: Datautor.
23. WIPO (2013). The Economics of Copyright and the Internet: Moving to an Empirical Assessment Relevant in the Digital Age. Economic Research Working Paper No. 9. Resource document. http://www.wipo.int/export/sites/www/econ_stat/en/economics/pdf/wp9.pdf Accessed 16 January 2016.
24. World Bank. World Bank national accounts data. Data base. <http://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS/countries?display=default> Accessed 7 April 2016.
25. World Economic Forum. The Global Competitiveness Index data platform. Database. <http://www.weforum.org/issues/competitiveness-0/gci2012-data-platform/> Accessed 16 October 2014.