

CHAPTER 1

THE COMMODIFICATION OF THE INTERNET

Since the 1990s, certain utopian discourses have tended to confuse the historical and technological features of the internet and the socio-political aspects that result – what Dominique Cardon calls ‘the spirit of the Internet’¹ – with actual uses. In other words, qualities are often projected onto the contemporary internet that it no longer has for many of its users. While this type of utopian reasoning does draw on true events from the past, it forgets that the internet is not a socio-technical construction fixed in time but is a *historical object*. Therefore, it changes depending on the context and the actions of the actors involved. Over the period from the 1960s until the beginning of the 1990s, networked computing emerged as a public good but then began to deviate from this initial notion towards a market-centred one. A link was then gradually established between economic neoliberalism and a certain form of technological determinism, expressed by the new notion of ‘the information society’. At the same time, the first commercial applications of networked computing tested

the uses and business models that would constitute the foundation of the commodified internet.

THE LEGACY OF ARPA

The official histories of the internet agree that its direct ancestor was the computer network set up in the late 1960s by US scientists working for Advanced Research Projects Agency (ARPA), an agency of the US Department of Defence responsible for research and development of new military technology.² ARPANET was the concrete result of a series of theoretical studies on networked computing dating back at least to the concept of the *Intergalactic Computer Network* developed by JCR Licklider at the Massachusetts Institute of Technology (MIT) in 1963,³ as well as perhaps the *Memex* by Vannevar Bush⁴ and the cybernetics of Norbert Wiener.⁵ ARPANET combined several innovations such as Douglas Engelbart's work on augmenting human intellectual capacity through computers, which was henceforth considered a communication tool for collaborative intellectual work.⁶ ARPANET also drew on the work of Leonard Kleinrock (MIT) and Paul Baran (Rand Corporation) on packet switching⁷ and John McCarthy on timesharing, that is, sharing computers among many users through simultaneous multitasking.

A Progressive Project

In the late 1960s, during that period of great political and cultural effervescence, the ambitious ARPANET project was based on the most 'progressive' technologies and management innovations (decentralised architecture, timesharing, packet switching, network computers and work in self-managing

teams), as opposed to the ‘conservative’ methods prevailing at the time (centralised architecture, batch processing, switching circuits, local computers and rigid bureaucratic hierarchy). ARPANET’s success in the early 1970s thus consecrated the open and collaborative socio-technical model, with its technical choices and collegial way of working, of the team headed by Robert Kahn and Vinton Cerf.⁸ This style of working continued after ARPA withdrew from the project in the mid-1980s and the National Science Foundation⁹ (NSF) took over. During this period, the internet was both invented and developed by a ‘republic of computer scientists’, that is, a community of equals whose core values were cooperation and the pursuit of scientific progress.¹⁰ The ensemble of technical and organisational innovations that would later serve as the internet’s foundation – from the establishment of regulatory bodies such as the Internet Engineering Task Force (IETF)¹¹ up to the development of the World Wide Web following research by Tim Berners-Lee and Robert Cailliau – would be marked by this same spirit of openness, cooperation and progress.

Convergence of Design and Use

Another important feature differentiating the computer networks of the 1970s and early 1980s from other technologies of the time is that there was no gap between design and use. In other words, ARPANET’s designers were also its first users, giving them the power to change the orientation of technical inventions and their implementation according to their own interests and needs. The development of electronic mail by Ray Tomlinson in 1971 is one example; as Tomlinson explains, engineers working on ARPANET at the time were trying to find interesting uses for it, and the ability to send

mail via the network seemed to solve their own communication needs.¹² This foundational idea of the internet, that the design or modification of a technology must be accessible to its users, inspired the first hackers who banded together in the computer clubs of the 1970s, such as Steve Jobs and Steve Wozniak, inventors of Apple, as well as Richard Stallman, creator of the free software movement. As Eric Raymond explains in his seminal work ‘How to Become a Hacker’,¹³ the hacker culture and the DIY spirit that prevails among many IT people owe much to the pioneers of networked computing working on ARPANET.

ARPANET – A Public Good

At the same time, the socio-economic context that ARPANET was born in also influenced the values associated with it. Indeed, the entire project was financed by US taxpayers. Private companies such as IBM and AT&T refused to invest in it despite the government’s proposals because they thought it would be impossible to make it profitable.¹⁴ The main creators of the project were thus employed by universities and public research centres. ARPANET was, therefore, a pure product of the tradition of state technocracy, which emerged in the United States during the Second World War and developed within its military–industrial and scientific complex. Although private companies were involved as subcontractors from ARPANET’s very conception, the funding and the initiative remained under the control of public officials. Consequently, the first computer networks were considered by those who built them to be *public property*, that is, assets financed by public funds in order to serve the public interest. This is precisely what explains the refusal of internet pioneers, at least until 1994 and the birth of the first commercial web

browser Netscape, to file patents on their inventions or to try to ‘monetize’ them by other means. This tradition of non-commercial technologies being developed collectively without being patented property and available to all continues today through the free software movement, which itself inspired the Creative Commons licenses and the theory of the Information Commons.¹⁵

Free Circulation of Information

Another core value of networked computing also resulted from the encounter of the early network designers and Californian counterculture of the 1970s: the free flow of information. Indeed, from the outset, ARPANET was conceived in order to facilitate the dissemination of information, and the networks inspired by it perpetuated this tradition. Their decentralised and non-hierarchical architecture made it difficult for a regulatory body to control the flow of information – a characteristic that quickly came into conflict with copyright and the legal frameworks for freedom of expression. This combination of technical choices and the internet’s cultural traits was translated politically into what Benjamin Loveluck calls ‘informational liberalism’, which continues to inspire a wide range of actors and communities, from peer-to-peer groups and anonymous to the proponents of digital currencies like Bitcoin.¹⁶

Through this brief description, it is easy to see how the birth of ARPANET and the internet and the influence of its initiators and users radically changed the perception of computing: while it was the very epitome of a technocratic apparatus designed for war, it came to represent a tool for individual freedom and a more harmonious society. As Loveluck writes, ‘This is how computers, originally denounced as one of the most advanced embodiments of individual alienation through technology, an

impersonal machine serving the interests of the bureaucracy or the State, in a singular reversal became one of the main tools serving individual emancipation'.¹⁷ Nevertheless, while networked computing benefited from the favourable context of post-war prosperity when the public resources needed for its development were abundant, the ARPANET and then the internet only appeared at the very end of this period. From the beginning of the 1970s, the economic crisis triggered by the oil shock encouraged more thinking about the contours of the so-called post-industrial economy. As will be shown below, the 'thesis of the information society' was central to these reflections, which would prepare the connected computer's entry into the commercial world.¹⁸

THE INFORMATION SOCIETY AND THE POST-INDUSTRIAL ECONOMY

In the US, the first attempts to elaborate the theory that American society was undergoing a structural transformation towards an 'information society' were written by Fritz Machlup in his 1962 work, *The Production and Distribution of Knowledge in the United States*, and by Marc Porat in his 1977 report commissioned by the US Department of Commerce, 'The Information Economy: Definition and Measurement'. In the latter, the author shows the considerable amount of information production and processing work as opposed to 'material' production. In 1973, Daniel Bell published his major book, *The Coming of Post-Industrial Society: A Venture in Social Forecasting*, which was considered the first explicit attempt to describe the transition to a post-industrial society. He forecasted the evolution of American society by extrapolating from trends that were already underway and thus observable. For Bell, the nature of employment

is the dominant feature in every historically determined configuration of society and economy. The decisive factor in the transition from an industrial society to a post-industrial one was the spectacular increase in productivity through information-related work; hence the idea that post-industrial (or post-Fordist) society is an ‘information society’.

The Convergence of Neoliberalism and Technological Determinism

The theory of a post-industrial society came just in time to provide an explanatory framework and rational justification for the economic and technological changes shaking up advanced societies towards the late 1970s.¹⁹ Substantial progress in computer technology and microelectronics, and their introduction into offices, factories, and households during the economic crisis, stirred up debates on the general evolution of the economy and society. It was in this fertile ground that Bell’s theory struck a chord with both the scientific community and economic and political decision-makers because, by setting a course and by identifying the means to follow it, Bell’s theory was supposed to help us manage the growing complexity of the world. At the end of the 1970s, Bell reshaped his theory of post-industrial society by incorporating the notion of ‘information revolution’. He was thus the first to make the connection between post-industrial society and the more visible aspect of the technological revolution underway: computerization.²⁰

Bell’s idea was even more relevant as it perfectly complemented the work of economist Robert Solow, who in the late 1950s had developed a theoretical model of economic growth in which technological innovation played a predominant role.²¹ This model, inspired by neo-classical economics, posits

that technical progress increases the productivity of capital and of labour. In other words, over the long term, growth comes from innovation. In combining Solow's and Bell's theories, what follows logically is this: if economic development depends on technological innovation, and if, in post-industrial societies, most innovation comes from the 'information revolution', then we must 'informatise' (or computerise) the economy. Solow and Bell's theories thus brought together two currents that became dominant in the United States in the 1970s: that of neoliberal economists, notably from the Chicago School, and that of intellectuals and engineers believing in the revolutionary potential of IT.

Technology to Overcome the Critiques of Capitalism

This convergence between economic neoliberalism and technological determinism was introduced to the general public through a series of highly popular futurology books. Among them was one very influential book, *The Third Wave*, written by American essayist Alvin Toffler following on his work, *Future Shock*.²² Toffler said his aim was to create a 'desire for the future' by describing it in the most positive way. But above all, he advances a theory underlying previous studies on the advent of the information society, which permeated all those that followed: the concepts and social theories inherited from the Industrial Age – especially those criticising capitalism – were no longer valid. He argues that a completely new analytical framework was needed in order to understand the changes underway since the traditional socio-political divisions (right/left, capital/labour and employers/employees) had shifted over time into a confrontation between the forces of progress (entrepreneurs, engineers and scientists) and immobile, backward-

looking forces (unions, traditional political parties and bureaucratic organisations).²³

Toffler's theses, which were popular but far from scientific, shifted the focus of debate. From the obligation of the State to support and supervise the emergence of an 'information society' through proactive policies such as ARPANET and the internet, the focus shifted to the importance of the market as an authentic expression of change and the only means for enhancing the evolution underway. Toffler's writings resulted from a long process of convergence between market advocates and proponents of an 'information society', which made digital technologies powerful vectors of neoliberal hegemony.²⁴ Now that the theory for commodifying networked computing had been developed, the next step in the process was establishing suitable policies.

THE DEREGULATION OF TELECOM AND THE NEOLIBERAL TURN

In 1978 in France, Simon Nora and Alain Minc's report called for a proactive policy by the State in order to develop a national strategy for the IT and telecommunications industry.²⁵ In the wake of ARPANET, the Télétel project was the practical result of this strategy and received massive public investment, resulting in the birth of Minitel.²⁶ In 1983, the French government launched Minitel, a computer network that achieved widespread adoption in just a few years as the government distributed free terminals to every French telephone subscriber. It provided e-mail, e-commerce, chat, research, game playing, blogging and even an early form of online porn. *Télématique* (videotex), or the combination of telecom and computing, was viewed as an opportunity for a

complete revolution in French economy and society, and so managing the Minitel was considered a public service. But while networked computing in France perpetuated the central role of the State, elsewhere it was quite the opposite: technological progress was only conceived through widespread deregulation.

The Pioneers: Thatcher and Reagan

The belief that the advent of the information society was imminent and inevitable, as well as the rise of neoliberal economic policy, converged in the early 1980s in the actions of the US government under Ronald Reagan and the UK government under Margaret Thatcher. They were the first to deregulate the telecommunications industry, which had previously been directly or indirectly subject to state regulation in almost all western countries. With the dismantling of American Telephone and Telegraph (AT&T) in 1982, the Reagan administration undermined the idea that had previously dominated: namely, that protecting the public interest required a single network under the supervision of a public regulatory body.²⁷ Indeed AT&T, a private company with a monopoly over the US telephone network exercised the *de facto* role of a public service. In 1974, the US government filed the first anti-trust lawsuit against AT&T based on suspicions that it had abused its dominant position. But gradually, starting with Reagan's election in 1980, more ideological arguments began to support the idea of dismantling AT&T. Among them was the idea that technological innovation could only come from a deregulated market, whose main purpose was not to ensure a public service for all but to maximise profits and dividends for shareholders.

Deregulation as a Remedy for Recession

In Britain, the idea that economic progress depends on market-oriented technological innovation started gaining support in the early 1980s. According to Paschal Preston, this development should be connected to the social and political context of the country rather than the actual importance of the ‘information revolution’.²⁸ Indeed, Great Britain at that time was experiencing a level of unemployment unprecedented since the crisis of the 1930s, along with growing public discontent towards the government of Margaret Thatcher. Therefore, the emergence of discourse around computerisation was the result of its potential for job creation through private initiatives, which meant to compensate for reduced public services and the closure of traditional factories. As a result, the ‘technological revolution’ was a central element in the UK’s neoliberal economic project. The public British Telecom company also had a monopoly over the telephone network until 1982. In that year, the Conservative government decided to sell a portion of the company’s capital and open the telephony market to private operators, notably Mercury Communications, with whom British Telecom formed a duopoly until the early 1990s. BT was completely privatised in 1993.

European Dogma

Despite resistance in several European countries, including France, the new policy of deregulation and privatisation became the dogma of the European Union (EU), not only among the groups that traditionally propounded this doctrine such as the Conservative and neoliberal parties, but even within the political currents that had historically been interventionist, such as the British Labour Party and the French

Socialist Party. Throughout the 1990s, the European Commission promoted initiatives in this direction, approved each time by EU heads of state. In 1994, Commissioner Martin Bangemann²⁹ presented a report, 'Europe and the Global Information Society',³⁰ based on arguments linking economic liberalism and technological determinism. The experts drafting this document advocated the privatization of public operators and the opening of markets to competition. The report urged the EU to trust in market mechanisms as the driving force of the 'Information Age', which meant no 'public money, financial assistance, subsidies, dirigisme, or protectionism'. These recommendations were endorsed at a summit of European heads of state in Corfu in 1994 and thus became an integral part of the EU's official policy, which national governments were obliged to implement.

This wave of deregulation and privatization in telecommunications, which lasted two decades, had major effects on the evolution of networked computing. First, the technical infrastructure required for its development gradually passed entirely under private control. Second, the translation of the ideological tenets of neoliberalism into concrete measures, implemented by democratically elected governments, legitimised those tenets and thereby opened the way for the commodifying of the internet. But to do so, it was first necessary to test out commercial uses and tools of networked computing.

FROM COUNTERCULTURE TO THE COMMODIFICATION OF CYBERCULTURE

In his major work, *From Counterculture to Cyberculture*,³¹ Fred Turner shows how the California counterculture movement of the 60s and 70s helped legitimise the idea that we should abandon politics and instead rely on technology and

entrepreneurship as instruments of social change. The central character of the book, Stewart Brand, a go-between among several social worlds, contributed decisively to the emergence and then the commodification of networked computing. The first step in this process was the popularisation of personal computers – very different from the first generation of computers intended to serve massive bureaucracies, the military and large companies. In the 1970s, Brand, through his writings and personal relationships in the Bay Area, brought computer engineers and hobbyist-hackers together through computer clubs. The meeting of these two communities triggered a paradigm shift in IT, which resulted in the first personal computers such as Apple II and Commodore PET.

A New Audience for the Networked, Personal Computer

This shift introduced computers into middle-class homes and thus in the hands of a very different group of people than professional computer specialists, who were largely teenagers and young adults with particular interests such as entertainment and interpersonal communication. In the late 1970s, home users, who were excluded from using professional networks such as the internet, joined a new type of affordable service that connected home computers over the telephone network: the famous *Bulletin Board Systems* (BBS).³² Very quickly, BBSs multiplied and the topics discussed on them diversified. In the 1980s, several BBSs connected together to create FidoNet, one of the first computer networks on the global scale. At the same time, Usenet, ‘the ARPANET of the poor’, was developed among UNIX users, mainly academics and students, before it was connected to the internet.³³ Both in their purposes and their users, these new networks led to a series of

innovations in interpersonal communication (e.g. use of forums) and entertainment (e.g. online games). Their success also attracted a growing number of people and paved the way for the commercial use of networked computing, even more so because in the 1980s, the technological and political environment was also changing profoundly.

In 1984, Apple, having created some of the first personal computers, launched the Macintosh 128K. Drawing on the work of Douglas Engelbart's team at the Xerox Palo Alto Research Center, Apple introduced several innovations such as the combination of the mouse and a graphical interface.³⁴ This enabled its users to avoid entering commands to perform tasks on their computer. This innovative design combined with a massive advertising campaign made Macintosh the first great personal computing success among non-specialists. An entire population of intellectual workers without computer knowledge (managers, professors, journalists, architects, etc.) was now able to use a computer in their daily lives. It was in this context that pioneers such as Stewart Brand began to offer the first commercial online services. In doing so, they discovered that the economic value of these services resided not only in their technical features but also in creating and maintaining user communities.

The WELL, the First Digital Social Network

In 1985, Brand and Larry Brilliant founded their own BBS called the Whole Earth 'Lectronic Link (WELL).³⁵ With a subscription, users could exchange messages with other users in a sort of forum organised by subject. Brilliant was responsible for funding, as well as technical implementation, while Brand activated his networks to develop the subscriber base and was in charge of management. Soon the various groups in

California that Brand was involved with began to take an interest in the WELL: engineers in the computer industry, computer club hackers, journalists in the technology press and old hippies, especially fans of the band The Grateful Dead. The WELL quickly became a place for exciting discussions on a wide range of subjects, from technology to politics and from music to cooking. The social ties that developed there were sometimes very strong, which inspired Howard Rheingold, one of its first users, to coin the concept of ‘virtual community’, which was very influential at the time of the popularization of the internet.³⁶

In a sense, the WELL was the first digital social network in history — a basic but functional ancestor of Facebook, Twitter and LinkedIn. Rheingold himself subsequently wrote that if he had known about studies on the sociology of social networks before writing his book on virtual communities, he would have called the WELL an ‘online social network’.³⁷ In fact, while competing services at the time, such as Prodigy, considered networked computing to be a channel for distributing professionally produced content, the WELL’s value resided in users’ postings. For that reason, Brand hired John Coate and Cliff Figallo, both former members of a hippy community, to lead discussions and moderate conflicts. Figallo quickly understood that relations between users were the only ‘product’ that the WELL could sell.³⁸ The most active users also realized that at the WELL, they were providing a form of work that benefited the platform’s owners. Carmen Hermosillo, writing about her WELL experience, published a pioneering text in 1994 in which she wrote, ‘I began to see that I had commodified myself [...] I created my interior thoughts as a means of production for the corporation that owned the board I was posting to, and that commodity was being sold to other commodity/consumer entities as entertainment. That

means that I sold my soul like a tennis shoe and I derived no profit from the sale of my soul'.³⁹

This is, roughly formulated, a fundamental idea for understanding the internet economy, one that would be formalized a few years later by Tiziana Terranova under the name of 'free labour', meaning the positive externalities creating economic value that users of digital services produce in a commercial context.⁴⁰ Free digital labour is now one of the main sources of value creation that the internet oligopoly relies on.

A Platform for Freelance Knowledge Workers

With the influx of so many new users, the WELL gradually became a professional marketplace for freelance workers in California in the mid-1980s. Consultants, programmers, journalists and others used WELL to make contact, share resources, collaborate, offer their services and build their online professional reputations. The WELL's transformation from a platform for everyday sociability to one for matching workers with jobs and advertising services occurred in a particular context. Indeed, the 1980s marked the triumph of neoliberalism, which expanded its cultural and political hegemony beyond the restricted circles of the intellectuals who had prepared its coming.⁴¹ After the long and patient intellectual subversion of the Keynesian order that had prevailed during the post-war boom, the values of entrepreneurship, competition and individualism eventually ended up forming the core of the new dominant ideology. A 'new spirit of capitalism' was instilled in companies, pushing them to reorganise into networks and to adopt the idea of management by project making regular use of workers who were freelancers (and therefore without job security) according to the company's needs.⁴² The WELL thus became the technological symptom of a much deeper socio-economic

and political revolution, through which post-Fordist capitalism took up the 'artistic critique'⁴³ touting independence and flexibility and used it to serve its own renewal. The current phenomenon of 'uberisation' is the logical fulfilment of this long-term dynamic, and Silicon Valley, once again, was the ideal place for this new capitalism.⁴⁴

The Digerati, Heralds of the Market

In the late 1980s, the collusion between the standard bearers of networked computing, including some former protagonists of the counterculture movement such as Stewart Brand, and the most powerful players in the market had become complete. This complicity eventually translated into substantial financial ties. In 1987, Brand and his partners launched the Global Business Network, a consulting firm serving multinationals such as Shell, American Express, Deutsche Bank and Coca-Cola. In the same period, he published a popular book recounting the creation of the Media Lab at MIT.⁴⁵ The Media Lab brought together engineers, scientists and artists. Its founder, Nicholas Negroponte, is a flamboyant intellectual and highly influential among the American economic and political elite. From its very inception, the Media Lab was entirely financed by dozens of private sponsors, including the largest companies in the world who wanted to benefit from the 'disruptive' innovations and ideas it generated. The Media Lab thus dramatically crystallised a radical transformation of intellectual work on digital technologies: it was originally supposed to provide an informed view on social issues resulting from the generalisation of connected computing, and instead, it came to serving the interests of capital and thus relegated any real critical thinking to the margins. A few years later in 1992, Negroponte and Brand were among the founders of the magazine *Wired*,

celebrating this vision of networked computing compatible with deregulated, financial capitalism. The Digerati,⁴⁶ this new generation of neoliberal intellectuals and techies federated around *Wired*, would then play a central role in the privatization of the internet.

NOTES

1. Cardon, Dominique, *La démocratie Internet*, Paris, Seuil, 2010.
2. Leiner, Barry M.; Cerf, Vinton G.; Clark, David D.; Kahn, Robert E.; Kleinrock, Leonard; Lynch, Daniel C.; Postel, Jon; Roberts, Larry G.; Wolff, Stephen, "A Brief History of the Internet", *SIGCOMM Computer Communication Review* 39, n 5, 2009, pp. 22–31.
3. Licklider, J.C.R., "Memorandum For Members and Affiliates of the Intergalactic Computer Network", 1963, available at <http://www.kurzweilai.net/memorandum-for-members-and-affiliates-of-the-intergalactic-computer-network>
4. Bush, Vannevar, "As we may think", *The Atlantic*, July 1945, available at <http://www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/303881/>
5. Wiener, Norbert, *Cybernetics: Or Control and Communication in the Animal and the Machine*, Cambridge, The MIT Press, 1948.
6. Serres, Alexandre, "Quelques repères sur l'émergence d'ARPANET", *Terminal*, n 86, 2002, pp. 23–37.
7. To this we must add research done at the same period in Great Britain by Donald Davies and Roger Scantlebury at the National Physical Laboratory.
8. This team designed the TCP/IP protocol (Transmission Control Protocol/Internet Protocol).

9. The National Science Foundation is a federal agency of the United States government whose mission is to support fundamental research. In the 1980s, its computer network NSFNet progressively replaced ARPANET as the backbone of the internet.
10. Flichy, Patrice, *L'imaginaire d'Internet*, Paris, La Découverte, 2001, p. 80.
11. The IETF is an informal, international and open group that has produced most of the technical protocols for the internet.
12. Tomlinson, Ray, "The First Network Email", available at <http://openmap.bbn.com/~tomlinso/ray/firstemailframe.html>
13. Raymond, Eric, "How To Become A Hacker", available at <http://www.catb.org/esr/faqs/hacker-howto.html>
14. McChesney, Robert, *Digital Disconnect: How Capitalism is Turning the Internet Against Democracy*, New York, The New Press, 2013, pp. 99–100. According to estimates cited by McChesney, the public money invested in the development of ARPANET, and then the internet, amounts to several billion dollars.
15. Aigrain, Philippe, *Cause Commune*, Paris, Transversales, 2005.
16. Loveluck, Benjamin, "Internet, une société contre l'État ? Libéralisme informationnel et économies politiques de l'auto-organisation en régime numérique", *Réseaux* 4/2015 (n 192), pp. 235–270.
17. [translated here] Idem. p. 260.
18. Duff, Alistair S, *Information Society Studies*, London, Routledge, 2000.
19. Webster, Frank, *Theories of the Information Society*, London, Routledge, 1995.
20. Dyer-Witherford; Nick, *Cyber-Marx: Cycles and Circuits of Struggle in High Technology Capitalism*, Chicago, University of Illinois Press, 2000.

21. Solow and Bell knew each other well and had worked together on a Commission set up in 1963 by President Lyndon Johnson on automation. In addition, they were among the earliest authors in the journal, *The Public Interest*, which spearheaded the neoconservative movement in the United States. This illustrates their ideological shift at the same time, leading them to espouse neoliberal positions in the 1970s. See Kristol, Irving, *Neo-conservatism: The Autobiography of an Idea*, New York, Simon & Schuster, 1995.
22. Toffler, Alvin, *The Third Wave*, New York, Bantam Books, 1980 and *Future Shock*, New York, Bantam Books, 1970. These two works sold several million copies around the world.
23. This theory had been developed earlier by Daniel Bell in his 1960 work, *The End of Ideologies*, in which he tries to overcome the notion of mass society that was dominant at the time. According to Bell, the post-war period in the West was characterised not only by the end of radical conflicts such as class struggle, but also the end of ideological struggles such as those triggered by the Second World War. This theme was taken up again by Francis Fukuyama in his well-known work, *The End of History and the Last Man* (1992).
24. Neubauer, Robert, "Neoliberalism in the Information Age, or Vice Versa? Global Citizenship, Technology, and Hegemonic Ideology," *tripleC*, 9 (2), 2011, pp. 195–230.
25. Nora, Pierre; Minc, Alain, *L'informatisation de la société*, Paris, Seuil, 1978.
26. Mailland, Julien; Driscoll, Kevin, *Minitel. Welcome to the Internet*, Cambridge, The MIT Press, 2017.
27. This idea was primarily based on the need for compatibility and interconnectivity between the multiple telephone networks as well as the maximisation of the network effect, that is to say, the individual utility which depends on the number of potential users.
28. Preston, Paschal, *Reshaping Communications*, London, Sage, 2001.

29. In 1999, following the resignation of the Commission headed by Jacques Santer, Martin Bangemann accepted a consulting job with the Spanish operator Telefonica, one of the major players in the reorganisation of European telecommunications companies that Bangemann had himself imposed.

30. The European Council's recommendations can be consulted at <https://publications.europa.eu/en/publication-detail/-/publication/44dad16a-937d-4cb3-be07-0022197d9459/language-en>

31. Turner, Fred, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism*, Chicago, University of Chicago Press, 2006.

32. The first BBS was set up in Chicago in 1978 by Ward Christensen and Randy Suess. In 1994, according to an estimate by the magazine *Infoworld*, nearly 60,000 BBSs with 17 million users existed in the US. Source: http://en.wikipedia.org/wiki/Bulletin_board_system

33. Source: <http://en.wikipedia.org/wiki/Usenet>

34. Hiltzik Rutkoff, Michael A., *Dealers of Lightning: Xerox PARC and the Dawn of the Computer Age*, HarperCollins Publishers, 1999.

35. The name of this service was inspired by the *Whole Earth Catalog*, the hippy movement's iconic publication, which Brand had launched in 1968.

36. Rheingold, Howard, *The Virtual Community: Homesteading on the Electronic Frontier*, Cambridge, The MIT Press, 1991.

37. "Online social network". Source: <http://www.rheingold.com/VirtualCommunity.html>

38. Cited in Turner, Fred. *From Counterculture to Cyberculture*, op. cit., p. 147.

39. Hermosillo, Carmen (humdog), "Pandora's vox: on community in cyberspace", 1994, available at https://gist.github.com/kolber/2131643#file-pandoras_vox-mdown

40. Terranova, Tiziana, "Free Labor: Producing Culture for the Digital Economy", *Social Text* 18, n 2, 2000, pp. 33–58.
41. Dixon, Keith, *Les évangélistes du marché: Les intellectuels britanniques et le néo-libéralisme*, Paris, Raisons d'agir, 2008.
42. Boltanski Luc, Chiapelo, Ève (Translated by Gregory Elliott), *The New Spirit of Capitalism*, Verso Books, 2007.
43. According to Boltanski and Chiapello, the 'artistic critique' of capitalism originates from the emancipatory political movements of the 60s and is based on a demand for freedom, autonomy and authenticity, as opposed to the more traditional "social critique" that demands solidarity, security and equality.
44. Morozov, Evgeny, *To Save Everything, Click Here : Technology, Solutionism, and the Urge to Fix Problems that Don't Exist*, Allen Lane, 2013.
45. Brand, Stewart, *The Media Lab: Inventing the Future at MIT*, New York, Penguin Books, 1988.
46. Brockman, John, *Digerati: Encounters with the Cyber Elite*, New York, Wired Books, 1996.