



The Imaginary Internet: How Utopian Fantasy Shaped the Making of a New Information Infrastructure

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An entire society is busy shifting into a new technical domain. The Internet has become the heart of information processing and telecommunications in business and at home. In this paper, I explore the reasons behind the engagement of all these social actors. I argue that the many utopias or ideologies accompanying the conception and diffusion of the Internet are among the key elements in explaining the mobilization of both computer specialists and the public. These ideologies are used to legitimize the new technique, to attract and integrate new users, to provide a framework for use of the innovation. They also afford a set of justifications that enable designers and users alike to explain their engagement in the digital world. The *imaginaire* is at the center of design and use of the Internet. Based on an in-depth analysis of writings by U.S. experts in various disciplines, and in the specialized and popular press, I present the technical *imaginaire* of the designers and promoters of the Internet. I show how these innovators used information technology to transform their technical dreams and projects into reality.

Reading the discourse that attends the birth of a new means of communication sometimes gives the impression that history stutters. Time after time, the same social reformers cherish hopes of solving problems of education or reviving the functioning of democracy, the same Cassandras perceive new media as a threat to culture or citizens' rights, and the same ideologists see the dawn of a new civilization. Should we denounce these false prophets with their short memories, who forget to compare today's technical trends with yesterday's prophecies? Or should we take a stand, espouse the ideologists', realists', or skeptics' cause, and separate the wheat from the chaff in these discourses?

Social scientists sometimes study this literature, either superficially or condescendingly, with irony. In the former instance, the literature is assumed to tell the truth about a new technique, although one that the technology's successors or sellers may eventually belie. In the latter, it is

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seen as no more than a fable, at best the product of literary analysis. I approach the question from a third perspective: considering these discourses an integral part of the development of a technical system.¹

The Internet is a prime example of the *imaginaire* surrounding a technique. Discourse on the Internet abounds, but we cannot interpret this profusion simply as the effect of some fad or as a paroxysmal case. The imaginary Internet is closely related to the role of this new technology in Western societies, especially in North America.

I question the reasons for individuals' mobilization around the Internet. Such mobilization around an information and communication technique has been studied in a more limited domain: that of the nineteenth-century introduction of the first data-processing machines (typewriters, calculators, and such). Joanne Yates has shown that the model of coordination by writing and use of these new machines would not have spread without a specific setting in which mediation and incentives could change.² The first business schools and the managerial literature developed at that time, proposed management methods and advised about the use of office machines. For this new managerial ideology, written procedure was the most appropriate means to establish efficient coordination among the different actors in a firm.

Uses of the Internet, however, are far more diverse. One of the main difficulties in studying this communication system derives from its complexity. Some analyze it as a new addition to the media, others as an interpersonal communication tool, or new system of corporate organization, and others as a device that facilitates trade. These facets of the Internet are rarely studied simultaneously, yet individuals may have global justifications for simultaneously engaging several views of the Internet.

A Corpus of U.S. Texts

U.S. literature on the Internet is burgeoning; the number of books with the word "Internet" in the title increased from one or two per year between 1984 to 1991, to 11 in 1992, to 1,014 in 1996. For the present study, I reference two types of texts: documents written by academics and computer scientists, and press articles. The first corpus includes writings by the founders of the Internet. Relying on the first U.S. historical books and on certain collective volumes available in hard copy or online, I began by selecting texts that defined the technical project's main lines and intended uses, then I identified those that described the first effective

¹ For a more complete analysis, see Patrice Flichy *L'imaginaire d'Internet* (Paris, 2001).

² Joanne Yates, "Evolving Information Use in Firms, 1850-1920: Ideology and Information Techniques and Technologies," in *Information Acumen: The Understanding and Use of Knowledge in Modern Business*, ed. Lisa Bud-Frierman (London, 1994), 26-50.

Internet uses and deduced possible development scenarios. In order to avoid retrospective constructions as much as possible, I primarily used texts written before or during the early development of the technique.

The second corpus consists of observations and comments by academics, experts, and journalists. I systematically studied four magazines, *Wired*, *Time*, *Newsweek*, and *Business Week*, for the period from 1991 to 1995. I used *Wired*, the main U.S. magazine for reflection and debate on the Internet and digital technologies, as a guideline. I identified authors who had written for, been interviewed in, or simply been commented on in *Wired*, and noted both what they had published in *Wired* and the books they had written. I included all relevant articles in *Wired*, whether written by intellectuals or journalists. For comparison, and to study how the imaginary Internet diffused from specialists to the public, I identified articles on digital technology in three U.S. newsmagazines: *Time*, *Newsweek*, and *Business Week*.

Internet or the Scientific Community's Ideal

During its first 20 years of existence (1969-1989), researchers in computer science initially developed the new technology, followed by others in the broader academic community, and, concurrently, those in counter-culture communities. The innovation framework was thus a non-market community in which the designers were also the users, so that during the entire period the creators of the Internet were under no pressure to sell their technique. All they had to do was develop a system capable of meeting their own needs, within the limits of a budget based on government funding. In this type of innovation, representations of a technique are relatively uniform; they correspond to specific social worlds. Moreover, the usual tension between designers' and users' *imaginaire* is absent because the two groups overlap.

I started with the creation of this new framework, the discourses and practices of the actors directly involved with the technique, especially those who Thomas Hughes called the "system builders."³ The utopias I explore were to be embodied in a technical system that worked and really was used.

Over a period of 20 years, from the opening of the Arpanet to the invention of the Worldwide Web, a very particular process of innovation was underway. Unlike many other technologies, the Internet and its various components were developed almost exclusively in the academic world. This research led directly to operational devices, thus short-circuiting the traditional step of transfer to industry. Such an exceptional process was possible only because computer scientists were the first users of their own inventions, and because those inventions were based largely on computer programs, intellectual work that academics could provide.

³ Thomas Hughes, *Networks of Power: Electrification in Western Society* (Baltimore, Md., 1983).

For the developers, the object was not only to steer computer science in a new direction (towards networks), but also to endow themselves with the working tools (message services, cooperative devices, collective documents) that the market could not provide.

This shortcut between research and use was reinforced by the fact that the development of tools and their uses enhanced the productivity of scientific work. As computer scientists linked up computers in a network for exchanging information, the very content of their dialogue concerned the construction of that same network. This circle was possible only because they were outside the market society where production and consumption are completely separate.

These academics, richly endowed by the Advanced Research Projects Agency (ARPA) and the National Science Foundation (NSF), were thus able to create an environment so favorable for the realization of their project, that they modeled it in terms of their own practices and representations of modes of sociability. The operation was carried out by a group of young researchers who viewed the university as a peer group, giving the social organization of the Internet four characteristics:

a) Interaction and cooperation between specialists or people with the same interests. These individuals are distance colleagues who constitute an “invisible college,” publish in the same journals, meet at the same conferences, and sometimes travel from laboratory to laboratory. This invisible college, which initially included some industrial laboratories such as Bell laboratories or Xerox Park, designed the Internet along the same lines and to meet their own needs. Pioneers such as Joseph Licklider were to call this social organization a community of interests; others such as Turoff spoke of a network nation.⁴

b) A community of equals where the status of each member is based essentially on merit, evaluated by peers. Unlike the classic university tradition, this evaluation is not only by legitimate authorities (commissions, journals, and so forth) but also by ordinary colleagues who test, comment on, and improve proposals. The debate, therefore, cannot be closed by any authoritative argument, and information flows freely, as manifested in Arpanet “Requests for Comments” and newsgroups.

c) Cooperation is an essential element of this scientific activity. Computer software is too complex to be created by a single individual; it requires teamwork. This collaboration is more intense when the aim is to network computers deliberately differing in design. Turoff and Lederberg

⁴ See Starr R. Hiltz and Murray Turoff, *The Network Nation: Human Communication via Computer* (Cambridge, Mass., 1978); and Joseph Licklider and Robert Taylor “The Computer as a Communication Device,” in “In Memoriam: J. C. R. Licklider, 1915-1990,” *Digital Systems Research Center Reports* 61 (Palo Alto, Calif., 1990): 21-41.

showed the effectiveness of Arpanaute communities.⁵ The fast flow of information allowed for a high level of transparency, which in turn facilitated cooperation. Yet as Lynn Conway notes, transparency also helped to intensify competition between teams.⁶

d) It is a world apart from the rest of society. The campus is a world of its own, a pathway for students between adolescence and the adult world, between school and the professional world, a place of innovation and experimentation for academics, where computer technology was to reign. Richard Cyert, chancellor of Carnegie Mellon University, commented in 1984: “the great university of the future will be that with a great computer system.”⁷ Backed by IBM (International Business Machines), he embarked on the construction of a network of 7,500 terminals.⁸

These academic computer networks and, more particularly, Arpanet, seemed to certain participants to be a closed community, separate from the rest of the world.⁹ In their history of the Arpanet, John King, Rebecca Grinter, and Jeanne Pickering use the metaphor of a mushroom town called Netville, protected for a long time by the Great Divide.¹⁰ To conquer new technological opportunities, pioneers in the computer field needed to be protected from the old world by the Great Divide. This boundary was codified in the form of rules reserving use of the network for certain laboratories and then, subsequently, for the academic world. Nsfnet thus developed an “Acceptable Use Policy” that specified that the network was intended exclusively for U.S. research and teaching institutions.¹¹ By extension, the network was opened to foreign universities (provided they opened their sites to U.S. universities), to private firms’ research centers collaborating with the academic world, and to para-university institutions. Other commercial uses were not accepted.

⁵ Joshua Lederberg, “Digital Communications and the Conduct of Science: The New Literacy,” *Proceedings of the IEEE* 66 (1978): 1314-1319.

⁶ Lynn Conway, “The Multi-Project Chip Adventures: Experiences with the Generation of VLSI Design and Implementation Methodologies,” Second Caltech Conference on Very Large Scale Integration (January, 1981), reprinted in *Internet Dreams*, ed. Mark Stefik (Cambridge, Mass., 1997), 143-156.

⁷ *Wall Street Journal*, 30 Nov. 1984, 18, quoted by Theodore Roszak, *The Cult of Information* (New York, 1986), 60.

⁸ Roszak, 58.

⁹ T. H. Myer, and John Vittal, “Message Technology in the Arpanet,” *National Telecommunications Conference '77 Conference Record, IEEE* (New York, 1977), 21.

¹⁰ John King, Rebecca Grinter, and Jeanne Pickering “The Rise and Fall of Netville: Institution and Infrastructure in the Great Divide,” in *Culture of the Internet*, ed. Sarah Kiesler (Mahwah, N.J., 1997), 1-33.

¹¹ This policy of closure on the academic world also stemmed from the fact that Congress reportedly refused to allow government grants to be used for commercial purposes.

The republic of computer specialists could thus function, sheltered from the outside world.

In the final analysis, the founding utopias of computer communication not only guided the initial Arpanet project but also constantly interacted with its technical realization. As the technical project took shape and developed, new utopias appeared (the idea of communication and interaction replaced that of distance calculation), feeding on early experiments, orienting future technical options, and their uses. This exceptional virtual circle between the elaboration of utopias, technical work, and the construction of uses was possible because it took place in a relatively closed and uniform community which saw it as a working tool that it both needed and could organize to suit its own practices.

Because of these constant interactions, my study of academic Internet utopias includes both the technical decisions that were made and the first uses of computer communication.

Communities, a Different Internet *Imaginaire*

As the Internet culture developed in the 1970s and 1980s in a relatively closed academic computer science community, a few dropouts on the fringes of the university world (the hackers) were trying to do computing in an autonomous and different way. The hacker culture clearly had certain points in common with the hippy counter-culture and with Arpanauts' representations. It shared the same refusal of centralized and commercial information technology that IBM symbolized at the time. The main difference between the two cultures lay in hackers' far broader view of the use and future of Information Technology (IT). For them it was a device that was not only an intellectual tool for academics to build new invisible colleges but for everyone to build a new society. These hackers were designers of the microcomputer, others were interested in computer networks.

Regardless, a new computer network model appeared. A second utopian project developed in the 1980s alongside the university model: the electronic community. Three independent social movements initiated this project. The first consisted of amateurs who wanted to create a system similar to the one set up by academics. The second was spawned by the Californian counterculture and saw computer networks as the association of a community utopia with an ecological (soft and non-polluting) technique. These two currents had in common the part played by hackers. The community development movement was the third current. Computer networks were seen as a means to organize local awareness and structuring, as radio had in the 1920s, and cable television and video in the 1970s. At times this movement was linked to the counter-culture in one of its initial dimensions, political and social activism, but it also had strong ties with the academic world and most Free-nets used university computer infrastructures.

Despite the diversity and heterogeneity of its origins, this electronic community differed in several respects from the invisible university college previously studied. First, the real or imagined local component remained essential, unlike the university network that by definition had freed itself from physical space. The social link was also different. Any academic was a potential member of the Internet provided her/his university and office were online. This was less a matter of a club spirit, as in electronic communities, than a consequence of professional status. In the invisible college, the degree of familiarity was relatively high, for “dear colleagues” regularly met at conferences or seminars and exchanged their articles, and Arpanet or Nsfnet reinforced this contact. Yet, their interaction remained essentially linked to their scientific activity.

With Usenet, the geography of invisible colleges profoundly changed. The groups’ dimensions increased while their boundaries faded and sometimes even disappeared. This was an anonymous world, far from the idea of a community so dear to most Bulletin Board Systems (BBS). The last point distinguishing the university from BBS was the fact that the former played a key part in technological development. Its members were both designers and users. Work in the world of electronic communities, in contrast, was more distinctly divided; while a few hobbyists devoted themselves to the technology, most users were content to communicate via the tools developed by others.

The Microcomputing World

Academics and BBS users also belonged to different technical worlds. Most of the former used powerful terminals running on Unix, situated only on university campuses, and had genuine computing skills. The latter used microcomputers at home, which were more a means for processing and storing data than tools for programming. They used their computers for intellectual work rather than scientific research, and needed standard software packages to perform these tasks. Although the microcomputers of the 1980s were not widely used by the public at large, a large proportion of the people who owned them were not computer specialists. Their use of microcomputers made them pioneers but it was not their computing skills that united them, it was a desire to communicate with a new tool, even if they were able to input data into a server (such as Free-Net) or host forums (for example, the Well, the best-known Californian BBS).

From Utopia to Community Ideology

Lastly, the community utopia differed from the invisible college utopia in that the initial dream was further from its realization. The local aspect gradually faded away behind a universal aspect, and the nature of communication, of egalitarian interaction at the origin of communities, hardly seemed to correspond to real practices. At PEN (Public Electronic Network de Santa Monica) or Big Sky Telegraph (Montana), for example, only a small minority actually participated. In the case of The Well, where

the community was not linked to a geographic territory, very few people expressed themselves and the vast majority simply observed the debate (read messages), as in most online communities. Most users seemed to use computer networks, the interactive medium par excellence, in the same way that they used the traditional mass media. Whereas the initial utopia, in particular, foresaw absolutely free, unrestricted dialogue, those experiments that actually lasted, such as The Well or PEN, soon saw the emergence of actors organizing the discussion. The leaders of forums, responsible for launching and moderating debate, thus played a key part in the community. Individuals who in the old media are called mediators or editors also had an essential role in BBS in bringing together transmitters and receivers, authors or artists and the public.

However, no change in the community *imaginaire* resulted from this evolution of communities' online practices in relation to the initial utopia. The idea of a virtual group in which everyone expresses himself or herself equally still dominates. The utopia has thus become an ideology partly masking the reality but also mobilizing actors. This ideology is particularly powerful to the degree that it is embedded in a long American tradition emphasizing the notion of community.

The Social Construction of a “Network Ideology”

During the 1970s and 1980s, the initial designers of the Internet were also its first users. Their framework was mainly that of the academic field (for Arpanet) or the counter-culture (for BBS). They dreamt of a world where people could exchange information freely from one side of our planet to another, where online communities replaced local communities, and where computerized conferencing afforded the possibility of practicing a “collective intelligence.” Design, uses, and ideologies were unified by the same perceptions in both the academic world and the counter-culture.

During the 1990s, there was a spilt in these closed worlds. Designers left the university to work in private companies and the Internet became a mass consumption product with widely varied users. Specialists working for computer journals or news magazines produced a new discourse about network computing and its impact on society. The imaginary Internet was no longer that of computer scientists, but a mass phenomenon. The digerati (digital generation), as the digital intelligentsia called themselves, diffused an Internet model of common interest communities, thus creating a “network ideology.” However, this new Internet myth was not completely outside reality, for the digerati were familiar with the design of these technologies and their first uses. They acted as mediators between designers and users, organizing the connections, and also building the socio-technical framework of the Internet. They initiated the debate on a digital society.

Virtual Communities, The Founding Myth

In 1993, the Internet appeared on the media agenda for the first time. At the beginning of the year, *Time* magazine published a feature called "Cyberpunk."¹² After recalling the link between cyber culture and the counter-culture, the author, Philip Elmer-Dewitt, discussed computer viruses, virtual reality, rave parties, drugs (ecstasy), and The Well.¹³ In particular, he cited Howard Rheingold, pioneer journalist in the electronic community: "We're replacing the old drugstore soda fountain and town square, where community used to happen in the physical world."¹⁴ In contrast to those traditional communities, Rheingold spoke of the "virtual community."

In September 1993, *Newsweek* published a feature on online life.¹⁵ One of the experiences presented was The Well. In an excerpt from his then forthcoming book, Rheingold emphasized the fact that virtual communities were not utopias since they had actually been created.¹⁶ Not only did the book become a bestseller, *Business Week* named it one of the books of the year.¹⁷ It was the first book about the Internet that was neither technical nor a practical manual. Rheingold discussed The Well at length and his own experience as a newsgroup user and host. He also introduced other electronic communities, such as Arpanet. Through his account, he constructed a representation of the Net in which virtual communities brought together people from all corners of the globe, many who remained attached to their locality. These individuals developed conversations that were as intellectually and emotionally rich as those in real life, in a world of balanced interaction between equals. The Net was presented as helping to recreate a social link and to breathe life into public debate and, more generally, into democratic life.

Rheingold's book incorporated one of the founding myths of the Internet. He took the electronic community and invisible college as socio-technical frames and placed them in a sphere different from that of ordinary sociability. In other words, he said that what was good for counter-culture communities or for universities was good for society as a whole, as if the change of social sphere would not fundamentally modify the situation. By putting the Internet at the heart of contemporary society,

¹² Philip Elmer-Dewitt, "Cyber Punk," *Time*, 8 Feb. 1993, 60.

¹³ Following this article, *The Well* hosts received many messages asking them: "Is this the cyberspace?"; see Mark Dery, *Flame Wars* (Durham, N.C., 1994), 6-7.

¹⁴ Dewitt, "Cyber Punk," 60.

¹⁵ Barbara Kantrowitz, "Live Wires," *Newsweek*, 6 Sept. 1993, 42-49.

¹⁶ Howard Rheingold, "Cold Knowledge and Social Warmth," *Newsweek*, 6 Sept. 1993.

¹⁷ *Business Week*, 13 Dec. 1993. The first printing of the book, Howard Rheingold, *The Virtual Community* (Reading, Mass., 1993) was 35,000. The following year, a paperback edition was released.

a new process of socio-technical construction was inevitably triggered. Rheingoldian mythology overlooked that phase.

Rheingold founded a new utopia. The idea was no longer, as in the 1970s and 1980s, to try out a technical project and to activate small groups of academics around it, but to offer American society as a whole the large-scale realization of new communication relationships previously experienced in small groups. It is hardly surprising, therefore, that the media used Rheingold as a reference to talk of a universal Internet, and that they proclaimed him the “first citizen of the Internet.”¹⁸

With the publication of Rheingold's book and articles in newsmagazines, a new imaginary Internet appeared. Initially, this appeared to be a quantitative development. Whereas discourse on the Internet had previously been diffused in closed circles (computing, counter-culture, and so forth), by more or less confidential media, from 1992-93 it took its place in the mass media. This was the beginning of a classic phase in the development of a technology: mass diffusion following laboratory research and early trials. In this fairly traditional perspective in the sociology of technologies, discourse on the new technology is considered simply as a tool to facilitate its diffusion.¹⁹ Yet, the technical *imaginaire* is not something apart from the innovation process, but an integral part of it.

These discourses strongly impacted the future of the Internet. In fact, they proposed a framework of interpretation and action for network computing and showed what could be done with the Internet and how. This frame was all the more powerful as it described communication practices functioning in the academic and counter-culture worlds, to which access could be organized. By becoming a new Internaut one not only became a user of network computing and of communication or information retrieval tools, one also entered into another social world where relations between individuals were equal and cooperative, and information was free.

This is a rather strange view, for society is neither a cybercampus nor a cybercommune. Inequities in computing and discourse skills far greater than those in the academic world have appeared. The principle of gratuity has faded with the need to finance certain resources through media-type means (subscriptions, advertising, and so forth). Nevertheless, the initial model has lasted. Forums for the public at large have been set up, different users consult information collated by universities, and ordinary individuals create sites where they present information, sometimes of great value. Thus, the “virtual community” is a framework for interpretation and action that is only partly unsuited to the

¹⁸ An expression found in one of the critiques in the presentation of his book on the Amazon.com website.

¹⁹ Everett Rogers, *Diffusion of Innovations* (New York, 1983). For a critical analysis, see Patrice Flichy, *L'innovation technique* (Paris, 1995).

new reality of the Internet. During the 1990s, it fostered a range of uses and behaviors on the Internet.

The *Imaginaire* at the Heart of Technical Debate

In the traditional history of technology, inventions are associated with an inventor's intuition. By contrast, contemporary technological sociology and history are built on a radically different hypothesis, the idea that technology is the result of an articulation of countless human and non-human elements and that the innovator's strength derives from her or his capacity to effectively articulate all these elements. In this schema opportunities count far more than projects. Through my reflection on the imaginary Internet, I rehabilitate the notion of a project, not in the sense of the inventor's brilliant *eureka*, but of a collective project of a group of users of Unix or Arpanet, hackers, and others.

Moreover, in the Internet case these projects can materialize in no time because new software can circulate on computer networks and be used immediately. Not only can a utopia rapidly turn into a project; it can also be embodied in achievements. The critical issue of users' mobilization produced a new ideology. It is this ideology that legitimizes the new technique, to attract and integrate new users, to provide a framework for use of the innovation. It also affords a set of justifications that enable designers and users alike to explain their engagement in the digital world. The *imaginaire* is at the center of design and use of the Internet.

However, the fact that this *imaginaire* occupies a key place in the technical actions of designers and users does not mean that it is necessarily unified. On the contrary, it is diverse and riddled with contradictions. Evidence of this divergence can be found in both technical achievements and social debate. For example, academics and hackers did not have exactly the same representation of communication networks, and the specific systems they built were completely different from the system of centralized and hierarchical communication IBM imagined at the time.

If defining a future is a key element in the definition of our collective identity, it follows that, in a democratic society, this debate should be organized in the political sphere. After all, is it not politicians' role to define our society's future prospects? Nevertheless, such debates take place in a wide variety of places and it is preferable to let them proliferate rather than trying to channel them. The producers of utopias are diverse; they produce not only discourses but also cultural products (novels, shows, and so forth) and software packages in which their vision is inscribed in algorithms. The technical *imaginaire* cannot be reduced to a public debate; it is also expressed in experiments.