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GLOBAL TECHNOLOGIES, GLOCAL APPROACH: A FALSE PARADOX

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DOSSIÊ

História digital e global: novos horizontes para a investigação histórica

ABSTRACT

This article seeks to identify the factors that have led researchers to root their historical approach in a national or regional context, rather than a global one. This may seem paradoxical when the Internet is thought to be global, and digital content and cultures at least partially cross-borders. These approaches are determined by reactions to a history of the Internet that has been far too focused on the United States from the outset, by a desire to consider this history in a given context, and by the historical sources. However, the use of national and regional approaches does not preclude the stimulating comparative or transnational perspectives that may renew this history in terms of infrastructure, missing narratives and user participation, as well as technical and human networks. We even suggest that studying the history of the places, people and communities that remain outside networks (whether by choice or by necessity) could tell us a lot about the global and asymmetric reality of the Internet.

KEYWORDS

Internet. Web. History.

The Internet was first presented as a global technology that transcends borders when it began to emerge among the general public in the 1990s, after 20 years of a more academic use. It nourished the global communication dreams of those described as *Netizens* by Michael and Ronda Hauben (1992, p. 1):

Welcome to the 21st Century. You are a Netizen (a Net Citizen), and you exist as a citizen of the world thanks to the global connectivity that the Net makes possible. You consider everyone as your compatriot. You physically live in one country but you are in contact with much of the world via the global computer network. Virtually, you live next door to every other single Netizen in the world. Geographical separation is replaced by existence in the same virtual space.

Despite the disillusionment and anxiety expressed about State regulations (and, particularly, those applied by the US government) that led to John Perry Barlow's 1996 declaration in Davos about the independence of Cyberspace, the dream of universal communication and global and distributed computer information networks remains central to what Manuel Castells named in 1996 in his eponymous book *The Network Society*. During the same period, politicians and the media, as well as the academic community increasingly discussed the "Information Age", albeit with some doubts about how efficient it would be.

A number of issues indeed tempered this enthusiasm as the Internet developed: the very first ARPANET network was based on "an ideal scientific community" (FLICHY, 1999, p. 77) and a network that was limited to use between academic peers and was, thus, not concerned with commercial stakes (PALOQUE-BERGES; SCHAFFER, 2019). Only a small part of the population, therefore, became *early adopters*. The privatization of the Internet, initiated in the mid-1990s (ABBATE, 2009), as well as the shift towards the general public during this same decade, are indication of the expansion of a "network of networks" that already showed the first evidence of the digital divide. The power stakes that became inherent to Internet governance following the creation of US-led ICANN (Internet Corporation for Assigned Names and Numbers) for Internet naming in 1998 were debated at length (MUELLER, 1999) during the 2003 and 2005 World Summit on the Internet Society.

The Internet had initially been designed for universal open use; yet, it was overtaken by the growth of dominant digital companies such as Google, Amazon or Facebook in the 2000s. Internet users today must deal with phenomena such as filter bubbles and fake news, as well as the development of Internet silos and a fragmentation that is not only linguistic, but is also attributable to closed universes created by social networks or applications.

A rapidly growing number of historical studies focus on the history of the Internet, and more recently of the Web (as we will discuss later in this paper).¹ Rather than the analysis of a global phenomenon, this current literature shows a clear trend towards national or local studies. How can we explain such an apparent paradox?

¹ It is important to note that these two domains are often studied by different researchers; the community that is interested in the first steps of the Internet does not share the same interests as the researchers who are more focused on applications and content, and, therefore, in the Web.

Why do historians often build a limited, localized narrative of what is mostly presented as a global phenomenon by its early designers, promoters and users? What may at first glance appear to be a paradox, however, deserves a closer look. As we will demonstrate, this trend is in reality a false paradox. By focusing on national and local case studies, historians aimed to decentralize the history of the Internet and the Web, thereby also allowing it to become more global. As we will further explain, their efforts are also fully in line with the aim of writing a more social and collective history, one focused less on technical facts and more on experiences and uses. Through national histories, historians reveal particularities and trajectories of development and reception that are deeply rooted in specific political, social and economic realities, but they also contribute to a “glocal” history, albeit a sometimes implicit one.

After identifying why the global approach is limited within the state of the art, underlining the US-centric roots of Internet history and the related challenges and issues, and discussing aspects such as sources that encouraged historians to consider the Internet and the Web “in context” (SCHAFFER; THIERRY, 2018), we will suggest various ways in which a more global history could be developed: one idea is to consider it as a “history of networking” rather than just a history of the Internet *per se*, as previously suggested by our colleague Andrew Russell (2012). Another method is via comparative and transnational studies, a field that is developing rapidly. Approaches focusing on governance issues, global imaginaries and experiences such as the digital divide, as well as the places and people who remain outside networks, may also be worthwhile, as we will further suggest.

FROM A US-CENTERED TO A DECENTRALIZED APPROACH

The keystones of Internet history were laid in the academic sphere in the late 1990s. These seminal works included Janet Abbate’s *Inventing the Internet*, which considers the genesis of Internet not only within the Advanced Research Projects Agency (ARPA), but also in US universities and industry (ABBATE, 2000). The first steps of this history naturally concern the United States, with some mentions of Internet development elsewhere in the world. From 2010 onwards, there was a general movement towards research that led to a less centralized historical narrative, and highlighted the more heterogeneous and varied links and influences within this history.

A history that was initially very US-centered

The history of ARPANET and the first steps of Internet are well known today. They underline the developments launched by Robert Taylor at the small Information Processing Techniques Office (IPTO) of the ARPA from the moment he obtained funding for his network project in 1966 until the first connection between UCLA and Stanford University in 1969. There is ample analysis in the literature of the growth of this project, which gradually evolved from a distributed network of heterogeneous computers to a “network of networks”.

Initially, the historical approach is mainly centered on the U.S. It is largely shaped by the main protagonists, who ensured that it is made part of their heritage and who reported their own visions and experiences of Internet history. US pioneers play a central role in this picture, whether they are ARPA researchers or the industries commissioned

with the production of the necessary equipment to make this network function, such as the Interface Message Processors (IMPs) developed by Bolt, Beranek and Newman (BBN). The universities associated with the development of Internet are also put in the forefront, and particularly those that obtained ARPA financing for their computer equipment. These entities are referred to as “ARPA contractors” and include those who were the first four ARPANET nodes to start functioning before the end of 1969.

The international community does, however, appear in the literature, as we can observe in the work by Janet Abbate (2000). She discusses the ideas generated in the UK, particularly those produced by Donald Davies and his team, who were already working on packet switching at the National Physical Laboratory. Indeed, ARPANET is based on several original ideas, such as creating a heterogeneous network by ending the use of centralized networks with computers made by the same manufacturer. Another key element is packet switching, which consists of cutting a message into information packets to facilitate their movement across the network and optimize the use of the lines in terms of interactivity and resilience.

Three pioneers of packet switching are generally mentioned in the literature. The first is Paul Baran of the RAND Corporation, who also theorized the idea of the distributed network, and whose diagram of this distributed rather than centralized network became a heritage document. The second is Leonard Kleinrock, who had been greatly involved in the development of ARPANET. Donald Davies and his British team are the last on the list. The UK and Norway were the first places outside the US to be connected to ARPANET in 1972, and Donald Davies was an active participant in the technical exchanges, although current historiography (BAY, 2019) tends to somewhat scale down his influence in the seminal choices of ARPANET.

The first public demonstration of ARPANET took place in 1972 and was marked by the creation of the International Network Working Group (INWG). This international exchange structure replaced the initial Network Working Group that had been created within ARPANET in 1969. The INWG was a more global structure designed to stimulate international exchanges and contributions about network specifications. These issues are well described by Janet Abbate, but the US remains the focal point.

This is also true of the interviews conducted by the Charles Babbage Institute with pioneers such as Leonard Kleinrock, Larry Roberts, Robert Kahn, Vinton Cerf and many other US pioneers,² until interviews with European pioneers are added in early 2010.

This emphasis on US pioneers does, of course, reflect a historical reality that is also apparent in two other seminal works, namely those of Alexandre Serres (2000) and Patrice Flichy (2001). Whilst Flichy’s *The Internet Imaginaire* reveals US imaginaries that concern the academic world but also the first online communities, Serres highlights some influences that are strongly linked to the US context, such as cybernetics or the 1960s neocommunalism of hippie communities, which are also mentioned in Fred Turner’s publication about Stewart Brand (TURNER, 2006). Serres asks whether ARPANET could have been developed elsewhere than in the US. He does, however, encourage readers to consider the trend to develop projects with similar technical specifications on the other side of the Atlantic, such as the Cyclades network that was developed in France from 1971 onwards. Our research extended Serres’ approach to explore how and why this visionary French project was halted

² See <http://www.cbi.umn.edu/oh/>.

in 1979, whilst the ARPANET project continued to evolve (SCHAFER, 2012). This abrupt slowdown is linked to internal changes of policy within the *Institut National de Recherche en Informatique et Automatique* (the French national research institute for computing and automation), where the project was being developed. The Cyclades network was seen as a potential threat to the competing project developed by the French telecommunications sector, which held the monopoly over telephone lines and had strong political support. It was also affected by industrial difficulties.

From the first half of the 1990s on, the internationalization of the Internet called for a reconsideration of the “network of networks” and of digital cultures outside US borders. It would, therefore, be logical to expect a more global history in the context of the development of the World Wide Web at the very end of the 1980s, which would then attract the interest of the general public during the 1990s. The Web was created at the European Organisation for Nuclear Research (CERN), located on the border between France and Switzerland. Rapidly after developing the Web in the late 1980s, its creator Tim Berners-Lee (2000) went to work at the Massachusetts Institute of Technology (MIT), thus returning the development of this global technology to the US field. This British innovator does, however, continue to have a polycentric vision of how the Web should be governed, and suggests in the mid-1990s that the World Wide Web Consortium (W3C) should not be limited to a US host but should also include branches in Europe and Japan.

However, far from trying to adopt a more global vision, particularly in reaction to the first US-centered steps, historians sought to decentralize this history by highlighting other national and local events.

Manifestos for missing narratives

This overtly US-centered history was followed by a questioning of approaches that glorified the role played by the US innovators, thus following a general movement that was taking place across the histories of computing and innovation. Andrew Russell (2012, p. 7) noted this in his presentation “Histories of Networking vs. History of the Internet”:

To sum up my case against the category of “Internet history”: its definition encourages Whiggish and teleological narratives; it is unnecessarily narrow and exclusive; it misses or at best misconstrues the broader outlines of a bigger and more interesting story, the digital (and global) convergence of computing and telecommunications; and it is insufficiently critical of the “pioneers” who historians and museum professionals see as heroes rather than as humans.

The alternative that I propose to the “history of the Internet” is a broader category, “histories of networking,” that can better capture the diversity of technologies and experiences that fall outside and across the margins of Internet history (and “Internet history”).

This critical approach was taken up by Martin Campbell-Kelly and Daniel Garcia-Swartz (2013), who denounced the absence of complex genealogies and the missing narratives. They underlined that “the ARPANET network was one among many, and not

a particularly large one at that". Kevin Driscoll and Camille Paloque-Bergès (2017) also developed this line of thought in a workshop, followed by their article entitled "Searching for missing 'net histories'", which highlighted the fact that "Internet is as much mythology as technology". They suggested and explored a number of avenues that may help to write "decentralized" narratives, covering from the conflicts about TCP/IP protocols and alternative solutions in the 1980s and 90s to the roles played by communities such as Usenet users in the 1970s and national-scale experiments like the French Minitel and De Digital Stadt (DDS) in the Netherlands (ALBERTS; WENT; JANSMA, 2017). The authors (DRISCOLL; PALOQUE-BERGÈS, 2017, p. 56) conclude:

Internet Histories represent a new field of scholarly inquiry, a transnational network of researchers attempting to understand how this network of networks diffused through so many different social, political, geographic, and technological domains. One of the key challenges facing this emerging field is the elasticity of the term "Internet" itself. How can one history contain the experiences of ARPA-funded researchers at Stanford in 1976 and an elderly mobile phone user living in Beijing in 2017? In the face of the essential plurality of the Internet, we propose the researchers adopt an alternative approach to Internet historiography rooted in the experience of users.

In short, historians have emphasized not only the extent to which a US-centric viewpoint leads to a teleological history of the Internet – one in which the path taken by the US is seen as the only possible option, raising the risk that the many alternative avenues explored over time will simply be overlooked. They also point to the invisibilization of a whole series of other experiences and networks – and debates, like the clash over the TCP/IP and X25 protocols (SCHAFFER, 2012). Reducing the network experience in the 1980s and 1990s to a history of the Internet, for example, means omitting a lot of other experiences, such as those that took place in France with Minitel (SCHAFFER; THIERRY, 2012; MAILLAND; DRISCOLL, 2017) and more widely with videotex systems (Prestel in Great Britain, Bildschirmtext in Germany, Captain in Japan, Telidon in Canada, etc.), as well as the virtual communities that developed via other infrastructures.

Finally, the increased interest in users reflects a more general movement in the history of technology and computer science that aims to abandon a historical perspective that is based purely on the founders and innovators and uses top-down analysis, thus encouraging historians to consider the Internet and the Web in context. These motivations and reasons lead historians to favor more contextualized and territorially rooted approaches.

INTERNET AND THE WEB "IN CONTEXT"

The end of the 2000s and the following decade were marked by several studies that sought to produce Internet "histories" rather than "a history of the Internet". This desire is echoed by the title of the journal *Internet Histories*, created in 2016. These histories concern specific digital communities and cultures, such as those found among the first users of Usenet (PALOQUE-BERGÈS, 2017), the Bulletin Board

Systems (DRISCOLL, 2014) or local communities, for example those using DDS in the Netherlands (BADENOCH; NEVEJAN, 2014). These approaches reveal a wide variety of differences in terms of infrastructure policies, regulatory choices or even network imaginaries, as Paolo Bory (2019) shows in his study of Italian networks.

National perspectives as an epistemological (re)turn

As Janet Abbate (2017, p. 11) emphasized in a recent article,

The Internet's infrastructure may be global, but for its users the Internet is always local. Users experience the Internet through specific, locally situated machines, programs, service providers and cultures, and their service providers respond to local markets and regulatory regimes. Economics partially determine what forms of online experience are locally accessible: the geographical coverage of Internet service is highly uneven and reproduces existing power disparities.

Here, Abbate raises the crucial issue of Internet usage at the level of users, of their experience, as well as the issue of asymmetry and the multiple infrastructures and agencies that may determine Internet access. These points should be considered in the light of recent developments in science and technology studies, as well as the changing approach to the history of computer science and information and communication technologies: we can see an increasing focus on users as IT became more widespread. This trend can also be seen in the approaches to ARPANET, where new issues such as maintenance and network maintainers (FIDLER; RUSSELL, 2018) were changing the way in which the actors and the network are viewed. But this change was also obtained with a wider consideration of convergence, and particularly that occurring between computing and telecommunications. This is visible in the study of McKelvey and Driscoll (2019), where the use of IMPs as boundary objects enables a new perspective on the role of the telecommunications sector in a history that had previously focused on computing. Beyond these approaches, which seek to renew interest in some actors whose importance had initially been underestimated, studies like Stephanie Dicks' observation of the Macsyma (Mac Symbolic Manipulator) community at MIT invite us to think about how communities used ARPANET (PALOQUE-BERGES; SCHAFER, 2019).

The democratization of microcomputers in the 80s led the *early adopters* and professional, militant or artistic communities to adopt this means of expression for their use, followed by the general public. Historians gradually reveal this process and challenge the idea of a common, shared and universal digital culture, although common values such as openness may cross borders. But above all, they seek to identify all the nuances of these singular histories, which can certainly follow general trends yet remain unique. This is reflected in the works of Benjamin Loveluck (2015) and Félix Tréguer (2019), which illustrate that US libertarianism is not the prevailing mindset in France in the 1990s, or in any case the French mindset is not modeled on the libertarian US imaginary during this period. Meanwhile, work by Nicolas Auray (2002) and Anne Bellon's (2018) thesis on the developing French policy on Internet governance describe specificities that stand out within the "big story" of the Internet.

As was highlighted earlier, we can, of course, identify trends that cross borders, such as the irritation of the early adopters of the Internet when they saw the arrival of “newbies” online. The Eternal September of 1993 in the United States was marked by the irritation of the early adopters, who were faced with the sudden influx of students when AOL offered its subscribers access to Newsgroups. A similar response occurred 3-4 years later in France, with hostile reactions to the arrival of the “newbies”. Our study (SCHAFFER, 2018) showed these reactions to be particularly evident in French Newsgroups during the second half of the 1990s, but this could be considered as a mere starting point. There is still an enormous amount of unexplored information about transnational digital cultures and controversies that could be gleaned from the digital-born heritage.

Sources and archives as key issues

Indeed, another point that deserves our attention is the sources used, as they are the very basis of history. The size and multiplicity of sources that can be considered to write the history of Internet and the Web hinder any attempt to see them in total terms. Different sources will be chosen to shape geopolitical, cultural or institutional perspectives of history. As is the case for many historians of the contemporary world, these sources are plethoric and require the intervention of numerous researchers, whatever the approach chosen.

Of course, a transnational and international vision is the central point of certain histories and sources: an ideal example of this is the historical study of the governance of the Internet, which takes a global approach perspective from the very outset, despite the fact that the evidence of controversies also point to strong national trends. When the researcher is examining sources from the International Telecommunications Union (ITU) or the W3C, he or she is directly plunged into the world international communities and transnational stakes that all involve a geopolitical and global vision, despite the evidence of national trends and protest, in particular from China and from G20 members including Brazil, South Africa and India. By pushing for a broader, more political definition of governance that would encompass more than the naming function or the responsibilities of ICANN, these countries favored for example the handing of responsibility to the ITU, an intergovernmental body of the United Nations. However, these sources – which reflect not only international and transnational dimensions, but also the issues affecting transnational and international entities – are countered by other much more local and national sources.

Although born-digital heritage and particularly Web archives are an indisputably rich source of promising global approaches that was designed for international use by the Internet Archive, we may also question the global use of these sources.

The Internet Archive Foundation has collected billions of Web pages across the world since 1996. It allows historians to explore the Web of the past (BRÜGGER, 2018), but this historical global approach has some limitations. The first of these is the unequal coverage of the different geographical regions. This could be explained by the difficulties in identifying websites (WINTERS, 2017). Some regions and countries are covered with more care, regularity and detail than others, despite a system that Anat Ben-David and Adam Amram (2018) rightly describe as a great human and technical network in their paper dedicated to the North Korean websites preserved by Internet Archive.

With 418 billion pages archived at the time of typing these lines, the mass of documents available for a given subject makes it difficult to carry out a global research. This overabundant data is now a challenge for the archiving of digital social networks, as evidenced by the Library of Congress' difficulties with Twitter archives: the LoC reached an agreement with the company Twitter in 2010 to retrieve all tweets that had been issued since 2006. However, this data is not accessible to researchers as the tools needed to search these gigantic databases are major stakes. There are, of course, other questions to be answered, many of which, concerning legal and ethical issues (MUSIANI *et al.*, 2019).

But the difficulties go beyond the heterogeneity of data or their volume, even if they are partly linked: the comparison of national corpora is difficult due to the absence of a whole picture in Internet Archive of data collection policies that evolve over time. The lack of some metadata and statistics neither facilitates data entry, nor the ability to obtain a complete vision of the elements that have been preserved. Thus, the Internet Archive has limits that the national web archiving institutions tend to mitigate by offering statistics and tools to conduct quantitative, as well as qualitative analyses. However, this often involves travelling from one fund to another, because it is impossible to “remotely” combine these national funds of Web archives on a European scale. The Bibliothèque Nationale de France (BnF – French National Library), the Danish archives or the British National Library can provide researchers with a precise picture of their individual Web archives and propose sophisticated and suitable tools for data searching and analysis. However, author rights and national legislations prevent a combined access to these archives on a given computer terminal, and the researcher will have to move from one country to another (although the British Library does put some web archives online that exclude the most recent data, and the Danish archives are available at a distance after user appraisal, the French library only allows the consultation of web archives within the BnF buildings in Paris or at the French regional branches). There are currently discussions about how to at least improve the circulation of metadata within Europe, but the fluidity of data circulation on the Web is currently not echoed in the Web archives. Of course, this does not prevent historians from using these sources, for example, in the recent WARCnet project, led by Niels Brügger, which started in January 2020 and aims to study European events such as European elections or terrorist attacks in a number of countries, including Denmark, the United Kingdom, Luxembourg and France.

GLOBAL PERSPECTIVES

While the preceding elements emphasize the motivations and reasons that lead historians to favor more territorially rooted approaches, recent historiography does not remain confined to national spaces, and approaches such as that taken by Googin and McLelland (2017) in their *Routledge Companion to Global Internet Histories* are already providing strong perspectives to enable historians to cross these borders. After a first step of bringing national histories together to establish links between them and conduct comparative approaches, transnational approaches have also started to develop. Comparative and transnational approaches admittedly often have different objectives: the former are often rooted in a comparison (whether implicit or expressly stated) with the US model and reflect a determination to decentralize a US-centric history, while the



latter often take as their starting point virtual cross-border communities or phenomena within digital cultures that go beyond borders (GIFs, memes, hacking, etc.). The two approaches do not necessarily have the same ambitions and sources, as was clearly shown in the book by Googin and McLelland (2017), which looks at both trends. But they nevertheless contribute to a globalized history, even if they cannot always claim to be fully global.

Comparative studies as first steps

Comparative approaches were not systematically carried out, but they have developed through contributions to collective works or trans-border collaborations between researchers, such as those planned in the Warcnet network we cited earlier, or those that appear in Goggin and McLelland's book – which, for example, proposes detailed discussions of the national policies carried out in South America. By choosing to consider the national routes adopted by France, or by following Internet history in Costa Rica and its long “resistance” to TCP/IP (SILES, 2012), we discover an implicit comparison with the United States and, of course, the dominant history. This is even more evident in Benjamin Peters' (2016, p. 2) remarkable book, *How not to network a Nation*, which demonstrates the reasons for the failure of networking projects in the USSR:

That said, let us begin with a slight twist on the conventional cold war showdown: the central proposition that this book develops and then complicates is that although the American ARPANET initially took shape thanks to well-managed state subsidies and collaborative research environments, the comparable Soviet network projects stumbled due to widespread unregulated competition among self-interested institutions, bureaucrats, and other key actors. The first global civilian computer networks developed among cooperative capitalists, not among competitive socialists. The capitalists behaved like socialists while the socialists behaved like capitalists.

By revealing how Soviet ambitions were hampered by the adoption of a competitive rather than a collaborative model, Benjamin Peters not only enriches the history of the Internet, but also the history of Soviet and US models, thereby going far beyond a mere history of networks.

For the Web, we can note the movement started by Niels Brügger (2017) and his team to quantify national Webs and their development. This study was initially carried out in Denmark, but has awakened an interest to apply this approach on a European scale.

Dana Diminescu and her team led another pioneering study as part of the e-diasporas project. She notes:

These new communication and organization practices have produced a vast, moving e-corpus, whose exploration, analysis and archiving have never before been attempted. The outcome of the efforts of more than 80 researchers worldwide, the

e-Diasporas Atlas is the first of its kind, with some 8,000 migrant websites archived and observed in their interactions.³

This project was also innovative in the field of Digital Humanities, and led to the creation of a collaborative platform and the *e-Diasporas Atlas*. This study reveals two central conditions for a global vision of the history of the Internet and the Web, namely the sharing of data between teams and researchers, and the constitution of large transnational corpora.

The potential benefits of this data sharing and collaboration are clear. We can confirm this from our own positive experience of hosting a South Korean postdoctoral fellow at the CNRS (the French National Center for Scientific Research) in 2015 to work on a comparative history of Internet deployment in France and South Korea (JO, 2017). This project yielded interesting and surprising results, starting with the discovery of the popularity of the Nora-Minc (1978) report. This description of the “computerization of the society” was a bestseller in France and was rapidly translated in South Korea. The study also revealed the parallels between the French Minitel and the South Korean project Hitel (a videotex system modeled on the Minitel and developed by Korea Telecom) and the similarities in the sociological profiles and interests of French and South Korean early adopters.

Transnational approach under construction

Beyond comparative approaches, transnational and even global approaches took shape. For the global approach, we may mention the book by Gabriele Balbi and Paolo Magaudda, *A History of Digital Media. An Intermedia and Global Perspective* (2018); and for the transnational perspective, Ignacio Siles’ stimulating approach in *The Internet as a transnational project: Connecting Central America through computer networks (1990-1996)*, where he notes:

Theoretically, this paper makes visible the importance of transnational processes in the development of the Internet. [...] This means making visible how different nodes in various countries emerged, how flows and relations were established between these nodes, and what actors, logics, and contexts made these connections possible. In this way, it becomes possible to tell the history of collaboration networks that have constituted the Internet outside the United States.

First, transnational histories emphasize the study of certain processes: flows, circulations, movements, connections, and exchanges that “operate over, across, through, beyond, above, under, or in-between polities and societies” (Iriye & Saunier, 2009, p. xviii). What passes through and crosses borders are people, knowledge, technologies, ideas, practices, and institutions. [...] Second, this body of work emphasizes the role of specific actors and how they obtain transnational action capacity (SILES, 2018, p. 231).

³ <http://www.e-diasporas.fr>.

This approach aims to build a history of processes and negotiations, a history that is human as well as technical, and to pinpoint the uncertainties at the heart of these events, instead of considering the final balance of power as the starting point for the general narrative and building upon it. The role of specific actors (often early adopters) is also examined on a European level, particularly in the work led by Camille Paloque-Bergès (2013) on the emergence of a European community around Usenet. It is also applied in our approach of European networks (SCHAFFER; BADOUARD, 2012, p. 16), enabling us to examine how the Internet has become a multi-dimensional political stake for Europe since the 1970s and to identify the first challenges to share and connect networks:

It primarily constitutes a domain of international public policy in which its difference and unity can be asserted. Technology takes on a strong political dimension, and the internal struggles to impose particular protocols in the 70s and 80s carry a true vision of the Union's position on the international stage. Consequently, the Internet is also becoming a political tool for the EU to strengthen its internal construction [...]. The consciousness of the Internet political stakes went through several steps, from industrial policies and technical standardization, to new modes of governance and legitimation processes. These steps follow the own history of the Internet, which is first developed within closed scientific networks before being opened to the general public. The infrastructure issue is thus overtaken by applications and uses. They also follow the European construction history, from the epistemic networks to the transnational democracy, passing by the building of a common market.

Beyond these approaches that often remain focused on technical and political actors and early adopters, other approaches are starting to shed light on more informal transnational and bottom-up phenomena, such as those used by the "Warez Scene". Wasiak (2019, p. 190) demonstrates:

Originally, the telephone itself offered such sense of simultaneity by enabling voice conversations with instant feedback from a second person. But in this historical case the sense of simultaneity was not just an impression given to two persons engaged in a conversation. It rather became a new condition for a whole subculture and eventually, one operating on a global scale. Due to the appropriation of the BBS system the whole geographically dispersed community of 'the scene' experienced the simultaneity when a cracked game could be released as '0-day warez' and circulated through a network of national and world HQs in a matter of hours from the moment when it became available in retail trade.

These phenomena described by Patrik Wasiak, based on his study of transnational software distribution through phone lines and BBS, pave the way for new and connected narratives of users and uses, and invite us to reflect further on transnational Internet phenomena. Such transnational approaches, coupled with

comparative approaches, do not enable us to piece together a fully global approach, but they do at least make it possible to sketch the broad outlines of Internet histories that are more complex than the initial master narrative. The global approach proposed by scientists working on issues raised within arenas of governance will undoubtedly be enhanced in the coming years with the incorporation of new and increasingly social global approaches, taking account of global imaginaries and experiences like those associated with the digital divide.

CONCLUSION

The case of the previously mentioned Warez Scene, the work of Ignacio Siles and our European research all provide reflections on transnational challenges, whether they involve the study of infrastructures or human networks. However, we have also shown that a global Internet history should not exclude the possibility of using monographs and approaches that are rooted in local and national spaces, as this would retain the socio-political and economic realities that both surround the study of the uses and users of the “network of networks” and provide a precise framework for this research. Although the Internet is global as a “network of networks”, it is also the sum of its parts, and these parts do not form the smooth and homogeneous whole that the ARPANET maps produced by the company BBN sought to describe. As Bradley Fidler and Morgan Currie demonstrated in a recent article, these representations of ARPANET drew a picture of a network composed of nodes with equal value, thus depriving the reader of the opportunity to view the reality of uses and giving the impression that each node was identical:

All told, the maps focused on the ARPANET subnet, as they were structured around the IMPs and the IMP-to-IMP links that connect them. The maps do not, nor were they ever intended to, describe the broader ARPANET of users interacting with their host machines in an increasing number of ways nor, for example, the social and political hierarchies between them. [...] First, the maps do not depict the different connections and densities of flow that diversified within the ARPANET. The maps do not visualize the network’s widening sociotechnical infrastructure, one no longer composed of one host per IMP (as the maps originally denoted) but of hosts’ diversifying user base and the interconnected networks of hosts, both locally and internationally. Durable patterns of highly local network use, for instance, emerged early in the ARPANET’s history and remained at varying degrees in different places well into the early 1980s (FIDLER; CURRIE, 2015, p. 50-51).

The so-called homogeneity is, thus, a facade. The ARPANET maps tend to gloss over actual usage practices. The reality is very different, and the global vision provided by the maps is based on static and reassuring parameters that do not reflect the growing complexity of the network. In this particular case, the global vision is one that is skewed and oriented to a specific interpretation.

This does not mean that it would be preferable to systematically fragment the study of the Internet and the Web; Internet and Web governance, imaginaries, content and digital cultures, as illustrated by memes and gifs, all of them, cross-borders.

The necessary articulation of local and global may therefore be the most coherent solution not only for the history of the Internet and the Web, but also in the search for the history of missing narratives, where the Internet is not considered as the only outcome in a teleological vision that would underline its universal nature. By proposing a history of networking rather than one that solely considers the Internet, Andrew Russell invites us to see things from a different perspective. We strongly agree with this assessment: it is the study of these movements, connections and networks that can lead to the building of a global history of the Internet, whether in terms of infrastructure or digital practices. We even suggest deepening this proposal by embedding networking in digital practices. We may add that studying the history of the places, people, societies and communities that remain outside networks (whether by choice or necessity) could also tell us a lot about the global and asymmetric reality of the Internet and point to an implicit history of invisibilization.

We will leave the last word to Janet Abbate (2017, p. 8), whose pioneering study opened the field to the history of the Internet and continues to inspire others to explore its evolution.

Haigh, Russell, and Dutton (2015) raise the question, “What is the history of the Internet the history of?” and find answers ranging from a narrow, technical definition of the Internet as a set of routers and protocols enabling network interconnection to a broader notion of the Internet that encompasses “the contents of the networks being interconnected and their users, social practices, and skills” (p. 143–144). Can we write Internet histories if we do not know what the Internet is? I suggest that it is time to reconsider not only what defines the Internet but the politics of such definitions. The ways in which historians define the Internet shapes the geographic and temporal scope of our narratives, the activities we include or ignore, the dominance of certain countries and social groups and the marginality of others.

By inviting us to reflect on what Internet we are referring to – and even going one step further, since she also suggests that our definition may depend on where we are looking and writing from, on our era and our experience – Janet Abbate ultimately raises a broader question, that of the researcher and the focus of his or her research. As researchers, and also as users, do we ourselves have a global vision of the Internet that enables us to begin to grasp it in all its complexity?

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