

# Three Roads to P2P Systems and Their Impact on Business Practices and Ethics

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**ABSTRACT.** This article examines some of the most relevant issues concerning P2P systems so as to take sides in today's strongly polarized debate. The idea is to integrate a context-based perspective with an ontological representation of informational norms; thanks to a procedural outlook which is presented in terms of burden of proof. More particularly, we examine three "roads." First, the topological approach to complex social networks allows us to comprehend the laws according to which information is distributed through P2P systems and how a "short route" has joined, and sometimes replaced, the traditional "long route" between creator, business, and the public. The second road is the context-based perspective elaborated by Helen Nissenbaum, and developed by Francis Grodzinsky and Herman Tavani: The goal is to determine the norms that govern such an informational flow as norms of appropriateness and distribution. The final road is the informational viewpoint on ethics proposed by Luciano Floridi with the idea that standard ethical theories cannot easily be adapted to deal with the new informational issues emerging with digital technology. While empirical evidence on the impact of P2P systems is still quite controversial, it is crucial to determine on whom the burden of proof falls in a given context, on censors or advocates, by singling out both the default norms and exceptions in the use and development of P2P software.

**KEY WORDS:** information ethics, ontology, P2P systems, topology of complex social networks, value chain

## Introduction

The emergence of information technology, the internet and file sharing applications—systems like peer-to-peer (P2P) software have disrupted the traditional value chain of media objects. Until the mid-1990s, there was the traditional "long route" between

authors and the public, mediated by the different phases and services of production, storage, distribution, and delivery of material artefacts via business organizations. As physical objects had to be stored, transported, and distributed before eventually being purchased by the public, most authors could not engage in all these steps: On the contrary, the rule was that "they preferred to resort to businesses to set up the characteristic trilateral relationship between creator, business, and the public, which is typical of primary exploitation of copyrighted works" (Ricolfi, 2007, p. 286). What is more, secondary exploitation of the artefacts required an even longer route in that further classes of businesses and markets had to be added to the manufacture and sale, as in the case of music broadcasting via radio and of films via television networks.

Technology, however, has profoundly changed this business of information products. By exploiting the revolutionary fact that, at least theoretically speaking, there is no longer any difference between the original and its copy, a "short route" is joining—and sometimes has even replaced—the traditional "long route." Specifically, "peer-to-peer (P2P) architectures, where users directly connect to others to share and download files, have further accelerated the propagation of digital resources" (Shang et al., 2008, p. 349). As copyright holders of sound recordings and phonograms quickly understood both in the U.S. and in Europe, this new scenario means that the conventional distinction between primary and secondary exploitation of a given work simply vanishes in digital environments: This is why both the World Intellectual Property Organization (WIPO)'s treaties from 1996 aim to prevent "that members of the public may access these works (protected by copyright in sound recordings and phonograms) from a place and at a time individually chosen by them" (*Copyright*

*Treaty's art. 8 and Performances and Phonograms Treaty's art. 14).*

As some popular on-lines stores like Amazon or iTunes illustrate, there exist fully integrated information systems implemented by means of complex server architectures such as the Content Delivery Network (CDN), which are reshaping the traditional trilateral relationship between creator, business, and the public. The difference between distribution and delivery of digital works is rapidly collapsing.

Yet, it is the very idea of creativity and authorship which has been turned upside down by the information revolution: While some scholars like Toffler (1980) or Anderson (2006) talk about a new type of “prosumers” (both producing and consuming), others insist on the difference between centralized and decentralized choices, between market and non-market mechanisms, to stress the novelty of social exchange based upon reciprocity and cooperation rather than price (as in Benkler, 2004). This transformation does not depend only on the possibility of harnessing the “distributed intelligence” of the internet, but also on the computational resources available at each step of the digital interaction that dwarfs conventional investments and makes many traditional intermediaries redundant (as already pointed out by Tapscott, 1997). While production and distribution tend to migrate from traditional business activities to the public via social sharing, it is clear that the development of file sharing applications-systems like P2P networks has made the “short route” even shorter.

The result of this evolution is the polarization of today's debate: Some stress that P2P interaction undermines key elements of our societies such as incentives for knowledge producers or protection of the personal sphere from unwanted scrutiny (Keen, 2008). Others present this interaction as the key to a new paradigm: Not only would communities spontaneously organize themselves on the internet, but such organizations are normatively judged to be positive developments that should be further encouraged (Bauwens, 2005).

*So, how can we balance these opposite views?*

On the side of the new paradigm-advocates, there is indeed both the vitality and strength of these file sharing applications-systems that, optimizing how information is distributed by their peer users, have created wider opportunities in digital environments.

In a multiagent system, the distribution and circulation of information by means of P2P software may raise issues of trust among peers in relation to the content of information distributed. Along with matters of trust (Durante, 2008), work on P2P software involves the growth of several crucial fields like search efficiency, incentive mechanisms, broadcast and multicast services, distributed databases, advanced computing, content delivery, and multimedia streaming (Shen et al., 2009). All in all, these file sharing applications-systems have been solving some major problems of the CDN architecture – which is used by very popular Web sites like Amazon, CNN, Google, and You Tube – based upon the traditional (and very expensive) client/server design.

On the side of P2P censors and opponents, however, some of the serious problems afflicting this technology include security and privacy threats, copyright claims, issues of connectivity and transparency (Vaccaro and Madsen, 2009a), availability of resources, and, to be pessimistic in some cases, even the possible collapse of the system. Xiaohe (2006, p. 68), for example, has argued that “file-sharing endangers the [music] industry's survival” and, furthermore, “that, from the legal and ethical points of view, maintaining the production of music file-sharing is problematic. It is illegal because the sharers are not the owners of the shared files nor are they authorized by the owners. It is unethical because what users share is not theirs. It is stealing because what they obtain belongs to others.”

Hence, in light of the current polarization, the aim of this article is to understand how technology is changing even longstanding rights like copyright (1709) and privacy (1890), turning them into matters of access and control over information (Ginsburg, 2003; Heide, 2001; Tavani, 2007). In what follows, we propose three “roads” in order to examine the new informational issues concerning P2P systems and their impact on business practices and ethics.

The first road is the *topological* outlook to complex social networks as developed by Pagallo (2007a, b). This approach enables comprehension of the laws according to which information is distributed through P2P systems so that they “have further accelerated the propagation of digital resources” (Shang et al., 2008, p. 349): Technical details, indeed, often have ethical relevance.

The second road is the *context-based* perspective developed by Nissenbaum (2004; Nissenbaum and

Benkler, 2006), and deepened by Grodzinsky and Tavani (2008). The claim is that all spheres of life are governed by “norms of informational flow,” although different social contexts may be governed by different sets of norms. Once we have grasped how P2Ps work, we have to examine the “context-relative qualifications” that can properly be applied to the nature of P2P systems.

The third road is the *informational* viewpoint on ethics proposed by Floridi (1999, 2003). His overall thesis is that standard ethical theories like the universal norms of Kantian deontology or the utilitarian norms based upon the evaluation of distributed consequences cannot be easily adapted to tackle the new informational issues created by digital technology (e.g., computer ethics). P2P dilemmas should be thus understood in terms of informational entropy and its opposite, that is, the “flourishing of informational entities as well as the whole infosphere.”

The conclusion aims to single out a theoretical convergence among these different “roads” so as to overcome current exaggerations of both advocates and censors of P2P systems. Specifically, we want to integrate the context-based perspective with the universal representation of informational norms via a procedural outlook which is presented in terms of burden of proof. Since empirical evidence on the impact of P2P systems is still controversial, it is crucial to determine on whom the burden of proof falls in a given context, on censors or advocates, by determining both the default norms and exceptions in the use and development of P2P software.

### The topological road to information

The topological perspective illustrates the laws according to which information is distributed in complex social networks (Granovetter, 1973; Milgram, 1967). By considering some key parameters such as the average distance between the nodes of the network and its clustering coefficients, we can shed further light on both the structure and evolution of a given system, by distinguishing three kinds of networks: regular, random, and “small world.”

The peculiarity of small world-networks depends on the apparent deviation from the properties of both regular and random networks: Since they present a short path length (as do random networks)

and high clustering coefficients (like regular systems), “small worlds” optimize the flows of information within a given network by exponentially shortening its diameter. These features have been found in a number of real-world networks: Electrical power grids, telephone call graphs, metabolic networks, the internet, scientific citations, the U.S. Supreme Court jurisprudence, and the power law-distribution of information that structure every P2P system at different levels (Iamnitchi et al., 2004; Pagallo, 2006; Ruffo and Schifanella, 2007).

From this topological perspective, it is then possible to grasp the functioning of P2P file sharing applications-systems in connection with the existence of a tiny fraction of nodes that are extremely well connected in the network and that are known as its “hubs.” There is indeed a “long tail” (Anderson, 2006) in the distribution of information in small world-networks, characterized both by a few nodes with very high values and by most nodes with small values. The presence of hub peers, that is, users who share a large number of items and thus play a main role in providing connectivity, is entwined with high clustering factor and typical short path length, insofar as there are spontaneous communities of users with self-organized interested-based clusters on the internet (Pagallo, 2007a; Pagallo and Ruffo, 2007).

This outlook provides a conceptual frame to evaluate the status and role of the nodes in “distributed” and “decentred” networks, namely, in systems where the presence and functions of intermediaries are no longer relevant or, on the contrary, are still operating (Bauwens, 2005; Galloway, 2004).

As a matter of fact, most P2P systems *do* present hubs and even small-world features: Such topological properties clarify the resilience of these networks despite the “free-riding phenomenon” and the selfish behaviors of (most of) the peers that are, in turn, triggered by some aspects of these applications such as hard traceability of the nodes and anonymity. Although some scholars, such as Adar and Huberman (2000), claim that free-riding represents a new digital form of Garrett Hardin’s *Tragedy of the Commons* (1968), it is provable that this is not the case of a P2P system like Gnutella, a popular system for sharing music files, because hubs link clusters of “affinity networks” while maintaining the performance and efficiency of the system. In more general terms, it is quite problematical to apply the standard version of

the tragedy of the commons to the environment produced by digital resources in the “infosphere” (Greco and Floridi, 2004).

Yet, another reason to pay attention to the laws of information-distribution in P2P systems is that their topological properties can be exploited to address such different issues as the protection of personal data or the enforcement of copyright interests in digital environments. In the first case, by harnessing the high clustering coefficients of the network – its “affinity circles” along with its transitive properties – it is viable to recommend information without requiring personal data: Hubs can be seen as vectors for developing all the opportunities offered by this technology (Ruffo and Schifanella, 2007). In the second case, hubs may be conceived, on the contrary, as targets in order to break these systems and, thereby, the P2P communities of digital affinities (Pagallo and Ruffo, 2007).

The panoply of all these possible applications, for or against privacy, for or against copyright, does not mean, of course, that technology is a simple means to obtain whatever end. Rather, it recalls to us the mutual interaction through which technology is reshaping key legal concepts and their environmental framework, while political decisions influence possible developments of technology. P2P interaction, in other words, cannot be studied as a self-dependent and purely technical phenomenon, since technical details often have social significance. Let us illustrate the point with the example of the “structured” versus “unstructured” P2P debate, that is, the different possible configurations of these systems and how the nodes are linked to each other at the overlay level (Pagallo, 2008a).

On the one hand, P2P networks can be unstructured, as in the cases of Gnutella and Kazaa, where overlay links are created by chance, with no “authority” established by either the software itself or a human monitor.

On the other hand, these systems can also be structured, as Kademia and Pastry. Structured systems are defined in terms of a specific topology – like a forest, a ring, and so forth – which develops with routing mechanisms and identifier spaces that allow nodes and resources to be located in the network.

Such different designs determine the efficiency in the distribution of information because, compared to centralized networks, structured overlays do not seem to present single points of failure or problems

of efficiency like the flooding search method adopted by Gnutella. What is more, the difference also has legal meaning in that structured models are better at preventing liability claims for actions committed by the users, and they do not push legal responsibility over a few super-peers, as in the case of Kazaa (Pagallo, 2008a).

The relevance of technical details and of different political opinions both on the levels of accessibility and the role of people’s decisions over flows of information – as with copyrighted works, personal data protection, etc. – brings us back to the polarization of today’s debate. If, on the side of P2P opponents, we have serious issues of national security, connectivity and availability of resources – not to mention child pornography or (cyber)–terrorism – on the side of P2P advocates it suffices to recall Edward Lee’s remarks (2005, p. 152):

What P2P does is something more than just home copying as with a video recorder: It gives ordinary people the power to be publishers – outside the control and concentration of the established industries.... Technologies, such as P2P software, facilitate the legal dissemination of artistic and expressive works by enabling any individual to share content with others on the Internet – in a decentralized way that does not require the approval or control of the major industry distributors.

*So, how can we prevent such an impasse? How is it possible to convince P2P detractors that the main task is not to strongly regulate nor to shut them down but, rather, to go on developing these file sharing-systems?*

Putting aside for now issues of objectionable content and national interest, even when we narrow our focus on the impact of P2P networks on industry profitability, empirical outcomes are quite controversial. Some evidence suggests that P2P systems reduce sales of music (Zentner, 2006), of movies (Rob and Waldfogel, 2006), etc. Others affirm that such software does not affect sales at all (Bhattacharjee et al., 2007; Smith and Telang, 2008); and, furthermore, there exists some work showing a positive effect of file sharing on sales (Andersen and Frenz, 2008; Gopal and Bhattacharjee, 2006). Even so, if “piracy and music sales are largely unrelated” with “clear evidence that income from complements has risen in recent years” (Oberholzer-Gee and Strumpf, 2009, p. 25), it is nonetheless obvious that piracy

would not stop being a reproachable thing and would require some regulatory attention.

In the next section, we take a closer look at the ethical features of the information revolution. After having considered how information is distributed in complex social networks through file sharing applications-systems, we will examine the norms which govern such an informational flow.

### The contextual road to information

The ethical context-based perspective proposed by Helen Nissenbaum in her work on privacy (2004; Nissenbaum et al., 2006; Nissenbaum and Benkler, 2006) offers a promising approach to some of the dilemmas produced by P2P systems. In fact, one of the hottest legal issues concerning P2P interaction involves not only the protection of copyright interests but of users' privacy as well. In the U.S., some scholars have pointed out "how the privacy of Internet users participating in P2P file-sharing practices is threatened under certain interpretations of the Digital Millennium Copyright Act (DMCA) [as] a new form of 'panoptic surveillance' that can be carried out by organizations such as the RIAA" (the Recording Industry Association of America; Grodzinsky and Tavani, 2005). This different form of private surveillance has also produced a new generation of data protection-concerns in Europe (e.g., the European Court of Justice's dictum on *Promusicae* from 2008).

So, in order to grasp the nature of both challenges and threats brought on by P2P interaction, the contextual perspective stresses the fact that there are no "spheres of life" that are "not governed by norms of informational flow" (Nissenbaum, 2004, p. 137). This does not mean that all spheres of life are ruled by the same norms. On the contrary, the theory is characterized by a *field-dependent* approach as contexts of networked interaction may be governed by different sets of norms (Nissenbaum, 2004, p. 137):

Each of these spheres, realms, or contexts involves, indeed may even be defined by, a distinct set of norms, which governs its various aspects such as roles, expectations, actions and practices. For certain contexts, norms are explicit and quite specific. For others, the norms may be implicit, variable, and incomplete (or partial).

Thus, while dealing with information about people involved in P2P issues, the context-based analysis claims a normative value: "Contexts, or spheres, offer a platform for a normative account [of privacy] in terms of contextual integrity" (Nissenbaum, 2004, p. 138). Moreover, the aim of the analysis is to guarantee contextual integrity by defining and governing information in the light of two types of norms (Nissenbaum, 2004, p. 138):

Among the norms presented in most contexts are ones that govern information, and, most relevant to our discussion, information about people involved in the contexts. I posit two types of informational norms: norms of appropriateness, and norms of flow or distribution. Contextual integrity is maintained when both types of norms are upheld, and it is violated when either of the norms is violated.

Hence, on the one hand, norms of appropriateness suggest "what information about persons is appropriate, or fitting, to reveal in a particular context. Generally, these norms circumscribe the type or nature of information about various individuals that, within a given context, is allowable, expected, or even demanded to be revealed" (Nissenbaum, 2004, p. 138). On the other hand, norms of distribution govern "what I will call flow or distribution of information – movement, or transfer of information from one party to another or others" (Nissenbaum, 2004, p. 140). The former type of norms determines whether it is appropriate or inappropriate, in a given context, to *trace back* information to an individual, whereas the latter type of norms dictates that information *is to be distributed* according to different standards in diverse contexts or spheres of justice (as in Walzer, 1983).

Informational norms can thus provide a useful ethical frame to be applied to the case of P2P systems. As proposed by Grodzinsky and Tavani (2008, p. 379), this framework suggests two propositions:

*P1:* P2P systems operate according to a default norm in favor of privacy, because personal information is not expected to be revealed in P2P environments unless it is required by context-relevant qualifications.

*P2:* In P2P systems, context-relevant exceptions (technically, qualifications) are assessed in legal terms; they should not be granted merely because of simple

requests by the entertainment industry, majors, property owners, etc.

However, it is still debatable how the evaluation of a context-relevant exception should be made. The two most likely possibilities are (a) an automatic and centralized monitoring of the data to be distributed in the network, and (b) the cooperative actions of the peers in locating material shared by a user who may be violating the law. Given the nature of P2P contexts, what Grodzinsky and Tavani claim is that such an evaluation should be left to the interacting peers, for this “preserves the flow of distribution and does not assume the role of cyber police” (Grodzinsky and Tavani, 2008, p. 380).

In the absence of centralized monitoring, informational resources are distributed according to varying standards in different contexts. Nissenbaum points out that these standards are only implicit; they may be inferred from common practices: “I propose that the requirement of contextual integrity sets up a presumption in favour of the status quo; common practices are understood to reflect norms of appropriateness and flow” (Nissenbaum, 2004, p. 145). Analogically, a presumption in favor of distribution applies to P2P environments, unless context-relevant qualifications demand otherwise, i.e., that distribution occurs in accordance with contextual norms of information flow. Consider the following examples.

Even if it were not illegal, child pornography is generally considered to be unethical because of the presumption that children cannot give informed consent to sexual activity. In this context, both norms of appropriateness (automatic monitoring) and distribution (filtering) should be altered in P2P systems. Children’s vulnerability and rights to protection trump users’ privacy rights, and unchecked distribution would merely encourage continued violation of children’s rights (Grodzinsky and Tavani, 2008, p. 380; Murray, 2007, pp. 157–163).

The second example concerns competing values and interests such as technological innovation and creation, access to informational resources and commercial trade, etc. The aim is to identify the norms of appropriateness and distribution corresponding to common practices, so that “norms [should] be compared with novel practices that breach or threaten them, and judged worth preserving, or not, in terms of how well they promote not only values and goods

internal to a given context, but also fundamental social, political, and moral values” (Nissenbaum, 2004, p. 146). As Helen Nissenbaum claims, “according to the insights of several privacy scholars, the list of values likely to be affected includes: (1) prevention of information-based harm, (2) information inequality, (3) autonomy, (4) freedom, (5) preservation of important human relationships, and (6) democracy and other social values. Values that are regularly cited in support of free or unconstrained flows include: (1) freedom of speech, (2) pursuit of wealth, (3) efficiency, and (4) security” (Nissenbaum, 2004, pp. 146–147). Think for example of authentication protocols as well as identification policies, that provide for use of pseudonyms, OpenID, and ways of ciphering content in P2P systems. In this way it is safer to prevent not only unauthorized access to the information stored at the overlay level of the system, but also legal liability of the content provider who does not happen to be source or the owner of that information (Pagallo, 2008b).

Finally, when those fundamental social, political, and moral values cannot be identified, norms of appropriateness and distribution are to be interpreted so as we may recognize and offer reconciliation to both sides of the dispute: “When these values clash with those that support restrictive treatment, we need to pursue trade-offs and balance” (Nissenbaum, 2004, p. 151). Think for example of Nissenbaum’s reference to the three paradigmatic cases of public records online, consumer profiling, and RFID (Nissenbaum, 2004, pp. 151–153). In the case of consumer profiling, the crucial issue is not whether information is private or public, gathered from private or public settings, etc., since this information may not be confidential or sensitive in nature. Rather, the problem is whether the action is *expected* in a given context according to established practices. For example, “it was integral to the transaction between a merchant and a customer that the merchant would get to know what a customer purchased. [...] Although the online bookseller Amazon.com maintains and analyzes customer records electronically, using this information as a basis for marketing to those same customers seems not to be a significant departure from entrenched norms of appropriateness and flow” (Nissenbaum, 2004, pp. 152–153).

Therefore, a normative context-oriented approach displays a significant “virtue” insofar as “context-relative qualifications” can adapt informational norms

to the nature of P2P contexts and they need not to be treated as “exceptions.” These qualifications, on the contrary, “can be built right into the informational norms of any given context” (Nissenbaum, 2004, p. 156). What is more, a contextual approach can be useful to frame the overlap or conflict between opposite claims as in the case of different specific values and interests which are put forward in the context of the interaction. One of the ways in which this theory differs from other theoretical work is that “it recognizes a richer, more comprehensive set of relevant parameters” (Nissenbaum, 2004, p. 151).

Nevertheless, such “virtues” lead to further problems: How is it possible that “implicit” norms emerge from the contexts that they contribute to defining? How can we identify the boundaries of such contexts? And what about the contextual framework of the invoked fundamental social, political, and moral values that do not necessarily vary “across culture, historical period, and locale”? (Nissenbaum, 2004, p. 156).

In order to address these issues, let us examine another “road” to P2P systems, namely, Floridi’s (2007a) ethics of information. This approach further defines how informational resources should be distributed in the context of P2P networks on the basis of an ontological viewpoint.

### The ontological road to information

Floridi’s ethics of information is an *ontocentric, receiver-oriented, ecological macroethics* (Floridi, 2008). By rejecting a rigid methodological anthropocentrism, this approach calls for a reconsideration of P2P interaction from a wider perspective than that based exclusively on the role of human agents. The informational outlook suggests a different understanding of the interaction between agents and receivers, assuming the “level of abstraction” which asserts that all entities should be represented in terms of information (Floridi, 2008, p. 21):

All entities, *qua* informational objects, have an intrinsic moral value, although possibly quite minimal and overridable, and hence can count as moral patients, subject to some equally minimal degree of moral respect understood as a *disinterested, appreciative and careful attention*.

This perspective aims to explain how interacting agents communicate and share resources by means of positive or negative messages. Due to its ontocentric outlook, Floridi’s informational theory offers a unified perspective for varying statuses and regimes that concern the content of shared resources. In the name of the ontological equality principle, these resources are indeed informational entities that should be morally treated as part of the informational environment or infosphere: Such a principle should not be considered as an indiscriminate justification of the whole *status quo*, but as a moral appraisal of entities *qua* informational systems. Consequently, the goal of Floridi’s information ethics is to be “impartial and universal because it brings to ultimate completion the process of enlargement of the concept of what may count as a centre of moral claim” (Floridi, 2008, p. 12).

Moreover, as a result of its characters of impartiality and universality, this perspective recommends a *field-independent* macroethics so as to rectify “an excessive emphasis occasionally placed on specific technologies, by calling attention to the more fundamental phenomenon of information in all its varieties and long tradition” (Floridi, 2006, p. 256).

A universal normative framework should thus be able to govern the life-cycle of information within the infosphere in an impartial, field-independent way. This framework is grounded in the moral analysis of the concept of informational entropy which is structured according to four moral laws. If informational entropy “refers to any kind of destruction or corruption of informational objects (mind, not of information), that is, any form of impoverishment of being” (Floridi, 2008, p. 11), the four moral laws command that (Floridi, 1999, 2003):

0. Entropy ought not to be caused in the infosphere (null law);
1. Entropy ought to be prevented in the infosphere;
2. Entropy ought to be removed from the infosphere;
3. The flourishing of informational entities as well as the whole infosphere ought to be promoted by preserving, cultivating, enhancing and enriching their properties.

What is striking about this comprehensive normative framework is that entropy refers to informational objects and not to information as such, while the four moral laws do not always refer to informational objects but to the infosphere as a

whole: “The duty of any moral agent should be evaluated in terms of contribution to the sustainable blooming of the infosphere, and any process, action or event that negatively affects the whole infosphere – not just an informational object – should be seen as an increase in its level of entropy and hence an instance of evil” (Floridi, 2008, p. 24).

*So, at the end of the day, does P2P technology negatively affect the whole infosphere?*

Floridi’s approach suggests to consider both the notion of entropy and the four moral laws in connection with the ontological friction in the infosphere. This involves “the forces that oppose the flow of information within (a region of) the infosphere, and hence (as a coefficient) to the amount of work and effort required to generate, obtain and transmit information in a given environment.... Given a certain amount of information available in (a region of) the infosphere, the lower the ontological friction in it, the higher the accessibility of that amount of information becomes” (Floridi, 2007b, p. 3).

By evaluating P2P systems both from the point of view of the ontological friction and “the impoverishment of the infosphere,” Floridi’s four moral laws of information ethics seem therefore fulfilled in two crucial cases.

First, as a potential indirect effect of P2P systems, the progressive extension of a *frictionless* environment represents a positive condition for the creation of intellectual informational objects (e.g., the right to information, education, and culture). As they promote the circulation and distribution of information – and the allocation of informational resources – P2P systems reduce the amount of work and effort required to obtain and transmit information in a given region of the infosphere. Risks for people’s privacy due to higher accessibility of personal information are compensated with anonymity techniques and hard traceability of the nodes in the system.

Secondly, the sharing of information as a *resource* is another potential effect of P2P software, since it represents a positive condition for the generation of new informational objects as a *product*. As we pointed out in the introduction, social exchange is fostered by P2P systems; thanks to the possibility of harnessing the distributed intelligence of the internet as well as the computational resources available at each step of the digital interaction. This positively affects

the informational environment (information as a *target*) insofar as the increase in the number of peers goes hand in hand with the increase in the amount of informational objects.

However, it is obvious that such a data conductivity has its own risks: While the reduction of the informational friction can facilitate the increase in the sharing of informational objects that are obviously illegal like child porn-files (Murray, 2007, pp. 157–163), we also have problems like information overload and security, destruction or corruption of informational objects and, more particularly, of intellectual objects such as copyright. Accordingly, how can we specify the P2P’s “contribution to the sustainable blooming of the infosphere”? Is there a way to determine the appropriate degree of friction in (a region of) the environment? Is it possible to reconcile such a universal treatment of informational norms with the strong emphasis on context-relative qualifications as in the case of copyright?

### **Ethics among peers**

The three different roads to P2P systems we have been considering are not, of course, the only ones. There are several other emerging approaches to business ethics as, for example, the integrative social contracts theory of economic ethics (ISCT; Donaldson and Dunfee, 1999), which seems promising for capturing the ethical implications of the impact of P2P systems on business practices. As further suggested by Calton (2006) and Johnson-Cramer and Phillips (2006), the ISCT perspective can be developed via a discursive process so that differences between information marketplaces and information commons, e.g., the “spontaneous affinities” of P2P users mentioned in “[The topological road to information](#)” section, might be resolved.

Leaving aside the ideal conditions of speech as a fourth eventual road, we believe that the topological, contextual, and ontological approaches to information as shared and processed by P2P systems allow us to focus on the *specific* informational nature of the issues: That is, how the laws of distribution and sharing of information in the network impact business practices and how to understand the new ethical dilemmas that arise in a given context such as P2P interaction. There is in fact a significant con-



vergence between the emphasis on context-relative qualifications and informational universalism.

On the one hand, the contextual approach enables the identification and support of fundamental values: “Conducting [...] a comparison in terms of social, political, and moral values, involves identifying fundamental values that may be served by (or obscured by) the relevant informational norms imposing restrictions on the flow of distribution of personal information in a given case” (Nissenbaum, 2004, p. 146).

On the other hand, the informational universalism takes the fallibility of human nature seriously: “Perhaps, we should consider that the ethical game may be more opaque, subtle and difficult to play than humanity has so far wished to acknowledge. Perhaps, we could be less pessimistic: human sensitivity has already improved quite radically in the past, and may improve further. Perhaps, we should just be cautious: given how fallible we are, it may be better to be too inclusive than discriminative” (Floridi, 2008, p. 27).

As we previously stressed, empirical evidence is indeed controversial and, what is more, we still ignore possible developments in the P2P architecture that will have not only technical but political relevance. So, going back to Floridi’s information ethics, can we determine whether P2P systems really promote “the flourishing of information entities as well as the whole infosphere”? Are there not specific contexts, e.g., copyright legal field, where this technology easily permits its users to impinge on other people’s rights? Is there something like a “presumption in favour of the status quo” as Nissenbaum claims (2004, p. 145)?

What we propose is to integrate the contextual approach with the ontological road to informational norms in order to determine on whom the burden of proof falls in a given context, on censors or advocates, by singling out both the default norms and exceptions in the use and development of P2P software.

First, we should avoid the exaggerations of both advocates and censors of this technology. Although P2P systems have become infamous as file sharing applications that make it particularly easy for users to access copyright-protected files for free, they involve a number of substantial non-infringing uses like new applications for distributed databases, advanced computing, broadcast and multicast services, and so forth, that have opened new markets by making the

“short route” even shorter: P2P applications are more complex and multifaceted than the simple downloading of video and music. This is why we think that the burden of proof ought to fall on those who want to prevent us from developing and using these systems (Pagallo, 2008c). Otherwise, risks and threats of this technology would only be but an excuse to curtail other basic interests and rights like freedom of research, of speech, or the fundamental value granted by the first paragraph of Article 27 of the Universal Declaration from 1948, i.e., “the right freely to participate in the cultural life of the community, to enjoy the arts and to *share* in scientific advancement and its benefits.”

Secondly, P2P technology as such is not at stake: This is crucial even when we focus on a specific sector like, say, music industry, and consequently claim that P2P software “merely reproduces others’ creative work” and that “this process risks injuring the music creators’ interests” (Xiaohe, 2006, pp. 70–71). Indeed, even in this case, the same scholar fairly admits that P2P file sharing-applications are “a new type of distribution” suggesting how “a new type of music production is needed. Legislation *should* enhance such a new development, support P2P technology in the interests of the public, protect copyrights, and regulate P2P stakeholders’ interests in a balanced manner according to the ethics of law” (Xiaohe, 2006, p. 73). All in all, “as even the recording and movie industries concede, P2P software ‘can be used for lawful exchanges of digital files’” (Lee, 2005, p. 155; quoting a brief for Motion Picture Studio and Recording Petitioners in *MGM vs. Grokster* from 2005). Therefore, in order to protect intellectual property rights, it is crucial to grasp that “companies should try to apply and realize the advantages of new technologies to increase consumers’ benefits, instead of resisting change, simply declaring their rights, and imposing the guilt of piracy on consumers” (Shang et al., 2008, p. 361).

*Finally, what about personal responsibility? Would it only be a matter of stealing?*

It is no mere coincidence that most of the troubles of P2P systems have been entwined with traditional copyright claims in the defence of the “long route” between creators, business, and the public. Certain forms of copying can obviously be considered immoral when they impoverish the infosphere by dampening creativeness and, therefore, diminishing

learning. Yet, we should not forget that copyright have been evolving over the last two hundred years in one direction only.

As the right to seeing her interests protected in any artistic or scientific production, the author's exclusive right to exploit the benefits of her own work, with the drawbacks of such a monopolistic condition, has always been counterbalanced by determining a period after which the exclusivity expires. If the first copyright act, i.e., the Statute of Anne in U.K. (1709), established a *fourteen*-year term of protection, this period has been expanded, as the U.S. experience paradigmatically illustrates. From the standard fourteen-year term of protection granted by the U.S. Copyright Act in 1790, copyright was extended to cover *twenty-eight* years in 1831, a *further* twenty-eight years of renewal in 1909, *fifty* years after the author's death in 1976, and *seventy* years in 1998.

So, the result is that the second clause of Article 27 of the Universal Declaration of Human Rights, i.e., "the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author," simply prevails over the first one, that is, the above-mentioned "right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits."

What we need is a more balanced interpretation of these rights. On the one hand, technical solutions for the next generation of P2P systems will need to cope with plain revenues for owners and ways for sharing profits with providers or mediators such as banks, credit card companies, brokers, or certification authorities (Pagallo, 2008a). Think about the Market Management of Peer-to-Peer Services or MMAPPS project, along with the credit system of Emule, the "tit-for-tat" model in Bit Torrent, the FairPeers model, etc.

On the other hand, as stressed by Xiaohe (2006, p. 72), "with regard to the distribution of benefit and burden, we should not just consider copyright holders' benefit, but also include the other stake-holders. We should also consider how all stake-holders can co-construct the new market." Instead of repeatedly extending terms of copyright protection, we should admit new ways of defending creativity such as, say, creative commons licenses in the U.S. or extended collective licenses in the E.U. Laying aside other possible legal solutions, it is likely that a more balanced

interpretation of the rights granted by Article 27 of the Universal Declaration of Human Rights will involve the reconciliation between old and new forms of copyright protection.

### Contribution to the literature

This article contributes to the literature on P2P systems so as to take sides in today's strongly polarized debate, that is, between P2P censors and opponents (e.g., Keen, 2008) and those who present these systems as the key to a new paradigm (e.g., Bauwens, 2005).

It is not the first time scholars have suggested dealing with P2P systems in a more balanced way. For example, Lee (2005) proposes "a way that best balances the interests of deterring copyright infringement and promoting technological innovation" in connection with the safe harbor-doctrine provided by the US Supreme Court's ruling in the *Sony* case. While P2P developers should have the freedom to innovate and develop software that is capable of substantial non-infringing uses, the traditional standards of secondary liability would apply for other conduct beyond the design, sale, or supply of the technology. For example, this is what occurs when developers facilitate infringement "by providing instructions and advertising on how to copy copyright works" (Lee, 2005, p. 156).

Our approach aims to integrate this perspective both from a legal and ethical viewpoint. We agree that P2P technology as such should not be at stake; yet, legal troubles of P2P systems involve not only developers but P2P users as well. Lee claims that "in the case of P2P software, it is clear that it facilitates both lawful and unlawful copying. It is important to remember that copying is not an inherently immoral act – it depends on the context.... Certain forms of copying could be considered immoral because they have an overall harm on society" (Lee, 2005, pp. 157–158). So, the aim of our article is to shed further light on these issues by examining both the context-based perspective developed by Helen Nissenbaum and the informational viewpoint on ethics proposed by Luciano Floridi. On this basis, we offer the "context-relative qualifications" or exceptions (Nissenbaum, 2004) that can properly be applied to the nature of P2P systems in order to

determine when copying would impoverish the “infosphere” (Floridi, 1999, 2003), by dampening creativity and, therefore, diminishing learning.

As stressed by Lu Xiaohe, however, “it is obvious that, from the legal and ethical points of view, maintaining the production of music file-sharing is problematic” (Xiaohe, 2006, p. 68). Although P2P systems have become infamous as applications that make it particularly easy for users to access copyright-protected files for free, the fact is that we cannot solve the problem by simply shutting these systems down. As the same scholar fairly admits, P2P file sharing-applications are “a new type of distribution,” suggesting “that a new type of music production is needed. Legislation should enhance such a new development, support P2P technology in the interests of the public, protect copyrights, and regulate P2P stakeholders’ interests in a balanced manner according to the ethics of law” (Xiaohe, 2006, p. 72).

We take Xiaohe’s claims seriously by illustrating how P2P systems really work, optimizing how information is shared and distributed in complex social networks, opening new markets, harnessing the novelty of social exchange based upon reciprocity and cooperation, etc. Yet, the problem is that standard ethical theories as in the case of “the ethics of law,” cannot be easily adapted to tackle the new informational issues created by digital technology. While proposing some concrete recommendations in connection with the rights granted by Article 27 of the Universal Declaration of Human Rights, we have thus suggested that Xiaohe’s proper balancing between P2P stakeholders’ interests and copyright holders should allow us to determine the appropriate degree of friction in (a region of) the social environment, that is, a positive condition for the creation of intellectual informational objects (e.g., the right to information, education, and culture).

Finally, we examined the empirical research on the ethical decisions about P2P file sharing: As Shang et al. (2008) affirm, “the results show that deontological evaluations are influenced by the belief in the ideology of consumer rights in all alternatives, and its impacts are larger than most of the other antecedents” (Shang et al., 2008, p. 359). As in the case of both Lee’s and Xiaohe’s work, the overall idea is “that to protect their property rights, record companies should try to realize the consumer benefits brought

via new digital and network technology, instead of simply declaring their intellectual property and resisting the innovations resulting from new technologies” (Shang et al., 2008, p. 349).

However, even when we narrow our focus on the impact of P2P networks on industry profitability, empirical outcomes are quite controversial. Some evidence suggests that P2P systems reduce sales of music (Zentner, 2006), of movies (Rob and Waldfogel, 2006), etc. Others affirm that such software does not affect sales at all (Bhattacharjee et al., 2007; Smith and Telang, 2008); and, furthermore, there exists some work showing a positive effect of file sharing on sales (Andersen and Frenz, 2008; Gopal and Bhattacharjee, 2006). Even so, if “piracy and music sales are largely unrelated” with “clear evidence that income from complements has risen in recent years” (Oberholzer-Gee and Strumpf, 2009, p. 25), it is nonetheless obvious that piracy would not stop being a reproachable thing and would require some regulatory attention. This is why we aim to integrate empirical research via a normative viewpoint so as to summarize our conclusions in terms of burden of proof. In accordance with P2P advocates, we argue for a presumption in favor of these file sharing applications-systems. Yet, in accordance with P2P censors, illegal uses of this technology can be made and these ought to be specified in order to introduce an exception to the general presumption in favor of the use of this software. What it is crucial is hence to widen our perspective and, along with the protection of copyright interests, consider some other relevant issues like search efficiency, incentive mechanisms and transparency, privacy, inadvertent disclosure of sensitive information, or concerns about the fact that many P2P users do not know what they are really installing. After a decade of copyright crusades, it is time to deal with P2P systems in a more balanced way.

## Conclusions

We have examined three “roads” to P2P systems so as to take sides in today’s highly polarized debate.

First, we illustrated the topological approach in order to understand how a “short route” has joined – and sometimes replaced – the traditional “long route” between creators, businesses, and the public. P2P technology has opened new markets by opti-

mizing the distribution of informational products. As empirical work shows, however, the final output of such software is still debatable.

Next, we considered a context-based perspective to determine the norms that govern the informational flow in P2P systems, that is, both norms of appropriateness and distribution. A presumption in favor of P2P interaction is put in place unless context-relevant qualifications require an alteration of such a distribution in accordance with appropriate norms of informational flow: P2P legal issues not only concern copyright interests but people's contextual integrity as well.

Finally, the third road illustrated the ontological bases of P2P interaction in the light of four moral laws. Whereas "good" may be defined as anything that improves or enriches the infosphere – making "evil" its opposite, entropy – it is important to distinguish the behavior of P2P users from the software as sources of good and evil. The proper balancing among different rights and interests should allow us to determine the appropriate degree of friction in (a region of) the infosphere.

The conclusions can be summed up in terms of burden of proof.

In accordance with P2P advocates, we argue for a presumption in favor of these file sharing applications-systems. They optimize how information is shared and distributed in complex social networks, thus opening new markets, harnessing the novelty of social exchange based upon reciprocity and cooperation, etc.

Yet, in accordance with P2P censors, illegal uses of this technology can be made and these ought to be specified in order to introduce an exception to the general presumption in favor of the use of this software. The *main legal* problem, however, does not involve piracy but a more reasonable interpretation of the rights granted by UDHR's Article 27.

What it is crucial is to widen our perspective and, along with the protection of copyright interests, consider some other relevant issues like search efficiency, incentive mechanisms, and transparency (Vaccaro and Madsen, 2009b), privacy, inadvertent disclosure of sensitive information, or concerns about the fact that many P2P users do not know what they are really installing. After a decade of copyright crusades, it is time to deal with P2P systems in a more balanced way.

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