From mass communication to new media: a network perspective

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Abstract

The purpose of this article is to determine the structural form of new online media, with network theory as the main framework of analysis. We argue that this form is a consequence of the shifting of the fixed positions of emission and reception that characterize classical media at a fundamental level. Based on technological, economic, legislative and social aspects, we show that the historical evolution which led to new media may be described by the concept of indifferentiation. This concept characterizes the historical transition between mass media and new media, but also the transition between so called web 1.0 web 2.0. This is a well-known dynamic within the theory of complex systems. Recently, a similar dynamic occurred in the structure of new media. We use these results as a basis to show that the form of new media is identical to that of space of networks, in the sense that this expression is acquired from modern network theory. We then show the social dynamic that determines this form of new media. We conclude that the evolution of new media simultaneously introduces and accelerates a process of social indifferentiation

Keywords: Classical media, World Wide Web, network theory, power-laws, social networks, social visibility

Introduction

It is now clear that the dynamics and structure of technology-based media are undergoing a profound change. The existence of an open content distribution platform facilitated the emergence of new communication platforms upon which millions of individuals participate. The examples are well-known, from the World Wide Web to Facebook, in addition to Wikipedia, Flickr and YouTube. They represent new media, participatory media (Among the audience, 2006), mass self-communication media (Castells, 2007), crowdsourcing media (Howe, 2006; Huberman, 2008), where "one-to-many 'lectures' (i.e., from media companies to their audiences) are transformed into 'conversations' among the people formerly known as the audience" (Among the audience, 2006). In this article, we seek to clarify this intuition about the profound shift from classical media to new media.

The main idea consists of showing how technological, economic and social factors lead to the indifferentiation of the "sender" and "receiver" positions described by classical mass communication models. These factors allow for an explanation of the emergence of mass participation in new media. That participation is driven by a specific dynamic involved in the act through which millions of individuals go public. The result of that dynamic consists on the form of space in new media being identical to the general

form of space of networks, in the sense that this expression is acquired from the framework of the so-called network theory (Dorogovtsev & Mendes, 2003).

The article's structure is the following. In the first section, we generally analyze the main characteristics of classical media, emphasizing the basic structure composed of two fixed positions, Sender → Receiver. In the second section, we analyze the technological and economic conditions, centred on the computer and Internet, which affect the development of new media and contribute to a shift from the two previous fixed positions. In the third section, we present the concept of open platform in content production. In the fourth section, we analyze the problem of content certification in new media. In this section, we present the main formal characteristics of new media, insisting upon the existence of power-law distributions. In the fifth section, we analyze the undifferentiating social dynamic of crowdsourcing media, showing how that dynamic is the cause of the specific form of those media. The conclusion indicates the nature of the new media companies.

Classical media

The Shannon-Weaver model is generally accepted as a base model for technologically mediated communication. It includes a Source that transmits a message through a Channel, which reaches a Destination through a Receiver. D. Berlo (1960) applied the model to any communication process according to the Source 茟 Message 茟 Channel 茟 Receiver structure. Berlo and especially W. Schramm (1963), above all took into account the model's application to mass media, which were becoming the dominant media during the 20th century. Applied to these media, the model describes the existence of a Sender (Source) who sends (broadcasts) to an undifferentiated set of Receivers (Recipients). The model can be applied either to interpersonal or to mass communication mediated by a certain kind of technology. In the first part of paper, we only focus on the later.[1]

For a better understanding of the model as he applies to mass media, it is important to recall, in broad lines, the historic emergence of the popular press and of the radio as broadcasting. That historic development provides the causes that were the driven forces that brought into reality the basic structure of classic mass media.

It is known that technologically mediated mass communication began to develop with the development of the industrial press during the mid-19th century. The confluence of four factors made mass media possible: technological, economic, legislative and social. Distribution by railway, the constant increase in printing speeds, the invention of the stereotype and linotype, as well as the use of wood paper, created an industry

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[1] The model was the subject of numerous modifications and criticism (cf. McQuail, [1983], 2000, for an overview), but in this article we assume that he always describes the fundamental structure of any mass media.

that required a substantial initial capital investment, only accessible to a shrinking number of individuals.[2] Those technological innovations created the context that made possible the economic model that would characterize daily mass media for more than one-and-a-half centuries. It was discussed by Emile Girardin in an early issue of the French newspaper *La Presse*, 1836.[3] Perhaps for the first time understanding that these were specific economic dynamics of information, Girardin distinguished between two types of newspaper production costs, namely falling costs (*frais decroissants*) and rising costs (*frais croissants)*. The first are fixed costs such as those for machinery, the editorial room and typographic composition. These costs are decreasing because they "fall in inverse proportion to the number of users, becoming less sensitive and apparent as they are shared by a greater number of copies." Girardin understood that a newspaper is subject to an economy of scale characterized by falling costs (or *increasing returns*): given the initial fixed costs (editorial room, machinery, etc.), the marginal cost of each copy decreases exponentially (and not only "proportionally", as Girardin, wrongly, seemed to think) with the number of units produced. On the other hand, rising costs, according to Girardin, were variable costs (e.g., the cost of paper), which increase proportionally with the number of copies printed.

If falling costs are a defining trait of assets based on information (Arthur, 1994), variable costs were still high in Girardin's age. As described below, that marked difference between falling costs and rising costs only recently witnessed a drastic decrease, when each copy's production and distribution cost approached zero. In the 19th century, falling costs, in addition to paper, included taxes which during that era were still applied to each title printed. They decreased when countries such as England eliminated the old "tax on knowledge" (tax stamp and taxes on advertising) in the middle of that century. By the end of the century, with economic capacity in place for that purpose, the conditions for establishing a newspaper became simple administrative formalities, as likewise resulted from the freedom-of-the-press law promulgated in France in 1881.

Finally, in the social dimension, the old society of Orders, typical of the monarchies, were steadily replaced by a society which A. de Tocqueville (Tocqueville, ([1840] 1961) definitively described as the emergence of "equality of conditions". It is a basic social condition based on the normative principle according to which any individual may occupy any social position over time. Tocqueville called this new social condition "democracy". It does not identify any political regime but rather the new social condition in which individuals become increasingly interchangeable, as opposed to the old social order in which individuals were predestined to occupy a certain social position. "Democracy", according to Tocqueville, is a state of *indifferentiation* in the sense that its norm entails any social position being open to everyone. The individuals are similar, they do not differ, in the extent that each one can occupy the social position that

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[2] Cf. Innis (1942) for technological and economic aspects present at the inception of mass media. Cf. also Starr, 2004.
[3] Cf. *La Presse*, 15 June 1836.

any other also can: along time, they can change. This is a *norm* (not a fact), a sort of referential and a method of analysis to which empirical reality conforms more or less. Indeed, the development of "equality of conditions" is an *historical process*, never fully accomplished because some *difference* always remains.[4]

Mass communication broadened with the advent of broadcasting, particularly when radio, during the 1920s, marked a rupture in the mode of print media dissemination. While broadcasting is fragmented in space and time, a media like radio produces a far more visible indifferentiation, since it operates in *continuity*, both in a spatial and temporal dimension: undifferentiated large geographic range and potentially uninterrupted broadcasting over time. The transition of radio from a point-to-point media like wireless telegraphy to a broadcasting media was only possible due to the confluence of technological, economic, legislative and social factors.

Radio assumed its modern form with the emergence of a technology for broadcasting that was technologically very complex and economically expensive (vacuum tube and alternators) and, almost simultaneously, with the development of a technology based on simple, increasingly cheap reception devices (receivers) (Aitken, 1976, Barnouw, 1967). In parallel, legislative action by governments favoured the concentration of broadcasting power among a shrinking number of companies. In the United States after World War I, the North American Navy indirectly exercised government regulation by requiring the main radio patent holders (General Electric, AT&T and Marconi) to combine efforts. In 1919, that led to the creation of RCA (Radio Corporation of America).[5] Subsequently, the Radio Act of 1927 declared the electromagnetic spectrum to be a public asset that could be licensed to private operators, thereby giving rise to the process of broadcast network consolidation.[6] In Europe, governments assigned broadcasting rights to monopolistic companies, such as the BBC in Great Britain (cf. Coase 1947), or stipulated mixed regimes (e.g. France).

Finally, broadcasting became society's dominant media when it met social demand for entertainment from a growing number of individuals completely disconnected from community elements typical of the old society of Orders (cf. Douglas, 1987). Initially, entertainment revolved around listening to music. In 1906, Lee de Forest came up with the idea of reaching a bigger audience than the one he experienced in music auditions at the New York Opera. A few years earlier, a medium such as the telephone was also viewed as a potential transmitter of music (cf. White, 2004). As such, radio as broadcasting medium meant the extension of listening entertainment content from the space of a concert hall to a greater, more

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[4] The concept of indifferentiation is derived from the dynamics observed in the so-called critical phenomena. In these systems, typically, we start with two different states, and by the action of an external parameter, there is less and less difference, and the system evolves towards a so called critical point. Precisely at the critical point, there is coexistence of the two different states. This is indifferentiation - which corresponds precisely to the critical point -, where the difference between the two states vanishes. Below, these kinds of dynamics will be described in an exact way (see references, note 27).

[5] Cf. Barnouw (1967) and Benkler (1998) regarding the decisive role that patent agreements played in the development of radio.

[6] Cf. Starr (2004, 343:446). The same author also emphasizes the decisive role that agreements concerning patent rights played in the development of radio.

homogeneous space, i.e., it meant a spatial extension of the relationship of the audience attending a public music performance.

Technology, the economy, regulation and the new social condition of autonomous and equal individuals (in Tocqueville's sense) led to the emergence of broadcasting as the main form of 20th century mass media; first radio, then television. Broadcasting is directed at undifferentiated individuals in the sense that all are identical receivers. Its fundamental structure is the absolute difference between sending and receiving positions. It is in this broad sense, that in this article we understand the "sender" and "receiver" positions. The "sending" position encompasses access to the channel, technologies of production, transmission and distribution, as well as the content produced and its legal framework. All of the above comprise "broadcasting". On the other hand, in the case of classical mass media, the receiving position is especially characterized by the type of technologies used in this type of position. The important point is the asymmetry or difference between the two positions.[7] For example, as cited above, broadcasting is characterized in the sending position by technologies and economic resources that are completely different from those existing at the receiving point. Government action also regulates the sending and receiving points in a completely different manner. Additionally, as emphasized previously (cf. Schudson, 1978), newspapers (first) and broadcasting stations (later) in the "sending" position became organizations with a hierarchical structure that editorially defines who sends and what is sent. In short, the fundamental form of traditional mass media consists of the existence, in one of the positions, of sophisticated and economically expensive technologies, as well as legislative and editorial normative principles, and, in the other position, simple, cheap and individual technologies that are limited to receiving. It must be noted that *the principle of growth* based on this media is rather simple. It involves the addition of more recipients of the same sender, beyond the existing ones. In this structure, the addition of a new recipient does not depend directly upon the existence of previous recipients. The addition of each new recipient is linearly independent of the addition of each previous recipient, so that the system is simply the sum of all recipients oriented towards the same sender.

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[7] Of course, mass media can treat the receivers (the individuals) as highly differentiated markets. Nonetheless, and this is the main point, they are all still 'receivers' and it is in that sense – occupying the position of 'receiver' – that they are all identical.
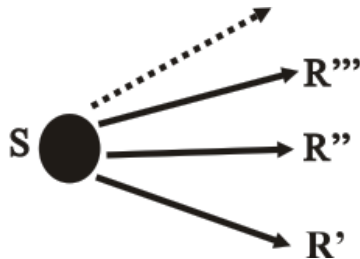
Figure 1. The fundamental principle of growth of classical mass media. It should be noted that the system may be considered as the sum of the independent and oriented pairs: S →R', S → R''; S → R''', S → ….

New Media

The passage from classical media to new online media consists of progressive indifferentiation, over time, of the "sending" and "receiving" positions. It is an historical process in which the indifferentiation of positions represents the progressive interchangeability in space and over time of the two positions: each position may become more indistinguishably occupied by any individual. *It is in this sense that new media follows on from classical mass media.* From an historical point of view, they emerge from the growing lack of distinction between previous distinctions. In a general sense, new media may be *defined* as a result of the progressive indifferentiation of classical sending and receiving positions; such media will be defined through an evolutionary historical process that must assume characteristics of classical mass media, summarized above, as a starting point. An historical process of indifferentiation is a trend that leads over time to the steady approximation of previous differences.

However, as will be shown, indifferentiation is mainly a benchmark of analysis – an abstract mechanism – of empirical reality. Indifferentiation is the approximation of reality to the abstract mechanism, upon which some difference always remains over time between the sending and receiving positions. We will see how indifferentiation manifests itself over time in the four dimensions cited above concerning classical media, the dimension of technology, economy, regulation and the social dimension of production and consumption of new media content.

The computer and the Internet

In order to understand the dynamics of new media, it must be borne in mind that the digital computer represents new media's basic technology. This is the essential technological fact. It was also decisive that

some pioneers of computing, particularly J. von Neumann (von Neumann, 1945) had drawn a clear demarcation line between the machine (hardware) and the programs (software), and, in turn, had come up with the idea of the stored computer program. That separation is not a logical necessity in the design of a computer.[8] Still, its adoption has two crucial consequences. Firstly, it originates the new universally programmable machine, i.e., capable of indistinguishably executing any type of correctly defined and previously recorded program in memory. Secondly, computers became available with a minimum degree of programming created by manufacturers themselves. Programs were increasingly developed by companies and individuals without any direct relationship to the hardware manufacturer (Campbell-Kelly, 2003). In turn, that was only possible due to another – also accidental – event. While the telegraph, telephone and components of a radio device were patented, J. von Neumann decided *not to patent* the computer (cf. Campbell-Kelly & Aspray, 2004). He allowed the design of a new machine to remain in the public domain from its inception, such that its uses could not be fully regulated or controlled by individual or corporate holders of intellectual property rights.

It is now possible to evaluate the extraordinary historical importance of the existence of a machine with a design in the public domain, universally programmable and subject to alteration by a large number of individuals. None of these characteristics represented a logical necessity but resulted in the computer becoming an *open platform*: any individual may develop any type of functionality that may be executed by that type of machine.[9] A *non*-dedicated technology became available. As has become abundantly clear – in fact so clear that the phenomenon has become imperceptible –, the computer may support various computing formats (text, sound and image) previously dedicated to execution only on certain types of machines. In that regard, we may address technological indifferentiation.

The subsequent technological development that facilitated the emergence of new media was the networking of computers. The technology is forty years old and began with the ARPANET network in the late 1960s. In the next two decades, the crucial idea of federating the various networks emerged as a meta-level "Internetworking Architecture", giving rise to what became known as the Internet.[10] As with the computer, to be an open platform is an essential characteristic of the Internet. That property also did not (and does not) represent a logical necessity.[11] The protocol of internetworking, the TCP/IP (transmission-control protocol/internet provider*)* protocol emerged for practical reasons of network reliability. It is a protocol structured according to the principle of end-to-end design. This means that it is neutral, regardless of the content format conveyed from one IP address to another (Saltzer et al., 1984). The protocol

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[8] Cf. Ceruzzi (2003: 81-84) on the origins of the stored-program computer concept, particularly the references to Konrad Zuse. The computer itself became a "programmer" when strings of code were recorded in memories and executed automatically as necessary.
[9] That point was emphasized extensively by J. Zittrain (2006) based on the concept of generative technologies.
[10] For the evolution of the Internet, see Hafner & Mathew (1996), Leiner et al. (1997), where the expression "Internetworking Architecture" can be found.
[11] L. Lessig (1999) was among the authors who best expressed the absence of any logical necessity or technological determinism in the Internet's development.

guarantees distribution regardless of the type of existing or future digital format. It bears emphasizing that such neutrality – such indifferentiation in light of the specific format of content conveyed – facilitated the extraordinary development of the Internet over the past four decades. When the protocol was created, no one imagined the later emergence of the World Wide Web or any of the audio and image formats that have been created since then. No one would have imagined that the traditional and specific content distribution channels could have converged into a single channel based on TCP/IP (Leiner et al., 1997).

In the context of legislative regulation, the difference between traditional broadcasting media and the Internet is also large. A broadcasting channel is usually licensed by the government to a company that assumes control over that channel. It is true that physical connections on the Internet have ownership, and government action during the 1990s that required telephone companies to provide non-discriminatory access to their lines was important.[12] But the Internet's most important level is the logical level defined by TCP/IP.[13] That level is open in the dual sense of being neutral and within the public domain; therefore, it has no ownership and is only indirectly regulated by governments (at least in occidental democracies) The result is that any company or individual, in the absence of obstacles created by intellectual property laws (cf. below) may freely execute programs and distribute content online.

From the perspective of undifferentiated dynamics of new media, the most important point is probably the fact that the existing technology at the end-points of the Internet is always the same: the open and universal computer.[14] This means that previous technological differences of classical media are blurring. While there is a clear, total distinction between the technology of sending and receiving in classical media, on the Internet, the "sending" and "receiving" device *is the same in both positions*, i.e., and again, the universal computer. There is a multifunctional technology, identical in two positions, that enables the production and distribution of the most varied computing formats. This is very different from the situation typical in broadcasting radio or TV, where the technologies at the 'sending" position are very different from the simple technology that exist at the "receiving" position. We stress that this is a crucial point.

If technology and regulation indifferentiates the positions, the same occurs with economic costs. It is relatively true (at least in developed countries) to state that the basic technology (and its programs) is economically accessible to nearly everyone, just as the distribution channel (the Internet itself) is (almost) equally accessible to all. We are far beyond the high initial costs necessary to create traditional mass media. And variable distribution costs, whose values, as asserted by Girardin, were decisive in the industrial

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[12] In the United States, interconnection among lines owned by various telephone companies was guaranteed by the Telecommunications Act of 1996. The principle of Internet neutrality was recently reaffirmed by the FCC, cf. 'In the Matter of Preserving the Open Internet - Broadband Industry Practices', retrieved from http://transition.fcc.gov/Daily_Releases/Daily_Business/2010/db1223/FCC-10-201A1.pdf. Similar legislation emerged in various European countries.
[13] Cf. Benkler (2006) on the distinction among the three levels – physical, logical and content levels – which characterize any technologically mediated communication process.
[14] We are speaking about the "computer" in the general sense of something capable of universal computation, whatever the physical device that implements that kind of computation.

press, also drop drastically on the Internet. In short, the emergence of new media represents the passage from dedicated, complex and expensive sending devices, and dedicated, simple and cheap receiving devices, to a single, multifunctional, and relatively cheap device identical on both sending and receiving points, based on an open and also relatively cheap technology of distribution. It represents the passage from one technology to another that indifferentiates previously differentiated positions.

Peer-to-peer networks

It is a trend that is verified, whether in the passage from traditional media to online media, or in the historical evolution that these have followed. Based on the physical Internet, there are numerous virtual networks with more or less asymmetrical technological design between the sending and receiving positions. As such, some of the typical asymmetries of classical media are still present on the World Wide Web (WWW) architecture, created around 1990. In spite of that feature went against the wishes of its creator (cf. Berners-Lee, 2001), the WWW is an asymmetrical client/server network, i.e. those two positions do not shift and remain fixed: neither position may be both client and server simultaneously (or almost simultaneously).[15]

It is this asymmetry which another network type, peer-to-peer computing (P2P), explicitly seeks to avoid. Despite the fact that peer-to-peer computing concepts may date back to the beginning of the Internet,[16] it is significant that the most important network architecture that historically followed the WWW is an architecture in which all computers are potentially peers.

That is the case with the current generation P2P networks. Perhaps one of the most well-known examples is BitTorrent.[17] On this network, a computer that originally provides a file is a "seed", from whom "peers" on the network can make downloads. After a download, a peer may change functions and also become the seed, or may permit the viral and distributed propagation of information through the network. Each BitTorrent member, almost simultaneously, may be both seed and peer. Considering the network as a *whole*, its principle of operation consists of the permanent shifting of the seed and peer position, i.e. all members may be considered seeds (senders) and peers (recipients) indistinguishably. Below, we will assert that the participatory intensity of seeds and peers may vary, but we can now assert that the mechanism of indifferentiation is the typical mechanism of new media. That mechanism must be clarified, with the help of P2P network example.

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[15] A client is a program (e.g. a browser) that requests information from a server computer.
[16] ARPANET's main objective was to enable the sharing of computing resources among many machines, cf. Hafner (1996: 38).
[17] On the BitTorrent architecture, cf. Cohen (2002).

A P2P network becomes attractive based upon the amount of content provided by the peer computers of members who join. It does not pertain only to the indifferentiation of computers' client/server functions. That indifferentiation at the level of technological network design creates conditions for any network member to send and receive content (music and video files, programs, etc.) to the network which transforms it into an *interactive platform*: the membership of one individual is a direct incentive for the other to be also a member and, perhaps, to add and provide content. This represents a manifestation of the morphogenetic principle of new media growth; in this case, the principle of network externalities. This means that the value of a network, platform or standard grows exponentially with its number of users (for a summary, cf. Economides, 1996). It entails a general principle of *imitation*: each individual is rationally encouraged to do the same thing as the others.

The externalities themselves do not define new media, since they were obviously present in the development of telephone networks at the end of the 19th century (cf. Flichy, 1995). Network externalities are a case of the general principle of *positive feedback*. This principle of imitation is the morphogenetic principle of growth in new media. It is a morphogenetic principle that *defines* a platform as an *interactive* process.[18] An interactive platform grows through the mechanism that indifferenciates the fixed positions, such as "sender" and "recipient". By joining a network, an individual becomes the "recipient" of existing content, but also becomes a "sender", by, in turn, providing content that will encourage outside individuals to join in turn. It is clear that, at any time, an individual is a "sender" or "recipient", and, therefore, there is a difference across the dimension of time, just as the intensity of participation may vary. But the mechanism of positive feedback causes the emergence of the simultaneous global aggregate of all "senders" and "recipients", which merge into a *single whole*: the network or platform that emerges from the acts, all identical, from each network or platform's individual membership. At a certain moment, a peer individual is a recipient of content, and in the next moment that peer may be the sender to another peer who is his/her recipient, who, in turn, by providing content, becomes the sender in order to encourage other individuals to imitate him/her, that is, to join the network. As such, abstractly, any individual member of the network may indistinguishably be designated as sender and recipient. That abstraction or totality contains a reality: the medium or platform created by individual members and senders of content, membership that is likewise created by the medium or whole through which individuals interact indirectly.

It is a growth principle of a medium's emergence. It is autonomous from the individual acts (the adhesion) that created the medium, which at the same time is created by individuals connected through what they create. It is a mechanism different from the linear, asymmetrical and unidirectional sender 荤 recipient type

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[18] Everett Rogers was perhaps one of the first to define new media as interactive platforms in that sense (Rogers, 1986, 195:196).

structure. It is the mechanism of causality characteristic of positive feedback in which the "cause" (medium) and the "effect" (membership) are merged and become indistinguishable (cf. figure 2).
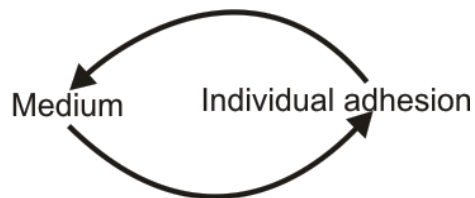

Figure 2. Positive feedback and the mechanism for formation of new media.

Coming after the WWW, P2P networks represent a moment of progressive indifferentiation of the fixed difference between sender and recipient existing in classical media. Apart from P2P networks, growth by positive feedback is present in networks generically grouped under the term Web 2.0. They are participatory media or crowdsourcing media (Howe, 2006, Huberman, 2008), mass self-communication media (Castells, 2007). YouTube and Flicker are well-known examples. They are platforms that grow according to interaction between peer producers/consumers of video and photography content: it is the effect of that interaction which creates the platform and which, in circular fashion, strengthens the membership of individuals. Below, we shall see that the same mechanism is present in social networks and that this mechanism has a quantifiable form.

Open content production

The creation and distribution of content by thousands and millions of individuals becomes possible when there are open platforms of content production (computer and programs) and distribution (Internet). However, the main obstacle in the development of some interactive platforms lies in the existence of current intellectual property laws, especially copyright laws. They have provoked a conflict, more intense than ever before, between the holders of intellectual property rights and a vast number of individuals who exchange and transform information; it is a veritable war (Litman, 2006).

Conversely, however, the ultimate objective of intellectual property laws is to encourage the future creation of informational content, and for that reason a monopoly is temporarily granted to individuals who effectively create (Landes & Posner, 2003). The effect of these laws makes it more difficult to gain access to the use and transformation of content protected by such laws. In the absence of intellectual protection

laws, content (information) is objectively a non-rival good (the consumption of a work does not prevent identical consumption by another person, nor does it reduce its available "amount") and a non-exclusive good (the work is available as input for new works). Intellectual protection laws render information (partially) rival and exclusive, increasing its price and impeding free access to and transformation of such information (Lévêque & Menière, 2003).

In the context of the war between traditional content-producing companies and their users, new forms of information (such as GPL, mentioned below) protection have emerged recently with the precise objective of not protecting the information, seeking to restore its non-rival and non-exclusive nature. There are new forms of information creation and distribution that create *open platforms at the content level*. If the Internet is an (almost completely) open platform in the context of technology, economy and direct regulation, we now encounter open platforms in the context of content as a defining trait of new media. An open content platform makes information non-rival by reducing the economic costs of production, distribution and use of information, favouring creativity (cf. Lessig, 2001). Conversely, there are *closed platforms at the content level*, defined by the exercise of restrictive intellectual property laws which raise the price of distribution, consumption and transformation of information. They are the platforms upon which the business model for traditional content-producing companies is based.

The opening of content does not reside solely in the existence of information in the public domain or in legally dubious acts of appropriation. An open content platform is characterized by new forms of content *licensing*. One of the most well-known examples is the GNU General Public License (GPL), a license initially applied to software programs,[19] as well the equally popular licence Creative Commons.[20] GPL is a very ingenious licence, since it is not limited to permitting the free copy and distribution of information. The license *requires* that anyone who has modified certain information licensed under the terms of GPL must allow any other person to continue modifying such information. It is a type of licence that requires information to remain free, and it is in that sense that it defines an open content platform. Therefore, a content production and distribution model arises that is totally different from the manner in which traditional media companies, based on typical intellectual property laws, control content distribution.[21]

Wikipedia is one example among many others of an open content platform.[22] The content of that collaborative encyclopedia is covered by GPL, so it may be indefinitely re-edited. Anyone may edit and re-edit. It is a model for creation of large-scale projects that the classical theory of organizations deemed impossible to realize (cf. Chandler, 1977). However, it is not very difficult to explain the reality of open and distributed projects such as Wikipedia. One just needs (Benkler, 2002, Boyle, 2006) to assume the

[19] The license may be accessed at http://www.fsf.org/licensing/licenses/gpl.html. The general GPL philosophy is analyzed by Stallman (2001).
[20] http://creativecommons.org.
[21] In his important book, Yochai Benkler (2006) analyzed the emergence of new economic models based on free and collaboratively produced information.
[22] http://www.wikipedia.org.

following: (1) the existence of an open-technology platform with global reach (Internet); (2) the existence of a more or less random group of subjective individual motivations; (3) the project's modular nature and (4), a crucial point, the existence of an open content platform, i.e. information fully accessible to anyone (non-rivalry and non-exclusivity of information).

Point (2) will be qualified further below. At the moment, it is stated that platforms on which individuals may, in a more or less free form, produce and transform content generate enormous creativity, regardless of any specific judgment about its quality. Such creativity is made possible by the elimination of technological, economic and legal obstacles. Intellectual property laws are institutional frameworks external to individuals that have the effect of moderating their exchanges of content. They are not instruments which facilitate exchange. They impede the reciprocity of exchanges in position. Their absence or violation increases exchange and reciprocity. The progressive elimination of any exteriority, the disappearance of certain institutional and legal frameworks, is the undifferentiating dynamic of new media.

Power-laws and certification of new media content

Conditions therefore come together which facilitate the emergence of a new form of content production different from the institutional system provided by markets and traditional media organizations (Benkler, 2006). The importance of open platforms, whether at the level of technology or software and content in general, has by now become clear. They enable an explosion of creativity carried out by thousands and millions of individuals who use available content and create new content. It is well known that the phenomenon does not reside in one project or another. It may generally apply to the proliferation of millions of blogs, more or less structured online journals, social networks where all types of content are exchanged, interactive multimedia platforms where anyone may write and provide images of events occurring around the world nearly instantaneously. They are crowdsourcing media.

Crowdsourcing media depart radically from classical media since their content is to a large extent created by "amateurs" and "citizens" without a precise institutional framework. Traditional media such as the press or radio represent the emergence of a type of institution based upon a clear organizational and legal system. As cited above, mass media in the 19th century gave rise to organizations with a form generally similar to other organizations. They implemented hierarchical structures, mechanisms of editorial responsibility, centralized management, and the assignment of tasks. Individuals became editorially responsible for the information that went public, and the chain of responsibility may be traced back to the last person responsible. Notably, those who could create and publish were relatively well defined: they are "journalists" and "professionals". In other terms, various forms of *certification* emerged, verifying who

those "professionals" are, which may include acquisition of professional portfolios, possession of an academic diploma, or a recognized specialization in a certain area, etc. Regardless of their specific forms, social forms of institutionally structured certification emerged.[23] Major newspapers of the 20th century became reference institutions, defined editorially by their autonomy, and independents of legitimate power or unfiltered public opinion. At least according to stated intentions, they were means to produce objective information for a vast audience.

Traditional media *differentiated* the position corresponding to the creation and publication of content. That is one of the last differences that new media tend to abolish. If they are based massively on the creation and publication of content by numerous "amateur" individuals who have free access to a technologically open platform with content that is also open, then they are systems distinct from traditional certification, which tends to disappear. Socially and institutionally certified professionals tend to be replaced by uncertified professionals (cf. Miel et al., 2008). Content tends to stop being produced by institutionally hierarchical organizations and is increasingly produced in an open, distributed mode without an explicit institutional framework. As cited above, the emergence of new intellectual property licences have begun to institutionally seal the abandonment of traditional content production models. The absence of mediating institutions beyond individual peers who are content producers is one of the aspects of the steady indifferentiation of the traditional positions of content editing and consumption. It must be emphasized that the change is in that way so profound that traditional media, starting with the large media groups, have adopted their own practices which have become increasingly similar to those which occur on "amateur" online platforms. The distinction between traditional institutionalized media and new media tends to become indistinguishable.

The disappearance of traditional forms of accreditation, certification and filtering (gatekeeping) does not lay to rest questions concerning the quality of information in new media. That is the essential point: how to guarantee some certification on open platforms with content produced by undifferentiated individuals, peers? In other words, how can some differentiation be guaranteed within the general trend towards indifferentiation? This point is effectively essential, given the fact that the response often found for this problem shows that indifferentiation continues to act in the very production of difference. Some of the more innovative forms of content certification show that the tendency towards indifferentiation is a fundamental characteristic of new media. It is present in the *formal* characteristics of these media. Let us examine two examples.

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[23] The fundamental moment of this process occurred at the turn of the 20th century with the creation of associations and unions of journalists, responding to the journalist's new status as a salaried professional working in an organization's institutional system. Regarding that transition and the institutional organization of newspapers, cf. Schudson (1978), for the North American case and Ferenczi (1993), for the French case.

Google

The first example is Google. To rank web pages that best corresponds to a search, Google uses an algorithm, PageRank, which is a model of individual acts that create web pages and hyperlinks between those pages (Brin & Page, 1998). The search for pages and hyperlinks and their subsequent ranking, performed by Google, is determined by the acts of individuals who are creating the medium, i.e. by the creation of nodes and hyperlinks through which WWW is navigated. This entails considering the WWW as a *networked* structure and not a client/server architecture. That structure is now well known. According to the theoretical framework that we have been presenting, it is caused by the mechanism of positive feedback.

The structure that characterizes the WWW is a typical property of a large part of networks that are defined by the existence of a group of nodes and the existence (or absence) of connections between such nodes.[24] In the case of the WWW, that property is a distribution function, *P(k)*, of *k* links (hyperlinks) between *N* nodes (web pages).[25] That function has the form $P(k) \sim k^{\lambda}$, i.e. a distribution without characteristic scale, or power-law. This means that the probability of a randomly chosen node (page) to receive *k* links decreases according to the ratio given by the exponent λ. In intuitive terms, that distribution means that there are few pages that receive a large number of links and a large number of pages that receive few links. It is a distribution rather different from a normal (Gaussian) distribution, in which, on average, the number of links is the same on all pages. The important point about power-laws distributions is indeed that the number of links decreases according to the constant ratio given by the exponent 芊. An initial study (Barabási et al., 1999) conducted on the *.edu domain of the WWW found 芊 ≈ 2.1, a value similar to another study on the overall WWW (Broder et al., 2000). We researched (Author, 2007) the *.pt WWW domain, and also found a power-law with exponent 芊 ≈ 2.15, as shown in Figure 3. We present the results whether for incoming hyperlinks (pages directed from hyperlinks) or for outgoing hyperlinks (pages that point hyperlinks to other pages). It is an important distinction, since the WWW is an oriented network, i.e. if there is a hyperlink between page A and B, it does not necessarily follow that there is also one from B to A.

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[24] Network theory has made fundamental progress in the last ten years. Among the many available sources, Dorogovtsev & Mendes (2003) must be cited at an advanced level, as well as Newman (2003), and at a more accessible level, the excellent work of Barabási (2002) and Watts (2003). In these works, it may be verified that the main properties of networks are, apart from distribution of links, the existence (or absence) of a giant cluster, the distance between the networks nodes and the clustering coefficient.

[25] The results that we present for the WWW are equally valid whether considering nodes as pages (the relative domain of a URL) or sites (the absolute domain).
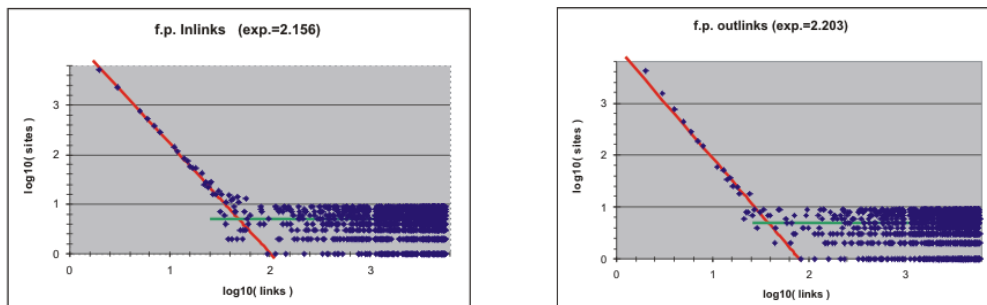
Figure 3. The *.pt World Wide Web domain exhibits a power-law exponent of 革 ≈ 2.15 (incoming hyperlinks) and 革 ≈ 2.2 (outgoing hyperlinks).

At least in its initial form, the PageRank algorithm used by Google is a search algorithm that gives rise to a power-law distribution (Vazquez, 2003). As such, the PageRank rankings result from popularity measured by the number of links that each page has. According to the original idea of the PageRank creators (Brin & Page, 1998), anyone who navigates randomly on the WWW has a probability of finding a certain page that is directly proportional to the number of links that point towards that page.

The fact that the WWW, as well as the Internet itself and almost all networks based on it,[26] are defined by a power-law seems to indicate that, after all, there are still *differences* in visibility and access to "sender" nodes (pages that are objects of attention and accessible through Google) that make up this network. Under this aspect, new media still possessed an asymmetry similar to classical media.

This is only true in the first analysis, since the difference in popularity of pages (always measured by the number of hyperlinks that point to each one) obscures the lack of difference that characterizes new media. Unlike mass media, new media are not asymmetrical. It is necessary to understand that a power-law distribution is scale-invariant, i.e. the relationship $P(k) \sim k^{-\lambda}$ is present in any segment of the distribution function. The global and local properties of the function coincide. The *a priori* expected result that we obtain for the *.pt WWW illustrates the scale-invariance, since the *.pt domain WWW segment has exactly the same form as the overall WWW: if one of those two segments were rescaled, both would remain indistinguishable (cf. Figure 4, by way of illustration). A page that is less popular than another can be considered, changing the point of view, more popular than another, always according to a constant ratio. This is valid for any Web domain, provided that it follows a power-law distribution.

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[26] The Internet itself exhibits a power-law (Faloutos, 1999), as does the P2P network Gnutella (Ripenau, 2001). Other examples are cited below.
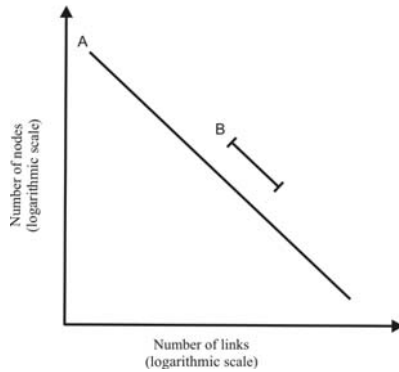
Figure 4. In a power-law, the global and local properties of a function coincide. In this illustration, sub-segment B has the same form (the same slope) as segment A. Multiplying B by a scaling factor, the segments become indistinguishable.

Additionally, the popularity of pages is determined by the existence of hyperlinks that point to them, so that pages are only very popular (have a large number of incoming links) by virtue of users creating many hyperlinks (outgoing links) that point to these popular pages. As cited above, outgoing links also exhibit a power-law. The WWW structure is simultaneously created by nodes (pages) that point to other pages and by nodes pointed by other pages. Many of the pages that are pointed by other pages in turn point to many other pages. However, it is true that the first set (incoming links) does not come close to coinciding with the second (outgoing links) (Mislove et al., 2007), which, therefore, verifies an effective *difference* in the WWW. Below, we will see how this difference tends to disappear on another type of networks.

Regardless of that important difference, a system that follows the power-law is a *self-organized* structure that emerges spontaneously from various local acts creating pages and links, and therefore was not the result from of an intentional design. These acts take the system to evolve towards a *critical state*, which is precisely the main characteristic of a state of indifferentiation: it is always the same relationship observed through an adequate change in scale.[27]

It must be emphasized that the invariant critical state does not emerge from individual acts, independently of other identical acts, but instead from *interactions* between those acts. The mechanism that originates a power-law, the law that supports the search conducted by PageRank, is that the more links a page already has (how much visible or popular it is), the more it will have (the more popular it will become). More precisely, each new page receives new links according to a linear function of links that it already

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[27] This is a fundamental result of the theory of critical phenomena in physics, cf. Fischer (1983), and complex systems in general, cf. Bak (1996).

possesses.28 On the WWW, "popularity is attractive" (Dorogovtsev & Mendes, 2003): popularity attracts popularity. Links are (proportionally) created according to previously created links; if there are many links that point to a certain node, this must be because that node has received a cumulative number of links over time. The operating mechanism is positive feedback. The medium (the WWW as a structure of nodes and links that draw attention to content) is created by interactions among its creators, i.e. through interdependence formed among them over the temporal evolution of the medium that is being created.

Therefore, it is concluded that certification (measured by page ranking) is implicitly provided by the numerous acts of-attention call (creation of links) aggregated by PageRank algorithm. If the ranking were understood as a type of "voting", it should not be overlooked that it represents a form completely different from truly institutionalized voting, which is processed under the assumption of a linear separation of decisions by each individual. In institutionalized voting, it is supposed that each person decides for himself, regardless of the decisions of others.

Slashdot

So, a new form of certification typical of new participatory media emerges. This form is intrinsic, created by acts of participants, starts from of a situation of equality of individual peers, and, which, in this respect, diverges from the institutional content and certification processes which predominate in traditional media.

A second example makes the meaning of the algorithmic treatment of certification even clearer. Slashdot is a platform that displays a set of stories on various topics (especially software) selected by a group of editors on a daily basis.[29] Hundred of thousands of site users then comment on the stories. This is the first level of comments. Those comments then lead to more comments, forming a second level of comments, from which more responses may follow, and so forth. In light of the vast number of comments, Slashdot incorporated a comment quality certification method. Users/commentators acquire a "karma" (reputation), which may range from "terrible" to "excellent", and which permits them to assign a score (from -1 to 5) to the stories on which they comment. A user's "karma" is given to him by *moderators*, who grade the activity of commentators. The principal issue is to determine who chooses and certifies the moderators. As stated by Slashdot's editor, "karma is used to determine who moderates and who doesn't." Namely, a user who acquires sufficiently high karma over time then attains the position of moderator, and in turn he gives karma to other users/commentators, and so forth.

Karma is a kind of symbolic object that passes through the hands of Slashdot creators. It marks the shifting between the user/creator and moderator positions. As with other platforms, the time cycle for contributions

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[28] It is generally admitted that a principle of popularity, according to which "popularity is attractive", is the mechanism that generates power-law distributions observed on practically all networks. The mechanism was originally formalized by Barabási et al. (1999).
[29] http://slashdot.org.

and position changes is rather short.[30] Therefore, and even though there remains some difference in time to perform these functions, the *positions of creator and commentator, first, and subsequently, creator and moderator, tend to be undifferentiated*: over time, each individual may occupy any of the positions. Again – that is the important point – if we consider the permanent changes in positions as a simultaneous whole, we re-encounter the mechanism of positive feedback as the process which at all levels characterizes the *indifferentiating* trend that is present in new media.
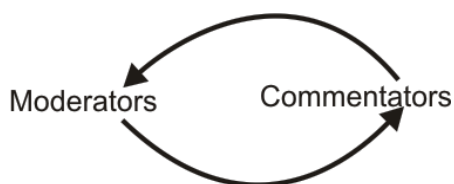

Figure 5. The indifferentiation of positions in the Slashdot certification system.

Intrinsic certification mechanisms exemplified by Google or Slashdot show that there is a tendency towards the disappearance of distinctions, towards the permanent inversion of "judge" and "judged" positions, of "edit" and "edited" positions; in short, positions that "send" and those that "receive". As an analysis benchmark, it may be affirmed that there is a fusion of positions. The equality of individual peers in new crowdsourcing media resides in the inversion or fusion of positions. The only "institution" that selects and certifies the peers is that created by the individuals themselves who are in turn selected by it according to a structure with a circular causality. Certification is not carried out by individuals, who in a position of exteriority, issue a judgement and make a decision. This is done with the help of *algorithms* that express a collective opinion from all of their own users. Numerous commercial and non-commercial platforms implemented certification or reputation systems based on positive feedback (a summary may be found in Dellarocas, 2006).

Bearing in mind the WWW and PageRank structure, we may anticipate the form of distribution in Slashdot participation. That platform may be defined as a network in which the nodes are the comments and the links are the existence of responses or replies to those comments. A study (Gómez et al., 2008) carefully examined Slashdot from that point of view and found heterogeneity in links, i.e. the distribution of links is similar to a power-law with exponent of 2.4: there are individuals who comment and/or respond much more than others.[31] That type of distribution is typical of new media, and it should be emphasized, again,

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[30] Lampe & Resnick (2004) showed that one half of comments on a Slashdot story appeared on average after 174 minutes, with 90% of comments appearing after an average of 1,060 minutes. On the other hand, the same study showed that 41% of commentators moderated while 68% of moderators commented.
[31] More precisely, the distribution of Slashdot is a heavy-tailed distribution, from which a power-law distribution is one particular case. The mathematical details are not very relevant here. The most important factor is that the distribution departs completely from a Gaussian distribution.

that it results from *interaction* (in the sense defined above), i.e. from shifting in positions between media users. It is also possible to anticipate that, in the absence of interactions, when individuals are generally independent of one another in their relationship with the medium (as in the case of classic mass media), then the distribution must have a form unlike a power-law. That is confirmed by the study of Gómez et al. (2008). If only the *first level* of comments on the initial story posted on Slashdot is considered – thus, a situation closer to the classical media structure, without the existence of interaction – then a normal or Gaussian distribution is observed. That difference in the form of the distribution, when only the first level of commentary is considered, or when subsequent interactive levels are considered, points to a fundamental conclusion of this article: *the form of new media is the form of the space of networks, and, more specifically, the shifting in positions between senders and recipients in those media assumes the form of a power-law.*[32] It is that conclusion that must be better established by analyzing the most recent generation of participatory media, virtual social networks of sharing.

Social networks and social indifferentiation

After the popularization of the WWW and development of P2P networks, the so-called Web 2.0 emerged. Some of its first examples, such as Wikipedia and Slashdot, were mentioned above. Peer networks like Flickr, for photography, and YouTube, for video, were also cited. Those networks also contain virtual social networks of "friends", known as social networking. The most well-known examples of these networks are the platforms MySpace, Facebook, hi5, Orkut and Twitter, among many others. They are virtual networks of "friends". Based upon the definition of a profile, a member invites other "friends" and begins to form a network of links with their "friends". Each "friend" is a node that provides, sends and receives often enormous amounts of content to and from other "friends". In some networks, when members modify their profiles, their network of friends is automatically notified of such changes, thereby calling attention to themselves.[33] The growth in social networks is rooted, once again, in the circular system of causality in which individuals create the content medium, which then reacts upon individuals, inducing new creative acts of membership that in turn bolster the medium's attraction: "friends attract friends". Social networks show how the historical succession of online platforms also converges towards indifferentiation. It is a point that can be demonstrated.

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[32] We do not equate "space of networks" with random networks, which are formed by links randomly distributed by a set of fixed nodes and which have normal distributions (Erdvos & Renyi, 1959), but instead with networks from which new nodes emerge which are linked to one another based on the structure of previously existing links, i.e. non-equilibrium networks. For a complete explanation of the differences between the two types of networks, see the references contained in note 24 above. So the "space of networks" is a space composed by nodes and links, and with typical properties such the distribution function, the clustering coefficient, etc. (see, once again, references in note 23). It was an outstanding discovery that many systems are networks in that sense, and that the form of new media also verifies the generic properties of the space of networks.

[33] Cf. Boyd & Ellison (2007) for an overview of social networking.

After an initial pool of results demonstrated that the Internet, the WWW and P2P networks exhibited power-laws, similar results were obtained for various Web 2.0 platforms. But there is also an important difference between the two types of results. First, the similarity. A study on Wikipedia (Capocci et al., 2006) as a network composed of the editing of articles and hyperlinks between them found a power-law with exponent $\approx$ 2.1. Another study (Shi et al., 2007) obtains the same value for the blogosphere. A study (Huberman, Fu & Wilkinson, 2009) on the intensity of video uploads on YouTube obtains an exponent $\approx$ 2.4. Another (Wilkinson, 2008) obtains power-laws on various platforms upon which users actively create (e.g., digg.com, a "voting" platform). Another study (Ahn et al., 2007) was conducted on an important South Korean social network, CyWorld, as well as MySpace, always verifying the existence of power-laws. Finally, Mislove et al. (2007) researched the social network supported by Flickr, the social network present on YouTube and the "pure" social network Orkut, while Wilson et al. (2009) focused on Facebook. Exponents with values between 1.5 and 1.9 were found, lower than the WWW (苹 $\approx$ 2.1, cf. above). This result suggests an important difference between the WWW and social networks, which testifies a growing historical indifferentiation in the transition between the so called Web 1.0 and Web 2.0. As we showed above with the example of the *.pt domain, in the case of the WWW there is a difference between the exponent values of incoming and outgoing hyperlinks. This is due to the fact that most popular sites are accessed from a large number of hyperlinks; however, they create a relatively small number of hyperlinks that point to other sites (consider the cases of google.com, yahoo.com, etc.). In this respect, there is an effective asymmetry on the WWW between sites with incoming links and sites with outgoing links. Conversely, interactive social networks tend to indifferentiate this difference. The two last cited studies found a high level of symmetry in social networks: if there is a link from friend A to friend B, there also tends to be an inverse link. In these networks, if the users receive incoming links, they also tend to link outward to those who link to them, i.e. almost all network users tend to act reciprocally.[34] The existence of symmetry in links between users results in a power-law exponent of social networks that is virtually the same for incoming and outgoing hyperlinks. Nodes with a large number of incoming hyperlinks also tend to have a large number of outgoing hyperlinks. There is a positive correlation between incoming and outgoing hyperlinks, an explanation of which is found in the positive feedback mechanism, which begets an outgoing link once a user receives an incoming link. There continue to be individuals with more links than others, but now all who link to others tend to receive links in return, according to a power-law. This is the form of the shifting in positions, or rather, the trend towards indifferentiation in social networks. In the media space, they definitively update social reciprocity as a social and fundamentally communicative condition.

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[34] The percentage of symmetrical hyperlinks is 62.0% on Flickr, 79.1% on YouTube and 100.0% on Orkut (the design of this platform requires symmetry). Wilson et al. (2009) found the level of symmetrical links on Facebook to be 65%.

New media represent a new social condition of millions of individuals who reciprocally create new participatory media by crowdsourcing. In this sense, the new media update the undifferentiating social trend that Tocqueville described in the 19th century as the "equality of conditions", i.e., the fact that the new social norm has become the real possibility of any individual occupying any social position. New media accelerate that trend by representing the updating of that possibility in the communication space. Throughout their evolution, classical media have also expressed the growing autonomy of society (Habermas, 1989). They became a *sui generis* institution separate from other legitimate institutions; they became a "fourth power" (Hunt, 1885) which defined them in a different, exterior position relative to overall society. In turn, new social media form a technologically mediated communication space that that is no longer in a position of exteriority: It is characterized by the disappearance of the two different positions. Regardless of the specific platform used (blogs, interactive sites for content sharing, social networks), they are created by a large number of individuals who reciprocally go public, i.e., who are simultaneously subjects and objects of more or less generalized attention from others. This is the specifically social dimension of new media.

The symbolic desire of public visibility, to be subject of attention, is the force present in the far-reaching development of social networks. Many members of those networks state that they join because their friends are already there, that is, imitation is the basis of membership and growth in participatory media:

> When I ask teenagers why they joined MySpace, the answer is simple: "Cuz that's where my friends are." Their explanation of what they do on the site is much more vague: "I don't know… I just hang out. (Boyd, 2007)

Once the membership is set up, the member creates a profile to exhibit himself/herself, invites friends to do the same and connects to already existing networks of friends. In social networks, the autonomy of the medium or platform is even clearer than in P2P networks, because the former are direct social interaction networks and do not merely facilitate the anonymous exchange of content. They place individuals face to face in mutual social exhibitions.

By exhibiting themselves and exhibiting to friends, the member increasingly affirms his/her identity. The entirety of a virtual social network may be seen as the mutual exhibition of each member and the external exhibition of each member by exhibiting themselves to their network of friends. Each friend is a peer immersed in a social bond created by his/her communicative exhibition. Therefore, a social network may be understood as a public exhibition space where anyone can be the focus of other's attention. As danah boyd writes:

> The desire to be cool on MySpace is part of the more general desire to be validated by one's peers (…). MySpace Friends are not just people that one knows, but public displays of connections (…). Of course, as Hannah Arendt wrote long before the Internet, everything that appears in public can be seen and heard by everybody and has the widest possible publicity. What has changed with the emergence of new tools for mediating sociality is the scale and persistence of possible publicity. (Boyd, 2007)

Social networks are the clearest example of the social dynamic of new media: finally, due to profound technological changes, each individual is potentially a *public* individual, in the sense of exhibition, making it possible for anyone to be in the crosshairs or to be the object of attention of others. No individual participates in a public space which precedes him or her. Each participating individual creates the form of space of new media which is identical to the form of the space of networks: nodes (personal pages for self-display) and links (a node calling the attention to another node), verifying typical network properties.[35] It is a different form of space than that of traditional media, where there is a distinct node that sends content to another group of nodes. It is a space in which everyone goes public, contributing to the creation of a networked public space of all exhibitions.

In fact, the public, social exhibition finally seems to represent the real explanation of the form of space (the distribution function) found in new media. The form of that space results from the interactions between individuals who create the space. In the case of the WWW, we saw that power-law distribution is explained by a principle of popularity: the more visible a page currently is, the more visible it will become (Barabási et al., 1999). On social networks, we saw how individuals tend to establish reciprocal links. A similar mechanism of positive feedback exists on other interactive platforms. In a study on the YouTube and Digg platforms (Huberman, Fu & Wilkinson, 2009), and on Twitter (Huberman, Romero & Fu, 2009), Bernardo Huberman and collaborators found distributions following a power-law. But, additionally, they verified the emergence over time of a *positive correlation* between the intensity of contributions to the platform (productivity) and attention received (popularity). Interaction, which increases over time, between subjects and objects of attention, takes the form of circular causality. As an individual's popularity increases, attention towards him/her as an object increases, which in turns boosts productivity, and so forth. More attention causes greater productivity, and more productivity causes greater attention. The existence of a positive correlation between productivity and attention by others, immediately allows the deduction of the observed power-laws (Huberman, Fu & Wilkinson, 2009). This fundamental result permits one to conclude that public exhibition, visibility to others, distributed by a large number of individuals in interaction, all as

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[35] In this article, we did not consider other properties of this type of space such as the existence of a large group of connected individuals, the distance between them and the existence of densely connected communities (clustering coefficient). They are all also present in participatory media. Cf. note 24 and references therein.

objects of attention, represents a deep social dynamic that determines the form of new media. The form of new media, i.e. the space of networks, is a consequence of intersubjectivity.

Participatory intensity may vary from individual to individual, but all are actors who create new media. With variable degrees of symmetry, individuals who represent the traditional classical media audience become subjects and objects of attention, senders and recipients of content. A communication space emerges that mutually exhibits and shows individuals. In their most interactive forms (as in the case of social networking), new media encompass this new reciprocal exhibition. Communication does not involve any mediation outside of individuals, as occurred in the mediation that defined the social reality of the audience present in traditional media. New media are media in a very different sense from traditional media, their goal is not only to inform or entertain a group of recipients. Technologically mediated new media are instruments that form primary ties of sociability between individuals.[36] Basically, that was the fundamental form of primary sociability captured by the *fundamental* communication model, i.e. the sender 丰 recipient model. But as the evolution of new media makes clear, the true general model of communication, with or without technological mediation, has a circular structure corresponding to the indifferentiation of positions:
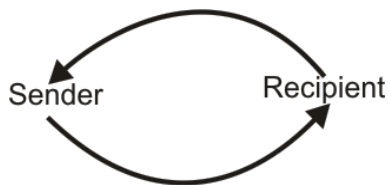

Figure 6. The fundamental communication model.

Conclusion

We are currently witnessing the erosion of the type of social condition traditionally known during the 20th century as the "audience", corresponding to the one 丰 many structure, in fixed positions, typical of classical media. The new social condition consists of new positions that each member of a traditional audience eventually occupies; all shift, *in potentia* or *de facto*, from observers to possible objects of attention. The process entails the progressive indifferentiation of boundaries between those who were audience members and who in growing numbers create new interactive media. There is a growing shifting in positions in which anyone, successively and more and more simultaneously, may be the object of public

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[36] "Primary sociability" does not designate a sociological condition but rather an anthropological condition of the similarity between humans. It corresponds to the formation of a fundamental social bond between them, in which communication mediated by language is the principal form. Cf. the excellent work of Lilti (2005), which shows that such fundamental sociability was the catalyst for formation of the public space in Europe during the 18t[h] century.

attention from an increasingly fluid audience, and whose members, at the next moment, may become the object of attention.

In this article, we began to see that the change in position of previous audience members results from technological, economic, legislative and social factors. It is that change between the "sending" and "receiving" positions which defines new online media. Secondly, we showed how the new content platforms grow as their users are simultaneously their creators. New media grow according to the interaction of their creators, who, unlike in the case of broadcast media, cannot be linearly separated from one another. Thirdly, we showed how those interactions, based on the general principle of popularity and self-display, lead to the emergence of the most specific form of new media: the distribution of attention according to a power-law. We saw that this law is the form of the shifting between "sending" and "receiving" positions and is identical to the general space of networks. A more in-depth characterization of that media would imply consideration of other metrics of network space, such as the difference between its nodes, the existence of communities and the formation of groups sharing a common interest. Many of those metrics are now perfectly understood.

Finally, an analysis of new media must analyze in which sense the very concept of the media company was profoundly changed. Some of the debates surrounding whether or not Google and Yahoo are media companies end when a new media company is defined not as a producer or distributor of content but simply as a creator of platforms for individual interaction. Following the path already taken by traditional companies, which now deploy interactive characteristics or buy interactive sites, it may now be predicted with a reasonable degree of certainty that a media company will be increasingly defined as a tool for interaction. This does not imply that future forms of interaction are exactly identical to those which currently exist, or rather, that the current type of software and interfaces that support the participatory culture will remain unchanged. Today, the primary new media are platforms like those provided by Google, YouTube or Facebook, but other interactive interfaces could emerge, always based upon the participatory media concept.

It is a question to know if the platforms owner's will sustain an openness policy, supporting a participatory culture. It also a question to know if they will not try to erect barriers around they own platforms, contrary to the idea of an open and universal digital network. It is also a question to know what will be the role of closed devices such as the IPad. Even if the overall tendency is uncertain, it can be said that the expectation, which today is merely a trend, is that crowdsourcing media will become increasingly important. They bear witness to, and simultaneously reinforce, a growing state of social indifferentiation.

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