Introduction

Communication techniques are like some department stores: there's always something new. For the past thirty years we've been hearing about "new communication techniques." Initially the term referred to the VCR or cable television; later, to the microcomputer and now to the Internet. Every time people believed that the new device was going to impose itself and oust existing ones, that self-media would replace mass media, that all individuals would be able to express themselves without the usual intermediaries, and, finally, that new communities would bring together individuals in different parts of the world. But promises of a communication revolution have a long history, dating back to the advent of radio in the late nineteenth century when these promises flourished.

A reading of the discourse that attended the birth of 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, the same ideologists see the dawn of a new civilization. Should we denounce these false prophets with their short memories, who repeatedly 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 accompanying the birth of new communication technologies?

The social sciences have studied these discourses, but often either superficially or else condescendingly, with irony. In the former instance they are assumed to tell the truth about a new technology, although that truth may eventually be belied by the technology's successors or sellers;

in the latter, they are seen as no more than a fable, at best the product of literary analysis. This book approaches the question from an entirely different angle. We consider these discourses as an integral part of the development of a technical system, and we study them as such.

The Internet, the main subject of this volume, is a prime example of the *imaginaire* surrounding a technique. Discourse on the Internet abounds, but this profusion cannot simply be interpreted as the effect of some fad or as an extreme case. The Internet *imaginaire* is closely related to the role of this new technology in Western societies, especially in North America. The purpose of this book is to show how an entire society is tilting into a new technological era.

Why have actors as different as computer scientists who design software, managers and employees who have to produce and coordinate within their firm, individuals who interact and entertain themselves at home, or politicians who dialogue with citizens, all agreed to adopt this technology? Why did computer scientists, sometimes voluntarily, design this technique rather than another one in the first place? Why have ordinary people agreed to learn about and then use the Internet for activities as commonplace as communicating with their family or friends, conducting information searches, or listening to music, as well as for design, administrative, or managerial work? In the final analysis, what we need to look at are the social actors' justifications for their engagement in the Internet project and the frame of representation of the new technique that has enabled designers and users to coordinate their actions.

Science and Technology Studies and Social Imagination

The project of this book coincides in certain respects with other sociological and historical studies of techniques. Most contemporary studies in this domain have definitively abandoned the traditional perspective in which the inventor's work was seen as the concretization of an initial intuition. In that approach it was believed that one particular technical alternative would triumph, owing to its intrinsic superiority. The initial idea was therefore crucial. This is the main point on which I focus my analysis. To this conventional linear perspective of technical development, the sociotechnique network approach, developed essentially by

Bruno Latour,[1] opposes a model in which innovation can start at any point and not necessarily in the fertile brain of a brilliant inventor. Following a series of translations, it attracts an increasing number of allies. It is the extent and soundness of the network, and not the relevance of the technical solution, that explains the success of an innovation. This constructivist approach has radically renewed the sociology of techniques. However, by focusing on alliances and opportunities, this research current cuts out the study of initial intentions and innovative projects. Although it is necessary to take into account the entire system of construction of a technique, does that mean that the characteristics of the initial project have no relevance?

Specialists in management extensively use the project concept.[2] The project team is the place in which a new technical device is formulated. One of the characteristics of management by projects, introduced into many firms, is the objective. Whereas the team and its leader have a large degree of autonomy and can choose their means, they have to attain a set objective. The principle of the project structure contrasts with the traditional rationalist model that radically separates design and execution. There is no simple, rigorous method for succeeding. Successful projects are the result of constant compromises with the different actors who have specific competencies and come from various departments in the firm. There is a continuous play of negotiation and interaction. The project leader has to be able to assert the identity of his or her project and discuss each of the elements with different experts involved in the operation. This idea of negotiation, compromise, and innovation induced by opportunities and ad hoc agreements is not too far from Latour's model. It nevertheless differs insofar as tension is constantly present between the wish to assert the project's identity and the openness to negotiation and compromise with partners both inside the firm and outside.

Finally, there is another current of sociological research that has also raised the question of coordination in technical development. Interactionist sociologists of science and techniques have examined how actors belonging to a distinct social world, with different visions of the same object, cooperate. Star and Griesemer introduced the boundary-object concept to study scientific or technical devices that are situated at the intersection of several social worlds but meet the needs of each world.

"They are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity."[3] The boundary-object allows cooperation to be organized between actors with different points of view and knowledge, without overlooking their individual competencies, by adopting a common approach. These two authors show that in the design and development of a joint research project, two types of boundary-object are created: a common vision that structures the project, and collective working methods.

These three theoretical currents have the same perspective: scientific or technical innovation that requires the coordination of many actors and the development of a series of compromises and adjustments. It is through these operations that innovation takes shape. Yet unlike Latour's sociology of translation, the other two currents consider that a new technical object has to be articulated around a specific identity, a common vision. Note that this collective representation of the technical project is not preestablished; it is the outcome of a collective construction. In other words, the technical collective is constituted not only through a series of local adjustments but also through the production of a common purpose.

When we leave "the short-term dimension" of technical development, that is, a specific project, and consider a more long-term dimension such as electrical light and power, high-speed trains, Internet, and so forth, we encounter more than simply a project or common intention; what we witness is a collective vision or *imaginaire*. This vision is common to an entire profession or sector, rather than to a team or work collective. It concerns not only designers but also users, which is one of the strong points linking these two types of actors of technical activity. Hence, if intentions and projects, as well as utopias and ideologies, play a part in the creation of technical systems, the contribution of the history of techniques will be useful to our study of the subject.

History of Innovation

Thomas Hughes's work on electric networks and on more contemporary projects like Arpanet is crucial. His technological system approach is very broad, and in *Networks of Power* he shows how a technical network necessarily intersects with larger social, political, and economic

networks. For instance, electrical systems include not only utility companies, but also manufacturing firms or investment banks. Hughes was keenly interested in "project management." He distinguished two types of technological project management: the modern, hierarchical kind used by Edison and Ford, with a bureaucratic structure and a specialization of scientists and engineers; and the postmodern one used in technological and scientific undertakings of the post–World War II era, with a flat organization, a collegial community, and interdisciplinary cooperation among engineers.[4]

Arpanet, the Internet ancestor, is a good example of this kind of management. Bright and self-motivated researchers can reach decisions by consensus. Heads of the projects are "not just managers," but they have technical competences for which they are well known.

Finally, the organization of Arpanet was based primarily on the values of the academic world. By focusing on the management of technical projects, we see to what extent the construction of the technical object is connected to the values of the environment in which it was born. We come across another concept in the study of innovation, that of the "design ambience," that John Staudenmaier tells us highlights "the many ways in which technological praxis is inextricably part of the larger human fabric."[5] The design ambience approach opens an interesting avenue. It shows that, contrary to the position of externalist historians, we cannot study the role of ambience without analyzing technical design. That is why the chapters of this book on Internet designers' *imaginaire* also consider their technical choices.

There is also a whole research tradition in the history of techniques that studied the question of *imaginaire*. Leo Marx pointed out a long time ago the "rhetoric of the technological sublime"[6] that appeared in the mid-nineteenth century with the steam engine. The vocabulary of the sublime, used to describe nature in the eighteenth century, was adopted in the industrial age to describe the "technological sublime." From these images a hymn to progress was built, an optimistic vision of these new technologies that was to facilitate their diffusion and use. Rosalind Williams has shown just how diverse and often contradictory these technical visions were. For instance, for some the steam engine symbolized power; for others it was hell.[7]

Several studies have investigated technological *imaginaires*: Carolyn Marvin on electricity, Susan Douglas on the wireless, and Joseph Corn on aviation.[8] Susan Douglas's objective is close to mine—namely, to analyze "the ideological frameworks within which emerging technologies evolve."[9] Corn clearly shows the interest of these different historical studies for furthering our understanding of technological development, when he writes: "The most naïve fantasies about machines and their possible impact are part of the same cultural milieu in which actual invention takes place and technology is adopted and diffused."[10] This *imaginaire* can thus mobilize both designers and users. It is precisely this question of the mobilization of actors that is at the heart of Charles Bazerman's and Joanne Yates's work.

Bazerman studies how Edison gives electrical light and power sense and value and incorporates it into existing cultural systems of meaning. Edison and his associates were not only making electricity, "they were also making meanings."[11] This creation of meaning has to take place in various arenas: laboratory, patent system, investment bankers, journalists, families, and so on. At the end of the process, meanings and value are permanently set. Thus, in the realm of representations, we find the same black-boxing phenomenon as sociology studied in the case of the technical object.

This question of the mobilization of individuals has also been studied with regard to the introduction of an information and communication technique, the first data processing machines (typewriters, calculators, etc.) in the nineteenth century. Yates has shown[12] 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. The first business schools and the managerial literature that developed at the time proposed management methods and advised on the use of office machines. For this new managerial ideology, the written procedure was the most appropriate for establishing efficient coordination between the different actors in a firm.

Uses of the Internet are, however, far more diverse than those of the first office machines. One of the main difficulties in studying this type of 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 facilitating trade. All these facets of the Internet are rarely studied simultaneously, yet individuals are present on several scenes of the Internet at the same time and the justifications for their engagement are global. It is in this respect that this study differs from Rob Kling's[13] study on computerization. Although I believe, as he does, that there are key ideological beliefs which help to legitimize the take up of computers, the starting point of my analysis is not social movements concerning computing but a corpus of discourses.

Before embarking on the study of the Internet case, it seems important to set out the key concepts of my analysis and to present my corpus.

Myth, Utopia, Ideology

The authors who celebrate or denounce discourse on the Internet readily use terms such as *myth*, *utopia*, or *ideology*. These concepts need to be clarified.

Myth

Although in the ethnographic tradition myths relate to the founding narratives of a culture, it is rather in the semiological sense that I use the term. For Barthes, the myth is a metalanguage that takes an existing sign as signifier and gives it another meaning as signified (*signifié*). The author of *Mythologies*[14] applied this approach to his study of advertisements or magazine photos that signify more than what the photographer's camera immediately shows. The meaning of a particular event recorded by a photographer or recounted by a writer gradually becomes poorer, eventually fading away. That initial meaning thus loses its value but retains a life sustained by the myth. Eventually the myth transforms a particular story into a natural representation.

Take the example of the anecdote that appeared several times in the first books on the Internet, in which two Internauts living at opposite ends of the United States, who had met on the Internet, decided to marry. By becoming a myth, this story took on another meaning. It was no longer the personal history of two individuals but an account showing that the Internet helped to construct a new social link, to create an

intimate relationship between two strangers who for a long time had never actually met each other face-to-face.

In this perspective the myth is distinguished from symbols insofar as it is based on a real event. "It is full of a situation,"[15] said Barthes. It is also distinct from ideology in that it does not hide the real: "Its function is to deform, not to do away with."[16]

Utopia, Ideology

The notion of a myth is often associated with that of utopia. In that case it is presented as a dream, a chimera. Paul Ricœur associates it with the notion of ideology and constructs an interesting conceptual frame in which he articulates the two. Although this analysis was designed to study nineteenth-century political thinking, Ricœur's frame is rich enough to be imported into the technical domain. Let us have a closer look at it.

At the center lies the idea that an ideology or a utopia should not be defined in relation to reality. Contrary to the entire Marxist tradition, ideology is not opposed to the real, for reality is symbolically mediat"Where human beings exist," says Ricœur, "there cannot be a non-symbolic mode of existence, and even less so, a non-symbolic kind of action."[17] Likewise, the current view which opposes utopia and reality overlooks the fact that reality is not a set condition but a process. On the other hand, utopia and ideology are the two poles of the social *imaginaire*, one trying to maintain social order and the other trying to disrupt it. Hence, there is constant tension between stability and change.

Ricœur's dialectic between utopia and ideology functions at three levels (table I.1).[18] At the first and most obvious level, an ideology, which is a distortion of the real, is opposed to a utopia, which constitutes a "totally unrealizable phantasmagoria." Then, "when we dig down, we reach the level of power"[19]—clearly the level that interests Ricœur most. Ideology legitimizes power, whereas utopia constitutes an alternative to the power in place. At the third and last level, we see the positive function of these two sides to social imagination appearing "to preserve the identity of a [social] group," in the case of ideology, and "to explore the possible," in that of utopia.

In the final analysis, the philosopher's conviction is "that we are always caught in this oscillation between ideology and utopia, . . . we

Table I.1
The three levels of Ricœur's Concepts

	Ideology	Utopia
First or current level	Distortion of reality	Escape
Second or political level	Legitimization of power	Alternative to power; undermining authority
Third or social function level	Group identity Integration	Exploration of possibilities

must try to cure the illnesses of utopia by what is wholesome in ideology—by its element of identity— . . . and try to cure the rigidity, the petrification of ideologies by the utopian element. It is too simple a response, though, to say that we must keep the dialectic running. My more ultimate answer is that we must let ourselves be drawn into the circle and then try to make the circle a spiral."[20] It is in this dynamic perspective that I wish to use Ricœur's schema to construct a model for the analysis of the technical *imaginaire*.

The subversive function of utopia, that allows the full range of possibilities to be explored, can be put at the start of the process. This is probably one of the most inventive phases but also the most unmethodical. In the process of gestation of innovation this phase corresponds to what I have called the "catch-all object."[21] The projects conceived of here are widely diverse, often opposed, sometimes simply juxtaposed. They belong to different social worlds. It is also in this period that some actors of technology discover the questions or projects of others. These improbable encounters among different technical devices or between designers and users can be passing occurrences or profoundly fertile events. In such cases, I refer to a *watershed utopia* (figure I.1).

In the second phase, a real alternative to existing technical devices is constructed as the models roughed out in the preceding phase become full-blown projects. We witness a change of meaning in the concept of a model, significant of this evolution. Whereas in the preceding phase a model meant tension toward an ideal, it now becomes the formalized schema of a technique to realize. At the end of this phase utopian reflection can evolve in two ways. Either it is embodied in an experimental

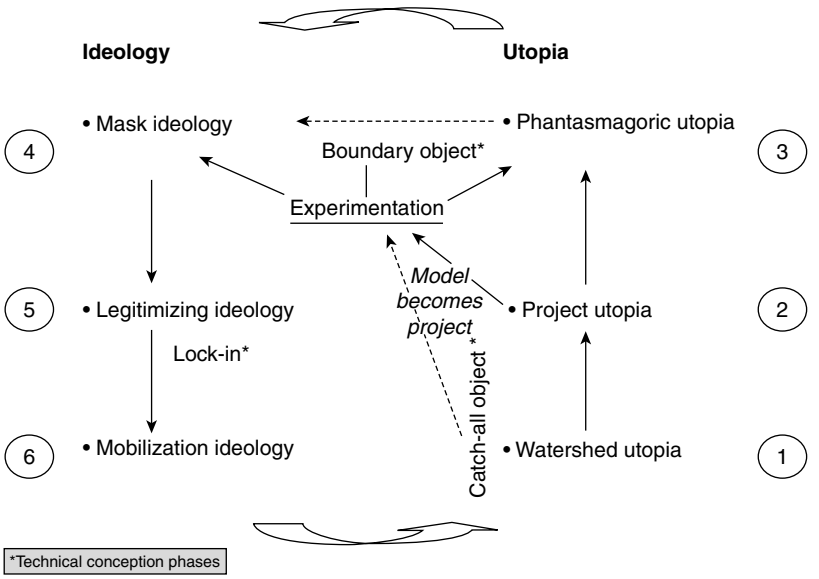

Figure I.1

project, or it becomes pure fantasy. The first possibility, the *project utopia,* is a peculiarity of the technical utopia. The author of this utopia often tries to concretize his or her project by building a mock-up or performing a technical test. This incarnation of the utopia is even easier to accomplish in the case of the computer techniques studied in this book. Very few tools are required to write computer software, compared to those needed to create a prototype in the mechanical or energy fields. What's more, software can be duplicated instantaneously and disseminated on a telecommunications network. It is therefore one easy step from design to use. By contrast, the *phantasmagoric utopia* is an escape, a way out, a refusal to face the technical reality.

When utopians become experimenters they are confronted not only with the technique but also with other social actors who have a different view of it. If they want to ensure that their experimentation gets beyond their workshop or, in the case of interest to us here, their computer, they need to construct a boundary-object, a compromise that can be used to associate multiple partners sufficiently loosely for everyone to benefit, yet

sufficiently rigidly for the device to function. This object situated on the boundary of several social worlds is different to the initial catch-all object.[22]

The experimental phase is not only a time for construction of the technique and its uses but also a phase in which the utopian discourse is reconstructed and bases its claims on the exemplarity of the trials performed. To attain their goals, utopians have to diffuse their new technology far and wide. The successful experiment will then become a myth. The particular social context that made the experimentation possible is forgotten, and this local technique is presented as the basic technique of a new social functioning. This shift performed by the myth will eventually transform the utopia into an ideology. In this new phase, aspects of reality are readily concealed in order to promote the new technique. In this case, I refer to a *mask ideology.*

The technical ideology will make it possible to legitimize the new technical system. As it becomes increasingly rigid, alternatives are cast aside and what economists call technological lock-in results. In this case, I use the term *legitimizing ideology.* Finally, since the positive function of this ideology is to mobilize the actors concerned—both the producers of the technology and its users—I call it a *mobilization ideology*.

These six types of utopian or ideological discourses allow us to separate different functions of the discourses of *imaginaires*. These functions can be used to characterize certain texts but may also coexist in the same document. The different types of discourse also follow one another in a temporal cycle. In some cases, the steps are crossed successively; in others, some never appear, or the process may even stop and the technical project never reaches maturity. In the case of the phantasmagoric utopia, the abundance of *imaginaires* prevents the technique from ever being set in reality; in other cases, the absence of a legitimizing ideology precludes the technique from occupying any significant place in engineers' options and users' ways.

Since this schema of the evolution of the technical imagination does not always exist in such a complete form, we can consider it an ideal-type. Yet there is always an articulation between utopia and ideology. The one is more evident in periods of technical conception and the other in periods of diffusion of the technology. In this book, we see several

cases of articulation between the different types of technical imagination, situations in which a technical utopia, unable to develop into a project, becomes a mask ideology. We also examine cases where, on the contrary, a utopia becomes a project that spreads throughout society after a long experimental phase. Finally, we see experiments that become the base of a new myth, and discourses that certain authors use to create a watershed utopia or, in other cases, a mask ideology.

A Corpus of U.S. Texts

U.S. literature on the Internet is recent but abundant. If we limit ourselves simply to books with the word Internet in the title, we find 1 or 2 per year from 1984 to 1991, 11 in 1992, 37 in 1993, 181 in 1994, 465 in 1995, 1,014 in 1996, and 1,395 in 1997. It is naturally out of the question to study all these books! For the purposes of my study here, I selected a number of reference texts that have two main origins: documents written by academics and computer scientists, and press articles. The first corpus includes writings by the founding fathers of information highways, the Internet, and virtual reality. To find these documents I relied on the first U.S. historical books and on certain collective volumes available in hard copy or online. I first selected texts which defined the main lines of the technical project and its intended uses, then others which described the first effective uses and inferred 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, which therefore correspond to the actors' initial projects.

The second corpus consists of observations and comments by academics, experts, and journalists. For my guideline I chose the magazine *Wired*, the main U.S. magazine for reflection and debate on the Internet and digital techniques. I identified authors who had written or been interviewed or simply commented on in *Wired*. I then noted what these intellectuals of digital technology had published in *Wired* and which books they had written.

As far as the press is concerned, I selected all relevant articles in *Wired* that were written by intellectuals or journalists. For comparison, and to

be able to study how the Internet *imaginaire* diffused from specialists toward the public at large, I also selected articles on digital techniques in the three main U.S. news magazines: *Time, Newsweek,* and *Business Week*. These four magazines were studied systematically from 1991 to 1995. For the following years, I carried out an in-depth study of *Wired* and added a few important articles from *Business Week* on the new economy.

A corpus like this obviously favors certain actors rather than others. It allows more space to academics, intellectuals, and journalists, and largely overlooks the discourses of entrepreneurs and users.

Historical and Thematic Analysis

These different texts cover two main domains of the technical *imaginaire*: the utopias and ideologies associated with the elaboration and possibly the diffusion of technical devices, and the description of an imaginary virtual society. As regards the former, I studied the representations of technical systems, the dreams and experiments that developed around information highways, the Internet, Bulletin Board Systems (BBS), and virtual reality. Concerning the latter, I propose a kind of treatise on the digital society, containing chapters on the individual and the body, communities, politics, economics, and representations of the past and future. These two approaches each constitute a section of this book. For the sake of fluidity in the presentation of these different issues, I have included reflection on virtual communities in the chapter on BBS and a presentation of virtual reality in the chapter on the body.

This work would not have been possible without Stanford University, which enabled me to constitute the corpus of documentation on which my study is based. In particular, I wish to thank Ralph Hester, who hosted me in his department. My reflection also benefited from the comments and advice of my colleagues at LATTS, Marne-la-Vallée University.