For a dynamic and post-digital history of the Internet: a research agenda

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ABSTRACT
The making of history of technology is in itself a challenge but making Internet history is a goal that is likely to be overly ambitious, given the breadth and complexity of such a technological artefact and of social relations that it entails. One way to reduce the difficulties presented by this objective is to think in terms of urgent research directions. In this short article, I propose eight themes that I think are unavoidable for scholars who want to accept the challenge of doing research on the history of the Internet.

KEYWORDS: Materiality; regulation; ownership; practices of use; dynamic history; robotization

The making of history of technology is in itself a challenge but making Internet history is a goal that is likely to be overly ambitious, given the breadth and complexity of such a technological artefact and of social relations that it entails. One way to reduce the difficulties presented by this objective is to think in terms of urgent research directions. In this short article, I propose eight themes that I think are unavoidable for scholars who want to accept the challenge of doing research on the history of the Internet. While there is a certain arbitrariness and lack of comprehensiveness to the choice of themes, I hope that these themes can provide some good starting points for discussing research agendas for contemporary Internet researchers.

First, the new wave of the Internet studies needs to put in perspective the materiality of the Internet, how the Internet was and is made of, and how it works (Brügger, 2002). To begin, considering and analyzing what materially Internet was, is and has become over time, both at the level of its infrastructure and at the level of the services and networks, is an important task. This technological artefact is made of a physical support consisting of a network of cables and optical fibers, in which the data can move. Private companies, that agree to use common and standardized protocols with the purpose to provide data navigation, act as Internet providers. Other private companies that produce content and data preside to the immaterial level of the Internet. All these companies are part of what Christian Fuchs calls “digital capitalism” (2016) that has its own history. Obviously, the picture becomes complete only if we include in it the World Wide Web, one of the most important services of the Internet that allows to navigate and benefit a huge ensemble of professional and amateur content (multimedia and not) as well as of the presence of research engines and web browsers. The picture, however, becomes meaningful only if we include
in it the networks of individuals groups, movements and firms that are in communication among them, organize them or do business with them. The material practices of use of this artefact as well as the social representation of it, the emotions that are posited inside it, the attitudes towards it and the perceptions of it are the fields of investigation where it is necessary to multiply our efforts of theorization, investigation and historicization.

Second, Internet regulation and ownership is another crucial issue to monitor and to which historical studies of the Internet should pay a specific attention – because it establishes a framework affecting the freedom of Internet users and the range of their human rights (Goggin, 2015). For example, let us consider the Internet Assigned Numbers Authority (IANA). So far, IANA was responsible for interpreting numerical addresses on the Web to a readable language. The regulatory framework has now changed, moving from a US control of the Internet to a non-profit organization, the Internet Corporation for Assigned Names and Numbers (ICANN), a multi-stakeholder body based in Los Angeles that includes countries such as China and Russia. It is too early to understand the possible effects of this transition from an Internet governed by the US to an Internet governed by a multi-stakeholder. For now, it suffices to say that Internet researchers have to keep under their radar this transition, because this theme certainly encompasses many other issues to analyze.

Third, we need to explore more concerning how the Internet is used, when, where how and by whom for communication, information, knowledge, teaching and learning, sociability, political organization and business. Social networks and applications are now the lens through which it makes sense to do this investigation. The Internet use entails various forms of labor relationships: waged labor, voluntary work, work for free and often the form of the labor relationship is hidden or mystified (Terranova, 2000). For example, the Internet is largely occupied by social networks, and, in turn, it nourishes the world of applications that are the current gateway through which Internet users manage to perform a lot of tasks and activities. In particular, almost a million and half applications are currently downloaded or updated, and in many cases bought and used by people. Social networks and applications have the apparent function to provide mediated solutions for a wide range of problems. However, their real "nature" behind these apparent functions is as private firms that make money with the service they offer.

Fourth, Internet researchers should avoid a flat or descriptive history of the Internet: the development of the various platforms and services provided by this technological artefact can be grasped effectively only if we reconstruct and interpret the historical dynamics that has generated them. Internet, like any other technology or object, is a place of power and counter-power and/or empowerment (Fortunati, 2014). Thus, we should look at this technology as at a terrain of confrontation, struggle, negotiation and mediation between social groups or political movements and even individuals with different interests. Internet evolution has been the fruit of many forces: army, industry, market, but, especially, initiative, creativity and innovation of users all over the world. What is important is to reconstruct when the technological initiative has been predominant and when users' social and political agency has produced radical changes or trends in this technological artefact. To take just one example: the transition from forums to blogs and to social networks can be read in terms of a technological evolution; or, alternatively, can be read trying to identify the social subjects who have provoked this evolution with their behavior. Only in the second case, we will be able to grasp the social meaning of this evolution in reconstructing the reasons and motivations behind users' behaviors.

Forums have been one of the first opportunities for people to express their own opinions and to discuss online. The main purpose of people contributions was to influence the agenda setting both of the online newspapers and of the news websites. Although their expectations, it turned out that the relationship between the readership and the newsroom has never taken off. Users were often reminded that the online place belonged to someone else (the owner of the online newspaper or news site) who dictated rules and limits of readers' messages by means of a webmaster. This figure generally selected, and gave a title to, the messages to be published according to the net-etiquette and traditional journalism rules (no bad words, curses, insults and so on), recommending people to write short comments (no longer than 30 lines) (Fortunati, 2009). Furthermore, editorial staff regulated the agenda setting of the forums by launching the themes, which later on were discussed by users. Very soon, people understood that, in addition to the limitations to which their conversation was subject, their comments were read maybe with interest only by other users – but that they were not able to influence the journalists and the newsrooms of the online newspapers. This brought many users to abandon the forums and create their blogs, where the online space belonged only to them and of which they had full responsibility. From 2001 to 2007, blogs enjoyed a big success (Jenkins, 2006). In 2011, it seems that there were 150 million blogs. However, the new freedom enjoyed by bloggers suddenly revealed its dark face in the sense that for bloggers it was difficult to find an audience and thus the majority of bloggers suffered of social and communicative isolation. The reaction to this isolation was a new migration on the part of users to social networks, where the possibility to reach an audience increased considerably.

Analyzing the interests, the motivations and the reasons behind users' behaviors enables us to understand that the social relationships that have developed over time among the various Internet stakeholders have shaped this technological artefact in a very different way according to the various temporalities. However, as Gerard Goggin argues, this also applies to the various geographical areas. The Internet is not the same all over the world, because the influence of culture, of political activities and social practices is different and we need historical research describing, for example, other histories in detail other than American Internet histories.

Fifth, it is necessary to avoid telling a unilateral story of the Internet. To do this, it is important to reconstruct a history of this technological artefact considered inside the network of personal technologies we use in our daily life. It is important for Internet researchers to not study this tool in a vacuum and to be aware that it is a part, although very important, of the media system. My concern here is specifically the vision that describes the Internet as a meta medium, a totalizing reality that has cannibalized the old media (television, radio and newspapers, telephone) (Agre, 2008). In this vision, the Internet, with its incredible force would have stormed analogue mass media and the telephone and would have sucked them into the meta medium of the digital world. The Internet, as the key place of the digital, would represent the new because it manages to do better what that the analogue did before, worse. If this is the present, then the future is presented as the site of the triumph of the digital on the analogue, what is perceived as outdated, retrograde (Lehman-Wilzig & Cohen-Avigdor, 2004).

Such a view is wrong because, in addition to overlooking the crucial role of users' subjectivity, it is prisoner of an opposition between digital and analogue, and between the Internet and the traditional media, which proves to be false (Ludovico, 2012). In fact, the digital does not do better what the analogue did and continues to do but it does so in a different way. Internet presents different characteristics and capabilities from traditional analogue media, and this diversity is the element that must be fully understood and analyzed. Understanding this diversity can put us in the position to understand how and to what extent the Internet has benefitted from other media and what in turn it has offered to them. On the one hand, the radio and the phone have brought the contribution of voice, still largely absent on the Internet; the cinema and the television, their ability to handle moving images and stories; and the press, its knowledge of the layout and of how information is produced. Overall, traditional media has offered to the Internet content, decades of experience in the production of languages and communicative, informative and aesthetic modes.

On the other hand, the Internet has shown the capacity to penetrate the analogue world of the old media and to hybridize with it. There is a lot of the analogue in the digital and, vice versa, for building digital products such as books or newspapers, the production process has to incorporate a lot of digital (O'Sullivan, Fortunati, & Taipale, 2017). It would be interesting to study the different phases of this production process in which the analogue still flourishes and those in which the digital is recognized as more suitable, convenient and so on. And to study it in the various contexts such as the workplaces (Sellen & Harper, 2002), the education world with the text-books and all the experiments that are exploring new strategies to put together the advantages of the Internet and of the paper, the information world with the print and online newspapers. Beyond the technical and structural aspects, the contemporary audiences are increasingly transmedia and, in addition to being more educated, experienced and proactive, they are able to take the best from the characteristics of each medium. A true story of the Internet today cannot but tell the interweaving with the stories of the other media because the technological ecology in which we live includes all of them. Indeed, in people's daily life, the various media constitute a dynamic network that led to a division of the communication and information labor among them.

At the same time, Internet has extended the traditional media networking capabilities to a potentially global audience and able to be proactive, a space and a time with less and/or different limits. Observing the processes of convergence and divergence among the various media over time allows us to understand to what extent the Internet has become interconnected with the television, the radio, the press and the telephone. Moreover, it allows us to understand how difficult it is today to draw the lines of demarcation between them and how fluid is the hybridization and specialization in the media landscape. A vision that supports only the dominance of the Internet in the media environment fails to grasp the dynamics that has developed among the various media and that is subject to a continuous change. There is a power relationship among the various media, which is continuously shaped and re-shaped by the preferences and practices of Internet use, and which brings to varying trends of convergence or divergence under the dominance of a medium. Contrary to what this vision proposes, it is instead clear that the dominance in the media environment is expressed today by the smartphone, which swept aside the desktop computer as the prerogative of the highest Internet access.

In this framework, special attention should be accorded to the study of the historical relationship between the Internet and the mobile phone, as this seems to configure itself today as the most essential relationship for the Internet. Smartphones have benefitted enormously from the contribution given to them by the Internet. Through the access to the Internet, mobile phones have transformed themselves from a device dedicated essentially to intimate communication to a tool capable to be open to any service, platform and application, such as WhatsApp. At the same time, smartphones have become open to a relation with the physical space in a richer way. Already in 2002, research foresaw that the merging between the mobile and the Internet would be held in the name of the dominance of the mobile phone on the Internet (Fortunati & Contarello, 2002). More recent data confirm that the access to the Internet is more frequent on the mobile phone than on the fixed-line Internet (ITU, 2015). The secret for explaining mobile current dominance in this specific relationship lies in the human body: the mobile follows the body in all its movements and respects its freedom of moving, while the fixed-line Internet obliges the body to be steady. Thus, the mobile phone gives to the fixed-line Internet the possibility to move, have legs and feet and being present where people go and are. Mobile phone gives to the Internet the possibility of becoming embodied in the aura of the human body and acquiring movement by upsetting the fundamental steadiness of users' body and the chain of micro gestures that the use of the fixed-line Internet implies. Mobile phones entertain with their users a more intimate and close emotional relation and this distinctive sign of the mobile phone extends also to the Internet once this is incorporated into the mobile phone. As it has drawn more closer to the human body, this has afforded the Internet the possibility to acquire a new life and a different relationship with emotion. The Internet has become a big repository of written or visual emotion, often expressed in a disconnected way from personal identity.

Sixth, another important aspect to investigate further at the historical level is in regard to sociability. Here one thing that the Internet has represented, especially in the last years after the advent of social networks, is the place in which the self of the humankind has had the possibility to network for the first time on a very large scale. One of the roles of the Internet has been and is to provide a place where humankind networks, supports, maintains and experiences many different forms of sociability: from friendship to contacts, from business relationships to dating, from sexual relationships to religious ones, to the social relationships in self-help communities and so on. On the positive side, this possibility has diminished the mental and psychological distance among people. A sole-minded humankind is developing, and this is unique for its experience. Jung's idea of collective unconscious is now embodied in a precise place and that is the Internet. Probably also, a specific collective personality has developed in the Internet over time, as well as a multicultural and multilinguistic awareness of the differences that characterize the humankind. The Internet has become a matrix of the encounters of many cultures, languages, interests, business, practices, knowledge, information and communication. As consequence, the Internet has represented an important window on reality since we have begun to have visibility of others and their lives on a global scale. Literature and media have been so far the places where we could imagine or experience somehow people's life. Now, social networks offer the possibility to read and look at the people's lives from their own perspective. On the negative side, social media have become the place where everyday life is often represented and communicated in a superficial manner, where hate speech (including misogyny, racism and bullying) could be developed without too many barriers and where fake news propagate virally and uncontrollably, just to make some examples.

Seventh, it is important to reflect and carry out historical, multidisciplinary research on how the Internet sensorium has transformed over time. Even now, silence is dominant in the Internet, which is still largely a written world. The most important activities in the Internet still seem to be reading and writing, whereas listening and speaking are set forth as marginal. Just the sensory impairment alone, as well as the lack of expression and communication that go with it, give a precise idea of the conflictual relationship with the material human body that the Internet entertains. This impairment is not something of irrelevant since it builds a social reality which under develops orality and the capacity to listen. We know instead that the human voice is important, for example, for intimate relationships, and also for social and political movements that have the problem to raise the voice for making their protest to be heard by those in power. This habit of not exercising the listening on the Internet has strengthened probably also people's incapacity of listening in their everyday life. The mediation of the technology of writing within the technology of the Internet has contributed to expel from this technology the presence of the human body and thus of life. The Internet presents a double technological mediation as it implies technology-mediated communication and written communication. The presence of writing on the Internet is so strong that the use of the Internet has influenced greatly also the use of the mobile phone that from an oral communication device has become a written device. One explanation can be that advanced by Fortunati and Baron (in press), who have argued that written forms of mobile communication have been successful because they are less direct and invasive than speech, since they are asynchronous and can be ignored more easily than a voice call. Nevertheless, there is in the last years an increasing penetration of voices – through, for example, YouTube, tutorials, Skype, podcasts, WhatsApp vocal messages and so on – which limits, in a certain sense, the empire of silence.

Eight, another important element to monitor, also longitudinally, and discuss is the increasing robotization to which the Internet has been submitted. As is well known, a high percentage of the Internet traffic (60%) is occurring today between machines (Zeifman, 2016). The introduction and development of bots, which are software designed to perform various functions, is treating the possibility to understand really how many visits by humans a website receives (Gehel & Bakardjieva, 2017). The role of bots on astroturfing (Bakardjieva, 2015) as well as on destroying and rebuilding reputations, introduces an issue of manipulation. The premise is that computer-mediated communication is a form of human communication mediated by a computer and thus lacking a series of cues on the identity of the interlocutor and on the characteristics of the context in which the interlocutor is located. Given this premise, bots can access the Internet through the same channels used by human users such as webpages, chat systems, videogames, etc. Moreover, bots act as spiders of search engines that monitor the Internet with the purpose to discover content and websites or as programs that scour the net looking for information to be used for spam campaigns.

A historical reconstruction of this process would enable us to understand in more detail why there has been the need of developing a strategy of contrast to these kinds of programs, such as providing tests that bots could not elude when they seek to deceive virtual systems by posing as users. The classic tools of contrast are the tests one needs to take in the webpages that offer the chance to sign up and submit users' data. Users are required to pass these tests in order to prove that they are not a robot and consequently that they are humans. These tests are called Captcha (Completely Automated Public Turing Test to Tell Computers and Humans Apart) and in reality, are a public and completely automatic Turing test that has the purpose to distinguish bots and humans. Practically, a Captcha test usually consists of the request to rewrite the content of a distorted word or an image or a number of images. Recently, vocal or auditory Captcha have been introduced, whose meaning can be de-codified only by a human user (Abrich, Berbenetz, & Thorpe, 2011; Gelernter & Herzberg, 2016).

These tests create the paradoxical situation in which the presentation of the self becomes secondary for a human being in respect to the need to demonstrate of not being a robot. So far, the presentation of the self was performed in order to delineate the uniqueness of a specific human being from the other human beings and to convey the rich data of his/her personal identity, with the purpose of distinguishing one particular identity from the other human identities. After the advent of bots, people are required by a machine to express their identity in terms of being a human in opposition to being a robot. It is a sort of reversal of the situation which had affected automata and androids, accused in ancient time of cheating on their identity because their features so imitated human beings as to be mistaken for them. The automation of the Internet entails also its new penetration into the physical space: the Internet of Things. This is a new frontier that will connect not only individuals but also objects, opening many social and psychological issues also requiring the full attention of Internet researchers.

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