Power and the Internet

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Abstract

Purpose – Starting from the end-to-end principle, a founding element of the Internet's technical architecture, the paper discusses its extension and effects at the social level. It shows how the Internet moves power from governments and private entities to individual citizens, restructuring our societies and creating a new global stakeholder class – individual users of the Internet. It connects the advent of this stakeholder class with a traditional principle of Internet governance, *"rough consensus"*. It discusses advantages and risks of this change, suggesting that this shift of power might be beneficial to solve deadlocks in the governance of global phenomena and to ensure that solutions pursue the global public interest. Finally, it discusses how this social evolution can be protected from opposing forces, countering the opinion that the freedom of the Internet is intrinsic and not needing regulatory supports.

Design/methodology/approach – The paper builds upon observation of case studies, such as the struggle between the industry and users over peer-to-peer music downloads, and upon the author's first-hand experience in global Internet governance processes.

Findings – The paper formalizes a social expression of the end-to-end principle and demonstrates the need for such principle to be recognized and protected by regulation, to preserve the social model described in the paper and its benefits.

Originality/Value – The paper explores the connections between the technical, economic and social architectures of the global network, providing support for understanding the political dynamics of the Internet and other global phenomena, and for designing effective governance processes to address them.

Article Type: Conceptual paper

Keywords: Internet governance, Globalization, Politics, Power structures, Information society, Network neutrality

1. Purpose and approach of this paper

The Internet is an instrument of change; technology, economy and society have been transformed in depth by its adoption. These transformations have been often studied in isolation; however, there is merit in attempting to draw a continuing line across the history of the Internet, and to explore the relationships between its architectural features and the type and direction of change that it determines as it reaches new sectors of society.

As the Internet becomes ubiquitous and broadly adopted, it promotes change at the heart of the social structure: in politics, and in the distribution of power across society. The purpose of this paper is to match manifestations of this change with what we learned from the history of the Internet, and make hypotheses on how the patterns of innovation associated with the architecture of the Internet, as already detected at the technological and economic level, act at the political level.

The hypotheses will be supported by presenting brief case studies involving collective action and social phenomena in different parts of the world – events that were enabled by the Internet, that have political relevance and that appear to follow the patterns described in the paper. As there would not be room for a complete discussion of each case, references to scientific studies or news reports are provided for each of them.

The conclusions will lead us to the thesis that power is being redistributed from the centre to the edges, into the hands of citizens, with a benefit to global democracy and freedom. However, this thesis is conditional; it builds on a requirement to preserve the "end-to-end principle" of the Internet at the social level as well, and it may be falsified by the lack of ethics among global citizens. Both the formal establishment of key individual rights, and the promotion of adequate ethics, become thus fundamental for a positive evolution of the Internet and of the globalized society that it fosters.

2. The end-to-end principle and the Internet

When the Internet was being conceived about forty years ago, its pioneers chose a technical architecture quite different from those adopted in traditional telecommunication networks.

In devices such as the telegraph, the telephone, and the television, networks were planned and deployed by a single operator, or by a few licensed ones operating under a strictly regulated regime. These operators built networks on which final users could use simple and inexpensive devices, often provided by the operator itself, while the intelligence was buried into complex, specialized appliances at the centre of the network. Users could access only the devices, services, contents and technologies that the network operator had approved.

However, when designing the ARPANET – the precursor of the present Internet – constraints were different: the devices at the edges already existed, under the form of mainframe computers which represented the state of the art in terms of complexity and computational power, but which were also heterogeneous and owned by several parties. As the purpose of the network was to interconnect these devices, it was natural to keep the complexity at the edges, and to design simple network

appliances that could connect a variety of final devices for a variety of purposes (Hafner and Lyon, 1996, pp. 73-75).

To allow for flexibility, new technological concepts – such as packet switching and protocol layering – were employed. Protocol layering (Carr et al., 1970; Crocker et al., 1972) allowed new applications to be introduced easily by writing new software on the peripheral devices, without the need to alter the network devices, and without requiring advance authorization by a centralized operator of the whole network, which anyway did not exist.

This design choice, known as the *"end-to-end principle"*, derived naturally from the technical circumstances; it deeply influenced all subsequent telecommunication network designs, though several years passed before its scientific formulation (Saltzer et al., 1984). Only in 1996, almost thirty years after the first ARPANET communication, the Internet Architecture Board attempted formal recognition of these architectural principles inside the Internet's technical standardization process, as a guideline for the then blossoming "mass Internet" technologies (Carpenter, 1996).

3. Economic effects of the end-to-end principle: innovation and network neutrality

Then, economic consequences of the end-to-end principle started to appear. The growth and the adoption rate of the Internet in the last decade of the twentieth century were unparalleled and far higher than those of any other previous telecommunications system during its initial adoption (Odlyzko, 2000, pp. 31-36, 52). Innovations usually were not brought forward by the network operators, nor by the Internet Service Providers (ISPs), by telecommunication corporations or by public regulators. Instead, most of the greatest innovations were conceived and prototyped by the users of the network, often young individuals or small businesses, often as an instrument to pursue other business rather than their professional activity, or even as an amusement.

For example, the World Wide Web was invented at CERN by Tim Berners-Lee and other physicists, not as part of their main research focus, but as a tool to support the scientific activities of the organization (Berners-Lee, 1989). The first online chat system, the Internet Relay Chat (IRC), was invented by a 21-year-old student from Finland to chat with friends (Oikkarinen and Reed, 1993, p. 1). The first peer-to-peer application, Napster, was invented by an 18-year-old individual, Shawn Fanning, who dropped out of college to pursue his idea (Greenfeld et al., 2000).

This pattern is different from the one that appeared in regulated and centrally operated telecommunication networks, in which only the network operator or the regulator can innovate. The attempt by Internet network operators – the ISPs – to regain influence over which applications and services can be deployed over the Internet gave birth to the debate over *"network neutrality"*: the economic incarnation of the end-to-end principle at the transport level, suggesting that network operators that move bits through the core of the network should not meddle in the applications and services that their customers use or introduce at the edges.

Since the seminal paper by Wu (2003), the network neutrality debate is rich and varied, but mostly focused on economic issues related to costs, prices, competition and market dynamics. What is interesting to our purpose, however, is the non-economic part of the debate – the one related to innovation, freedoms and distributions of power.

As part of this debate, a study found that a traditional, non-neutral innovation process – where ISPs have the ultimate power on whether to allow, encourage, forbid, or discriminate against new services – would cause the innovation rates to be lower than the current one (Van Schewick, 2007, p. 378), supporting the idea of a direct link between the devolution of power to final users and higher rates of development in society. Some studies have raised attention upon the impact on political freedoms of possible network neutrality regulations or lack thereof, trying to redefine network neutrality as one incarnation of a broader principle of Internet freedom (Meinrath and Pickard, 2008, p. 227). While there are a number of caveats to be made (see (Zittrain, 2008, pp. 164-165) for a detailed discussion) several scholars have found unescapable links between network neutrality, the end-to-end principle and the social freedoms that such principle promotes (Balkin, 2008, pp. 102-107), often leading them to argue in favour of pro-neutrality regulation as a requirement to protect free speech (Yemini, 2008, pp. 37-38), or to frame the neutrality discussion in free speech terms (Nunziato, 2009, pp. xiii-xv).

After forty years of decentralized mass computer networks, the technical effects of the end-to-end principle are sufficiently known, and such principle is broadly adopted in the design of telecommunication networks. Stemming from the technical end-to-end principle, its economic effects subsequently came into play. It is now becoming clear that they bear strong connections with socio-political issues, and specifically with the freedom of speech and communication of Internet users. Is there more to this chain of links?

4. Social effects of the end-to-end principle: the case of music downloads

Our reasoning obviously leads to the concept of an end-to-end principle at the social level. I will formulate it as the idea that *every user of the network should be enabled to exchange and distribute information and to organize actions over the entire network, freely, without the need for authorizations, and with the guarantee that no one will interfere or discriminate against the user's input to the network before it reaches the other users*.

The enabling power of the end-to-end principle for innovation can be extended to the social level. Immediate and inexpensive access to media spanning the entire world increased the diversity of information and the opportunities for free expression enjoyed by global citizens, due to the lack of the control mechanisms typical of traditional media, up to the point that several concerned governments are increasingly implementing forms of centralized content control over the Internet (Karlekar and Cook, 2009, pp. 1-2).

Users found effective ways to share content freely over the Internet, and this increased the opportunities for access to knowledge and education, fostering movements such as Creative Commons and the free software advocacies, and strengthening trends such as open access to scientific and governmental information. Without the end-to-end principle, the lobbies that oppose these developments – starting from the intellectual property industry – would have much better chances to succeed, by applying their pressure on single controlling points such as governmental regulators and network operators.

Thus, the end-to-end principle applied at the social level has significant consequences in social and political terms, which only recently have started to appear, and which have yet to be fully understood.

It is key to note how hard it is to impose anything over the Internet. An example lies, again, in the ten-year-long struggle by the music and film industry against peer-to-peer sharing of audio-visual content over the Internet by individual users. Notwithstanding huge investments in terms of money, resources, technical devices, legal pressure, anti-piracy advertising, and lobbying, and notwithstanding harder laws, international treaties, stronger enforcement efforts, and significant commitment by powerful governments, the practice of freely exchanging audio-visual content over the Internet has been widely embraced.

Peer-to-peer file sharing applications, which did not exist ten years ago, now account for 10 to 80 per cent of total Internet traffic, depending on the conditions of observation (Sevcik, 2005; Sandvine Inc., 2008, p. 2). Every new device employed by the industry to repress the phenomenon was met with new counter-technologies and work-arounds by the users; legal actions and advertising campaigns were met by the public opinion with outrage or mockery, often motivating more people to join the crowd of "criminals"; attempts to discourage music downloading by persuading users that it is unethical have failed (D'Astous et al., 2005; Lysonski and Durvasula, 2008).

In the end, the alliance of industry players with governments, Parliaments and law enforcement agencies has brought scarce results against the common mindset of millions of global citizens, who independently decided that the present intellectual property rules and economic incentives were sufficiently unfair to motivate them to commit a crime, and to continue committing it for several years, even while risking prosecution. Rather than going after what is common behaviour by a significant fraction of its citizens, society is thus led to reconsider its rules in view of the positive uses of this technology (Pagallo, 2010).

Recently, the music industry has increasingly been switching from repression to Internet-friendly business models. Thus, this case seems to suggest that a redistribution of power is happening; power centres such as governments and corporations, which in the past were able to impose their will even against widespread opposition, were unable to do so when the battlefield moved to the Internet.

5. How the Internet redistributes power

We saw how the Internet is shifting the distribution of power from the centre to the peripheries, and from a few strong players to many individuals. Sure, if by "power" we mean the ability to make laws, nothing has changed; but if by "power" we mean the ability to do what you want notwithstanding the rules imposed upon you by society, then the Internet has brought power into the hands of billions.

It becomes harder, sometimes impossible, to exert governance by authority, when authority is used to push agendas unpopular with the public. If the clash is minimal, the incentive to act will be minimal as well and people may just let go, but if there is a serious motivation to oppose the authority, the rules will be opposed successfully. Thus, governance needs to be exerted not by authoritativeness, but by policies acceptable to everyone including final users, so that they will be implemented voluntarily without the need for complex enforcement activities.

If we also consider globalization, we observe how the stakeholders broaden up to include the entire world, or at least those billions interconnected through the global network.

This is not a new concept: throughout the twentieth century, power has been shifting from governments to other actors, "privatizing" governance activities. Initially, these actors were multinational corporations, but the process went on to include non-governmental organizations (NGOs), promoting the governance models known as *"public-private partnership"* and *"multi-stakeholder governance"* (Börzel and Risse, 2005, p. 195; Martens, 2007, p. 4). Some studies point out how these governance models replace traditional, hierarchical power relationships with horizontal and distributed interactions (Börzel and Risse, 2005, pp. 196-198; Hocking, 2006, p. 20).

The Internet pushes this process to a new stage, in which stakes and opportunities do not lie any more with large entities and juridical persons, but with individuals scattered all around the planet.

These individuals lack power in the traditional sense, but can create the avalanche effects typical of complex systems. It happened with Tim Berners-Lee and the Web, but also in more political realms; for example, in April 2006 in Italy, a 23-year-old named Andrea D'Ambra started an online petition to ask for the elimination of fixed fees when topping up pre-paid mobile phone accounts. These fees, unknown to other countries, represented a significant source of revenues for the oligopolistic Italian mobile operators; thus, strong lobbying was applied against this proposal. However, the online petition quickly gathered over 800,000 signatories (Petition Online, 2006), and the government, in face of such a public pressure, was forced to change the law and forbid these fees starting from March 2007.

Political action thus moves into the hands of individuals using collaborative Internet platforms to promote political stances. A review of activist platforms in the United States found that the Internet *"increase[s] the potential for a variety of democratic practices"* (Pickard, 2008, p. 642), though also mentioning some of the risks that we will later discuss. In Sweden, an entire new party – the Pirate Party – was created online; it quickly gained political relevance (Li, 2009, p. 307) and won a seat at the European Parliament in 2009 (Kravets, 2009). Even in the arena of formal international governance, where "multi-stakeholderism" is still far from granted, the United Nations forum dealing with the Internet already found the need for a further step: the direct inclusion as full participants of individual experts (Doria, 2005, pp. 41-43) and even of individual users in general (Sha'ban, 2005, p. 238).

Thanks to the end-to-end principle, the Internet erodes power groups that dominated the industrial age, and refocuses political dynamics on the individual citizen of the world.

6. Glocal governance by rough consensus

"Governance by consensus" is a traditional *motto* of the Internet: the technical organizations of the network claim to be "bottom-up" and to operate by consensus.

Technical standards – the Request for Comments (RFCs) – are discussed online in open working groups, and adopted by a criterion defined as *"rough consensus and running code"*: a standard is officially adopted once its workability has been proved by at least one running implementation, and once all major objections to it have been cleared (Russell, 2006, p. 55).

The key concept here is rough consensus: a formula that recognizes the difficulty of imposing anything over the Internet and envisages general agreement, rather than a majority on whatever kind of voting system, as the objective of the process; at the same time, it prevents deadlocks by allowing the standard to be approved even in the face of persistent opposition, as long as this opposition is minor or maintained only by a few participants.

This formula works well because it reconciles two opposite social features of the Internet: the need for voluntary agreement, and the fact that a certain degree of disagreement can be tolerated by the network itself. Due to the end-to-end principle, it is actually unnecessary for the entire Internet to use the same protocol to accomplish the same purpose; it happens to have several competing protocols for the same purpose. The only necessity is that any two end-points that want to dialogue adopt the same protocol for their communication.

There is however a prize for the global adoption of the same protocol all over the Internet: everyone can dialogue with everyone else without the need to learn multiple protocols or to negotiate which one to use. When discussing technical standards, this is a sufficient prize for most people to give up part of their requests and come to an agreement; and those few who still disagree can do things in their own way without disturbing the others.

It is not automatic to apply these dynamics to political decision-making as well: there might be stakeholders who benefit from the status quo and have a vested interest in preventing any consensus from being reached.

However, the "rough consensus" principle provides a way out of the difficulties. Full consensus is not necessary: as long as a prevailing policy, opinion, custom or attitude spreads out among the users and sets the direction, the remaining minority of people who disagree does not constitute a problem, and will disappear naturally in the long term without the need for impositions.

The "rough consensus" principle also takes care of the difficulty in dealing with cultural diversity. In this case the principle becomes another manifestation of the so-called *"glocality"* principle, that suggests that global policies and projects should be adapted locally to suit the specific customs. The apparent tension between globalization and cultural diversity can thus be reconciled by avoiding to impose global policies, and by enjoying the fact that, with local variations, all stakeholders move in the same direction.

7. Fulfilling the promise of globalization

A quest for effective global governance marked the last decades, on issues ranging from global warming to trade regulation, up to the recent financial crisis. Issues have generally been addressed through the traditional form of international governance – intergovernmental institutions. Even with the increased involvement of corporations and NGOs, deliberation always rested on the shoulders of governments. As a result, progress at the global policy level on these issues has been scarce; almost invariably, specific national interests prevented any significant agreement from being reached, and many issues remained dangerously unsolved.

The Internet showcases a rather new mechanism of global governance. It sports a non-national nature; traffic is not clustered by country nor routed according to borders, and transactions customarily involve users and servers located across several countries. This makes it difficult to apply national regulations without breaking the end-to-end principle.

While the Internet was being built, governments had no role in defining or enforcing global policies. And Internet policies tend to be naturally global; on some issues, even allowing local variations is either very difficult (e.g. in the root level of the Domain Name System, managed by the Internet Corporation for Assigned Names and Numbers) or plainly impossible (e.g. in the allocation of Internet Protocol address space); for the rest, the prize of global compatibility tends to make standards global.

Recently, national governments attempted to gain back some authority on Internet governance matters. At the local level, governments want to trace what citizens do with the net, and to block access to selected content for different reasons (stifling political opposition, preventing hate speech or child pornography, stopping off-shore commerce for tax purposes...); they try to assert and enforce their national jurisdiction even if that requires breaking the Internet and the end-to-end principle (Schultz, 2008, pp. 803-805). Globally, governments are concerned with their lack of control over an infrastructure of military and business importance (Cukier, 2005). Attempts to establish stricter national regulation, usually by technical devices such as content filters and forced logging of communications in the middle of the network, have been met with public hostility in Western countries (Black, 2008; Hendery, 2009) and even in China (Cui and Cui, 2009) – and with opposition by the scientific community (Bambauer, 2008, pp. 29-30). Anyway, most countries – including democratic ones – now implement or plan to implement forms of Internet content filtering (Deibert et al., 2008, pp. 235-432; Freedom House, 2009, pp. 28-112).

However, the implementation of these measures allows circumvention by motivated users, giving way to a technological escalation of new barriers and new breaches (Yang, 2008, p. 5) and to the devising of non-technical bypass measures, such as mis-spelling sensitive words (Yang, 2009, p. 113). The most effective form of centralized content-based filter – the so-called *deep packet inspection*, where the type and destination of the communication is examined for every packet sent through the network node – implies the abolition of the end-to-end principle and the interception of all electronic communication of all citizens, thus threatening democracy directly.

In other words, to restore the primacy of governmental regulation and the possibility to enforce it in a deterministic manner, the personal freedoms due to citizens in Western countries have to be undermined – and the horizontal architecture of the Internet has to be reverted into a hierarchical structure with a government at the top, breaking the global nature of the Internet (Schultz, 2008, p. 838). Again, the removal of the end-to-end principle and the centralization of power go hand in hand; another example can be found in the systematic interception of Internet traffic flowing through the United States, even if originating from non-U.S. citizens, after the "September 11" attacks (Bendrath, 2009, pp. 25-26).

Some scholars have seen in this an unavoidable trend to the destruction of the global and borderless Internet, dooming it to become a set of national networks and the terrain for a new cold war (Goldsmith and Wu, 2008, pp. 183-184). To this troublesome scenario, we can oppose a different one in which the "rough consensus" and "end-to-end" principles are preserved. This scenario envisages non-deterministic forms of governance in which undesirable content can be statistically

removed at the user edge of the network, by letting the users adopt third-party filters on a voluntary basis, and by accepting that such filters may sometimes fail. If the obsession with "hard law" instruments is removed, and power is allowed to flow down to the edges, the result is a freer and more democratic society.

Similarly, at the global level, progress can be made when rough consensus emerges among the users, often thanks to the viral spreading of some behaviour, application or service which is voluntarily adopted. For example, the most effective counter-measures against *spam* to date are "blacklists" and other filters deployed by the ISPs[1], and the implementation of Bayesian filters inside the most common E-mail applications (Siponen and Stucke, 2006, p. 136). The laws enacted by certain countries, though perceived as a disincentive, were in fact scarcely effective, due to the hardships and cost of prosecuting each and every spammer, and to the difficulty of defining spam in practical terms (Moustakas et al., 2005, pp. 6, 8), and also to the availability of international "spam service providers" in countries that had not made spam illegal.

In this scenario, the clash of national interests that obstructs progress on global issues can disappear. The driving force for deliberation becomes the independent adoption of a given solution by a huge number of individual stakeholders, each in their own capacity and role. A process in which people 'vote' by making their choice is started, and the outcome is more similar to a form of global participatory democracy than any voting process based on governments could ever be.

8. User-driven governance and the global public interest

The constituency of the individual Internet users, in particular, can become a leading force in fulfilling the idea of a world which, while allowing for cultural diversity, is sufficiently united to avoid war and promote peaceful life on the planet.

Following the decentralized and borderless design of the Internet, the resulting constituency is cross-national by nature, developing social, cultural and economic ties among individuals from different nations with an ease never seen before. Thanks to the Internet, people gain immediate access to media and cultural contents, not just the "mainstream" but also the "grassroots" ones, produced and shared directly through blogs, forums, platforms for user-generated content, and social networks. This allows people to build a new, higher level of international dialogue, and a sense of belonging to a single global community spanning the entire world (Castells, 2008, p. 78), changing global media dynamics and sharing local events immediately with the world (Fairweather and Rogerson, 2005, pp. 160-161), even in wars and disasters (Mark and Semaan, 2009, p. 11).

Such a distributed constituency is hard to capture; as grassroots and peer-to-peer information sources gain strength, controlling mainstream media might not be enough to force common thinking. As we saw for music downloads, in front of strong motivations, even law enforcement and media campaigns can be fruitless. Though the constituency of global individual users is unlikely to

1 The interception and blocking of spam messages by the ISPs before they get to the user's mailbox could be considered at first sight as a violation of the end-to-end principle. However, the end-to-end principle is meant to protect users from undesired interference by network operators; if the user actually requires this interference and freely opts into it, then the network operator is just supplying a service, as a proxy for the user himself.

be perfectly flat, with the emergence of new "gatekeepers" (MacKinnon, 2008, pp. 253-254), such emergence is still a bottom-up process.

This is why individual Internet users represent a new powerful actor in global governance discussions, that can embody better than any others the concept (still vague) of *"global public interest"*. While governments are constrained by national interests, business action suits the profit of the shareholders, and even NGOs are often driven by their own needs of fund-raising and visibility, individuals in the aggregate can push for the best possible solution for the common good.

9. Ethical risks in user-driven governance

In this scenario, ethics is more relevant than ever. As the evolution of the Internet is determined by the sum of individual actions at the edges, its degree of ethicality will depend on the ethicality of the population. When confronted with the increased social power that the end-to-end principle allots to everyone, individuals have to *"do the right thing"* for the resulting collective action to be beneficial to the public interest.

The sum of behaviours that maximize the individual benefit might not be beneficial in the overall, giving way to *"tragedy of the commons"*-like scenarios (Hardin, 1968). The complete abolition of any price for the fruition of intellectual products is probably undesirable – yet this could be the final result if consumers were to decide on their own whether to pay or to get the same content for free[2]. This reinforces the importance of ethics in a networked society, and stresses the need to embed social responsibility in the behaviour of all stakeholders – not just corporations, but individuals as well.

The Internet creates a class of globalized users prone to international and intercultural dialogue, but many have just started to be touched by this process, and most humans are not even connected to the Internet yet, nor educated enough to make active use of its opportunities. If the process of power devolution to the bottom is too fast, global governance dialogues could be subject to disruptive kinds of public opinion such as nationalism, religious integralism, xenophobia and so on. In fact, the same cultural differences that make diplomatic dialogue difficult show up again at the citizenship level, but unmediated by the specific education that diplomats enjoy.

The fragmentation of public spaces, caused by the Internet's peer-to-peer nature, can break society into non-communicating and reciprocally hostile groups refusing dialogue and democracy rather than embracing it further (Fairweather and Rogerson, 2005, p. 165); the idea of a "global public sphere", though fascinating, may lack the basic requirements for democracy (Fraser, 2007, pp. 7-8). The idea of a borderless "global citizenship" could be replaced by a trans-national ethnic identity, in opposition to other groups, as in the case of global Chinese emigrants (Ong, 2006, p. 503) or even of Islamic fundamentalism (Khatib, 2006, pp. 69-70).

By applying the end-to-end principle to social and political activities, the long-standing clash between collective moral and personal expression becomes more powerful as well. The end-to-end

2 However, this could also not be the final result: scenarios of the "tragedy of the commons" type apply to finite and scarce resources, while digitalized and immaterial resources can be infinite and abundant by nature. This is anyway out of the scope of the present paper.

principle reflects the typically North-American concept of unconstrained free expression, as enshrined in the First Amendment to the U.S. Constitution. In Europe and elsewhere, some kinds of expression and content are expected to be censored; it is illegal to publish certain kinds of content or to promote certain opinions, and thus to input them to the network. Even when such content comes from a place where it is not illegal, there is widespread expectation that it should be made unavailable to the citizens of the country, as in the paradigmatic case of auctions of Nazi memorabilia on Yahoo! (Goldsmith and Wu, 2008, pp. 1-10).

Another example of this clash can be found in the outrage that burst throughout Italy in the first days of 2009, when it was discovered that several young users of Facebook from Sicily had used the social platform to create idolizing pages for the most famous Mafia bosses and killers (Owen, 2008). Outrage arose when the administrators of Facebook were asked to remove this content but, clinging to their "First Amendment" view (and to the lack of utilitarian incentives for policing content in their system), they did not immediately agree to do so (Katz, 2008). Apology for the Mafia is illegal in Italy, but even if the content had been uploaded by Italian users for Italian users, Facebook applied the American mindset to it. As a result, in two weeks about 160,000 individual Facebook users asked the Italian government to get this content removed by authority in some way; many suggested shutting down Facebook as an alternative.

This case shows how, in the user-driven governance scenario, controversies arise when some stakeholders do not fulfil their share of responsibility; however, such fulfilment is inherently difficult if there is no common standard for how to behave. The case also shows that there are situations in which most people commonly expect the end-to-end principle to be broken, and censorship to be deterministically applied in some way, at the source of the content or even in the middle of the network if necessary.

The usefulness of the end-to-end principle at the social level should thus not be taken as an argument in favour of its application in an absolute manner. After all, depending on the culture, there are cases in which action by authority may be desired; defining these cases and the appropriate authorities could be a valuable task for future policy-making discussions.

10. Conclusions

My discourse promotes the hypothesis that, as long as the behaviour of each individual Internet user and stakeholder is responsible, the ongoing shift of power from the centre to the edges of our society, and from traditional power blocks to all citizens, can be a positive step forward towards a peaceful global society; it would free governance processes from the deadlocks resulting from the clash of specific interests, and promote the bottom-up adoption of solutions that pursue the global public interest.

This shift of power derives from the adoption of the end-to-end principle as a founding paradigm for the Internet and the globalized Information Society, not just at the technical level, but, more importantly, at the economic and social levels. So, if we believe in this hypothesis, we must recognize and uphold the "social end-to-end principle" as described in section 4.

Mistakenly, in the early phases of the mass Internet, thinkers supported the idea that the end-to-end principle embedded in the technical architecture would necessarily imply the existence of the end-to-end principle at the social level, thus making the Internet automatically independent from traditional centres of power (Barlow, 1996). According to this theory, the Internet needed no regulation but the absence of regulation itself; its anarchy would naturally have preserved the end-to-end principle at all levels.

The experience of the last fifteen years shows instead that the economic and social incarnations of the end-to-end principle are continuously endangered. At the economic level, the principle works against dominant players willing to gain competitive advantages in contiguous markets, or to extract additional revenues at the expense of consumers; of course these players oppose the principle, as evident in the network neutrality debate.

At the social level, governments and corporations resist any redistribution of their power to citizens, sometimes for self-preservation, sometimes fearing chaos. Nowadays, even in democratic societies, governments attempt to control the Internet by imposing filters, licenses, bureaucracy or taxes; companies attempt to gain control of the flow of information just like they do in other media.

To preserve the end-to-end principle, regulation is necessary, to ensure that individual citizens of the network enjoy unfettered communication with all the other global citizens connected to the Internet, defining a limited range of exceptions. Other desirable objectives for global Internet governance exist: a better definition of the meaning and scope of existing human rights in the Information Society, the establishment of new rights and duties, and the provision of practical standards for responsible online behaviour. However, the basic elements of the social architecture of the network are the keystone that, if removed, will lead to the collapse of the Internet as we know it today, and of all its beneficial effects in terms of openness, democracy and development.

Some proposals have been put forward, starting with the concept of an *"Internet Bill of Rights"* launched by Rodotà (2007) and others, and debated at the Internet Governance Forum of the United Nations. Without entering into the discussion over the proper forms and processes for this endeavour, it is necessary to realize that the innovative social dynamics enabled by the Internet are neither intrinsic nor invulnerable. A collective effort is necessary to protect these dynamics, avoiding that the free and decentralized Internet of these first forty years turns into its nemesis: a tool for ubiquitous surveillance and dominance by a few controlling centres.

The innovative considerations in this paper give way to several options for further research. A more systematic global survey of changes in national politics brought forward by the Internet may confirm the existence of a process of power redistribution. Intersecting the debate on a "global public sphere", the nature, requirements and features of a new type of global, transnational, Internet-enabled democracy should be studied, as well as the global Internet users as a political constituency. Also, the new international regulations necessary to protect the social effects of the Internet are yet to be defined in detail.

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