The French “Three Strikes Law” against digital piracy and the change in usages of pirates

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1. Introduction

This article aims to investigate what could be the consequence of the Hadopi law on the usage of digital pirates. This law voted by the French parliament in September 2009 has been strongly criticized by Internet users and consumer advocacy groups. Opponents of this law argue that Hadopi is useless and obsolete, mainly because Internet users are able to change their behaviour and bypass the law.

We suppose that Internet users make rational expectations concerning the future consequence of the Hadopi law. We use answers to a survey conducted among 2,000 Internet users in Brittany to give insights of the consequence of the hadopi law on the usage of pirates. We use multivariate descriptive analysis to support the change in the usage of pirates as an answer to the control process established by the Hadopi law.

1.1. a brief history of digital piracy on the internet

In 1999 Shawn Fanning who was student in Boston develops the software Napster. For the first time distant individuals who don’t know each others are able to share and exchange numerous musical files. The technical innovation is that files don’t pass trough a central server but transit directly from one computer to another.

Napster claims more than 25 millions of users at the end in February 2001 just before the service has been shut down by the U.S court in July.

Other peer-to-peer (P2P) networks emerge on the Internet (Gnutella, Edonkey, Kademelia, overnet). Gnutella overcomes the weakness of Napster which was the centralization of indexation data (IP of peers, characteristics and names of files exchanged) and by the way enhances the robustness of the network. Edonkey and Kademelia enable the multi-source download and increase the user experience. Numerous lawsuits are filed against users, servers owners or even software manufacturers but these actions are too scattered and face the resilience of such communities and networks. P2P networks also have to deal with "free riding" problems. As showed by Adar and Huberman (2001), 99% of files are shared by 25% of users which tend, despite the self-organization of these communities, to weaken the sustainability of P2P networks.

The appearance of Bittorrent protocol marks a big shift in the history of digital piracy. Invented by Braham Cohen in 2001 this protocol enables to enforce cooperation in the network. The rule generated by this protocol is simple, the more you allow users to upload to your computer, the faster you can download. Bittorent is at the beginning of the 2000's the most used P2P protocol. Even if many websites (thepiratebay, mininova etc..), which indexed links to torrent files have been prosecuted by different legislation, it remains the best and efficient way to download audio-video files on P2P networks.

But as the monitoring of P2P networks by copyright owners increases, new methods to watch movies and series as well as listening music emerge on the Internet. The streaming websites (allostreaming, megavideo) don't need to store files on the computer, as a result users can't be prosecuted for illegal possession of copyrighted contents. Direct download websites (megaupload, rapidshare) enable to download audio-video contents on servers hosted in "digital havens". As the communication protocol is HTTP the risk of being monitored is lower and users can't attract the attention of the court for receiving stolen goods.

The history of digital piracy can be seen as a race between pirates and copyright owners. The latters try to find the best way to discourage pirates using copyright laws which aren't adapted to digital issues. The formers change their practises, develop new software and platforms to escape penalties.

1.2. Do digital piracy really harm cultural industries

Theoretical aspects

If the conventional wisdom states that the development of copying technology harms the demand for originals and makes the long-term supply decrease (Johnson, 1985), different papers show that there are conditions under which piracy could make the profit of the firm increase (Peitz and Waelbroeck, 2006a).

First, if the supplier of originals can discriminate between users who use an original good to generate copies and those who do not. Indirect appropriability suggests that the price of originals rises, internalizing the cost of potential copies (Ordover and Willig 1978, Liebowitz 1985, Besen and Kirby 1989).

Secondly, if the good supports network effects, its value rises with the installed base of users. It could be profitable for the supplier to accommodate for a number of illegal copies in order to increase the willingness to pay for originals (Conner and Rumelt 1991, Takeyama 1994).

Thirdly, the asymmetric information between producers and consumers of cultural goods makes piracy able to provide the missing information (Takeyama 2003, Duchêne and Waelbroeck 2006, Peitz and Waelbroeck 2006b). The so-called ‘‘sampling effect’’ produces a better matching between the consumer desire and the variety of goods proposed. The supplier is able to take advantage of this effect as consumers have a higher willingness to pay for a product which perfectly matches with their preferences.

Most of the time only the ‘‘sampling effect’’ can be observed in empirical studies related to the consequences of digital piracy on the music and movie industries. Indeed, indirect appropriability needs to control the number of copies made from the original, which is impossible with digital and costless reproduction technologies as a copy can be done from another copy. Contrary to software, the utility which can be derived from listening to music or watching a movie is not directly linked to the number of people who have the same consumption. Indirect network effects can be taken into account and take the form of fashion effects, reputation mechanisms and word of mouth (Awad et al. 2004, Moul 2007), but these would not be discussed in this article. To our knowledge, except for software (Givon et al. 1995, Brynjolfsson and Kemerer 1996), no empirical evidence shows that network effects induced by piracy have an impact on cultural industry revenue.

Balanced results in the empirical literature

Different methodologies have been used to test the impact of digital piracy on the revenue of the cultural industries. The major problem is to gather data on the behaviour of piracy, an illegal and hidden activity. Panel-based studies (Zentner 2005, Liebowitz 2008) suffer from the use of internet broadband connexion as a proxy for measuring piracy. The broadband connexion is a "black box" which covers very different and various usages (piracy but also listening web radio, watching YouTube and streaming plateform etc…) and thus, doesn't allow to directly address the consequence of digital piracy. As a result these studies seem to have overestimated the negative impact of online piracy.

A second category of studies have directly measured data transferred on P2P networks (Oberholzer-Gee and Strumpf, 2007, Blackburn, 2007) and show no negative effect of piracy on the legitimate demand for music. The criticism which has been done to theses studies is that they fail to solve the endogeneity problem which states that files downloaded are also those which are purchased by consumers. As a result they have probably underestimated the consequence of piracy.

Finally survey-based studies which have the disadvantage of being based on individual declaration produced various result sometimes showing a substitution between sales and digital piracy (Zentner, 2006, Rob and Waldfogel, 2006) and sometimes complementary relationship based on sampling effect (Bounie et al., 2006).

Many authors have also considered that a file download equals a sale lost and fails to understand that users don't necessarily download files they would have bought otherwise. This basic calculation also leads to an important overestimation of the loss suffered by cultural industries.

It would be simplistic to reduce copyright infringement on the internet to a simple conflict between content producers and Internet users. Nicola Christin, (2010) considers that the tussle involves five actors with consumer electronic manufacturers, software manufacturers and Internet service providers in addition to end users and content providers. The author highlights various and conflicting incentives between the different actors of the tussle. For example ISPs and consumer electronic manufacturers indirectly benefit from digital piracy without paying a heavy price[1]. The role of ISPs is central because they deliver the bandwidth which enable to share files on the Internet. Furthermore the commercial development of

[1] There exists local exception as for instance the tax on private copying in France which is levied on removal media storage like MP3 device, USB key, external hard drive etc…

broadband connexion has been based on the ability for Internet users to listening and watching audio-video content which is a veiled reference to file-sharing activities.
If social science literature doesn't prove that digital piracy is responsible for crisis in cultural industries, they highlight the change in the process of production/diffusion/consumption (Dejean, 2009) as well as news habits and individual usages born with digitalization of cultural goods.

2. The Hadopi law

Hadopi is the name of the agency created to monitor P2P networks and manage the "three strike" procedure addressed to pirates. This *ad hoc* authority is part of a law named "creation and internet" which aims to promote and protect creative works on the internet.
The procedure supposed to deter digital pirates is a three step process. First time an individual is caught downloading or sharing copyrighted content on the Internet, a warning email is sent to his mailbox. The second time the presence of the pirate is detected on a P2P network a certified letter is sent, at the third infringement the ISP is supposed to suspend the internet connexion of the pirate.
Many criticisms have been done to this three strikes procedure. The first major critic is a technical matter and concerns the use of the IP address to confound the pirate. Indeed the IP address identifies the computer and not the user, as a result those who suffer from the disconnection of the Internet access are not necessary those who have trespassed the law. Furthermore the IP address can easily be hacked which can also make impossible to identify the real pirate.
The second major critic is legal and concerns the ability of the three strike process to disconnect Internet users. This issue was at the heart of the "telecom package" reform proposed to the European parliament. This text was supposed to unify EU telecoms rules and one of its amendment (voted in may 2009) says that *"no restriction may be imposed on the fundamental rights and freedoms of end users, without a prior ruling by the judicial authorities*". For the same reason the French constitutional council decided in June 2009 that an administrative authority wasn't empowered to take the decision to disconnect Internet users. The reason was that Internet is part of the freedom of speech and consumption.
For all these reasons the Hadopi law has been changed and voted in September 2009 by the French parliament. In the so-called Hadopi 2, the decision to disconnect Internet users will be taken by judicial intervention. The second major evolution is that users won't be prosecuted

for copyright infringement but because they neglect to protect their computer from potential hackers.
As a result if the rules underlying the tree strikes law have changed the general purpose is still the same: deter pirates from using P2P networks.
The French legislation and especially the Hadopi law neglect the complexity and the conflict of interest raised by digital piracy. By only considering the role of end users in the copyright infringement online, this law takes the risk of being considered as unfair by users. The consequence can be the development of illegal behaviours in order to circumvent the law. The development of such practises can also be driven by the reactivity of online community as well as the decentralized structure of the web which make almost impossible the generalization of content monitoring system.

When Napster have been shut down, P2P networks changed their organization to become smaller and numerous, when network congestion appears, P2P protocol evolved to foster cooperation, we argue that the ongoing control of activity on P2P networks will lead to a shift in the usage of digital pirates. Indeed there exists different ways to bypass the Hadopi law. The two mains alternatives are the *streaming*, which enable to watch video and listening to music without downloading files on the computer, and the *direct download*, where illegal content is hosted on remote servers.
To support our hypothesis of the change in the usage of digital pirates from P2P networks to alternatives platforms, we use the answer to a survey conducted among 2,000 Internet users in Brittany between the 16th November and the 13th December 2009 by the M@rsouin research group.

Our main result is that Internet users have anticipated the consequence of the hadopi law and changed their usage to continue illegal acquisition of copyrighted contents. This result supports the idea that Internet users are able to quickly adapt their usages to a change in the legal environment to keep their practises unchanged.

3. Empirical analysis

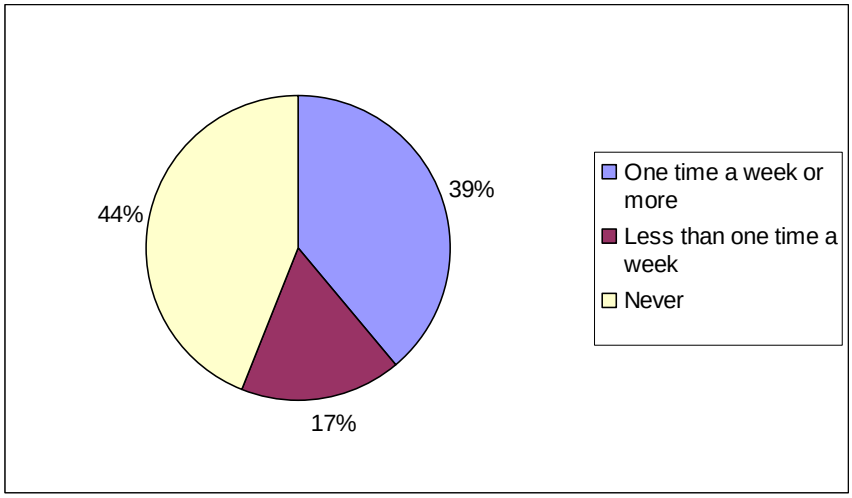
In the rest of the paper after having described some basics statistics of the M@rsouin survey we make a typology of audio-video consumers on the Internet. The goal is to better

understand the potential consequence of the Hadopi law by segmenting Internet users as regard to their usages.

3.1. Basics statistics

Over the 2,000 people interviewed 67% are Internet users. Over the 1,340 Internet users 56% say that they watch video or listen to music on the web (39% do it at least one time a week and 17% less than one time a week) (**Figure 1**).

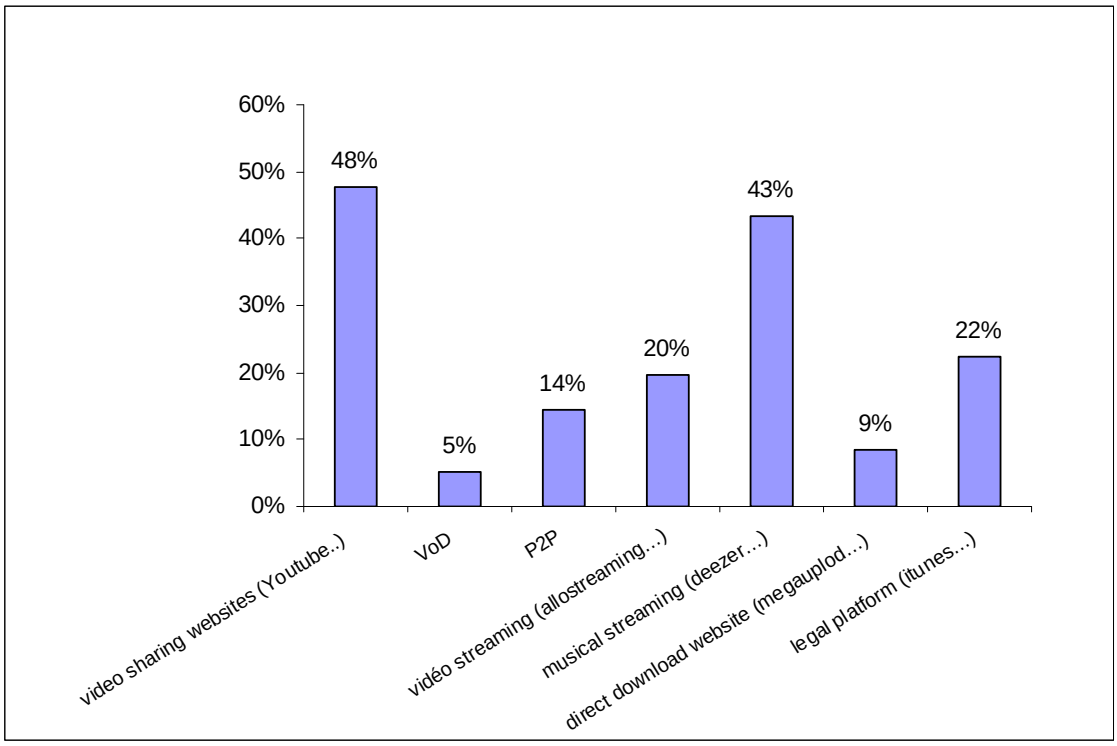
Figure 1: Frequency of audio/video consumption on the Internet[2]



Observing Figure 2, it's not surprising to note that video sharing websites, like youtube or dailymotion (48% of the audio/video consumers) and the audio streaming websites like Deezer or Spotify (43%) are the more common usage among audio/video consumers. We have to note that in both cases these practises are free but legal as regard to the Hadopi law. 22% of audio/video consumers have already paid to download music or video on legal platform like Itunes or VirginMega and 5% have rented videos on VOD platform.
Even if video sharing and audio streaming websites can hide illegal practises the larger part of copyright infringement are done on P2P networks (14% of audio/video consumers), on video streaming website like allostreaming (20%) or on direct download platform like MegaUpload or RapidShare (9%).

[2] Based on Internet users.

Figure 2: Categories of audio/video consumption on the Internet



3.2. A typology of audio and video consumers.

We use multivariate analysis to define a typology of audio/video consumption on the Internet. We first proceed to a Multiple Correspondence Analysis (MCA) over the different usages of audio/video consumption. This methodology aims to exhibit the underlying structure of the dataset by representing dimensions best able to explain the association of variables.

The categorical variables used are:

- Offline consumption:
    - Culture: going to the cinema, theatre or museum (modality 1 to 4)
    - DVD: buy CD or DVD (modality 0 to 2)
- Online consumption
    - Streamleg: Gather video sharing and audio streaming websites (modality 0 and 1).
    - Legal: buy music or video on legal plateform (0 to 1).
    - Pirate: Use P2P networks (o to 1).
    - Piratealt: Are pirates who use platform which are undetectable by the Hadopi (0 to 1).

We also use two illustrative variables to better characterize the two mains dimension of the MCA analysis:

- Rev: indicator of perceived income (modality 1 to 4, with one representing people who consider having a high income)
- Hadopi: Indicator of the change in the audio/video consumption after the vote of the Hadopi law. The question was “Did Hadopi changed the way you consume audio and video files on the Internet?”. Modality goes from 1 to 4 with one representing the answer “yes absolutely” and 4 the answer “no absolutely not”.

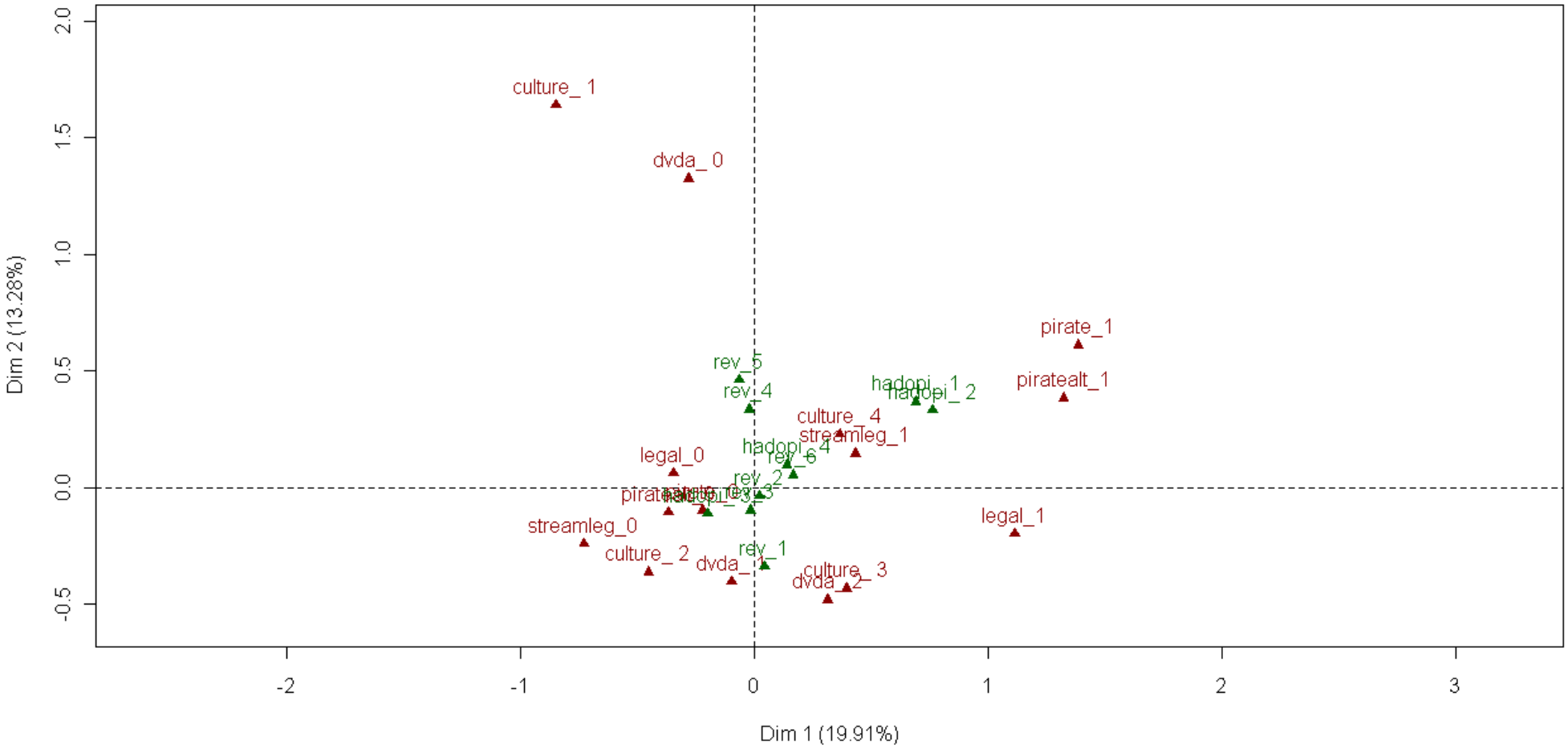


Figure 3: MCA analysis on audio/video consumption

The result of the MCA analysis (figure 3) enables to characterize the two mains dimensions of the dataset. The first seems to be the illegal behaviour online. The use of P2P network, illegal streaming and direct download ("pirate" and "piratealt") are the two mains contributors to the inertia of the first dimension.

The second dimension is defined by people who don't buy any CD or DVD and don't have cultural activity offline (cinema, museum). This information doesn't define the main determinant of this dimension which could be the consequence of low income or even geographic or social isolation. However the illustrative income variable (Rev) suggests that income could be a good explanation for this dimension.

Another interesting result is the proximity between "pirate" and "piratealt" which highlights the fact that those who illegally download on P2P networks are also those who use alternative method of piracy. The relative proximity with "hadopi_1" and "hadopi_2" also suggests that Internet users who use P2P networks in addition of using alternative method of piracy are those who declare that they have changed their audio/video consumption online. This first analysis seems consistent with our hypothesis of a change in the online behaviour of pirate as a consequence of the vote of the Hadopi law.

After highlighting a typology of audio/video consumption of Internet users, we perform a hierarchical ascending classification (HAC). This methodology merges cluster according to the proximity of observation. As a result internet users in each cluster are supposed to have similar behaviour in term of audio/video consumption. Three clusters emerge from the HAC:

The "*inactive cultural" (13%)*

This category of individuals are clearly those who have little or no audio/video consumption, being offline or online. 100% of individuals in this group have offline cultural activity (cinema theatre, concert, museum) less than one time a month. This cluster represents Internet users with basic usage of the web. Only 54% of Internet users in this group have ever use legal streaming platform which is the most common audio/video usage in this category.

34% of individuals consider that they have low income (as compared to 17% in the whole population) which supports the idea that economic issue is responsible for the weak cultural activity of these Internet users. Moreover, population in this cluster is older than others which explain the non adoption of online audio/video consumption, especially free platform which enables to overcome revenue issue.

The *"legal consumers"* (74%)

These Internet users are those who have a offline cultural activity at least one time a month. They are not engaged in illegal consumption online, neither in a Hadopi sense (0% use P2P network) nor in a non Hadopi sense (only 18% use alternative platform of piracy as compared to 21% in the whole population). Of course people who consider that the Hadopi law hasn't changed anything are over-represented in this cluster.

We can't exclude in this group the presence of Internet users who have stopped the use of P2P network since the Hadopi law has been voted, however nothing enable to highlight this behaviour.

The *"pirates"* (13%)

This group is composed of pirates (100% use P2P networks). The most striking result is that this category of user exhibits very complex structure of usage. Indeed, 54% of pirates use alternative platform of piracy (as compared to only 21% in the whole population), 48% have ever bought on legal platform (23% in the whole population) and 84% use audio/video streaming websites (62% in the whole population).

As regard to the consequence of the vote of the Hadopi law, the pirates seems to exhibit two very different behaviours. 17% of pirates say that the vote of the Hadopi law has changed "a little" their audio/video consumptions (as compared to 5% in the whole population). The second observed behaviour is about pirates who reported that the law hasn't changed anything (51% in this cluster as compared to 32% in the whole population).

The fact that these two different behaviours are observed in the group of pirates is meaningful, it means that the Hadopi law has had an impact on P2P users. Those who have "a little" changed their behaviour could have either:

- Reduce their presence on P2P networks.
- Increase or begin the use of non Hadopi sensitive method of piracy.
- Increase their consumption on legal platform.
- Start using Virtual Private Networks or have encrypted their connexion in P2P networks.

Those who haven't change anything since the vote of the Hadopi law can have:

- Decided that they're not going to change anything since the three strikes process isn't effective.
- Decided to take the risk of still using P2P networks.
- Not understand the purpose of the law

Even if we don't have any information on the direction of changes induced by the law, we know that the pirates have a good knowledge of the alternative way of watching, listening and downloading digital goods on the Internet without being caught by the Hadopi.

The other interesting information highlighted by this typology is that pirates also differ from other by having already bought digital goods on online legal platform. On the one hand it means that Hadopi law can encourage such behaviour on the other hand by disconnecting Internet users who use P2P networks, the law can also prevent the use of online legal platform.

Conclusion

The results provided by the multivariate descriptive analysis are meaningful to better understand what will be the future consequence of the Hadopi law on the usages of digital pirates. A typology of audio/video consumption clearly segment users according to their ability to use P2P networks (and being a pirate in an Hadopi sense), but this cluster of Internet users are also those who have the better knowledge of alternative way of piracy (streaming and direct download are undetectable by the Hadopi). Reactions of pirates to the Hadopi law are twofold, they have a little changed their habits or they don't changed anything but in both cases they are still pirates. Of course it doesn't mean that digital pirates will not change their behaviour when the three strike process will be operational but currently it hasn't had the expected effect.

Moreover the fact that Pirates are also online buyers of digital goods raises questions about a law which intend to disconnect P2P users from the Internet.

Further investigation will be necessary to evaluate the consequence and the shift in usages generated by the Hadopi law. It would be also very interesting to compare results from M@rsouin survey with network metric to reinforce the idea that streaming and direct download have replaced the use of P2P networks for digital pirates.

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