Introduction

This book is about understanding new media. For many, the term has become a loose but voguish way of referring to the latest or hottest new offerings from a growing miscellany of digital devices used for communication, entertainment, and information purposes. We, however, will avoid discussion of what's hot and what's not in new media along with predictions of what the new media landscape will look like in the future. Many other books cover these topics, though they often do not do it well.

Our use of the term *new media* is set in a broader historical context: a media service or product is new from the point when the underlying concept starts to be implemented until the service or product can be regarded as established in the marketplace (in the sense that the product or service is very unlikely to be withdrawn as a failure). The amount of time from concept to established presence can range between a few years and many decades; we regard the video telephone, which first came onto the American market in the 1960s, as still an example of new media. The title of the book, *When Media Are New,* conveys our intent to examine both current new media and earlier media, such as online services when they were first introduced. The subtitle of the book, *Understanding the Dynamics of New Media Adoption and Use,* indicates that we focus primarily on users' reactions to new media and their determinants.

A new media product or service may be broadcast, person-to-person, or—increasingly, these days—a combination of the two. A clear-cut dichotomy no longer exists. Its content may be created for distribution to an audience, as in conventional broadcasting, or it may be the interaction among two or more users, as in conventional telephony or simple e-mail. The innovation may be radical (as when the telephone first enabled people to engage in conversation despite not being within earshot of one another) or a matter of substantial improvement in the quality of the communication that is provided (as in the transition from conventional to high-definition television).

It is helpful to distinguish individual communication products and services from platforms. We regard neither the Internet nor today's mobile phones as examples of new media. It is better to treat them as platforms, each of which can be used in the provision of a variety of media—clearly, an increasing va-

riety. We will treat them in this way and focus on some but not all of the new media they have come to support.

Some new media do not require their users or audiences to acquire a product that embodies new technology or to use a newly introduced service, or both. *User-developed media* come into being when users fashion a new application for themselves using technology that is *already* (even if only recently) available and *without* a purpose-designed service having been provided for them. An important case in point is early blogs, formerly weblogs—how quickly language can change! Generally, however, new media have required the introduction of new communication products or services.

This book is written from a standpoint that balances guarded optimism with measured skepticism and balances theory with practice in a way that is useful to both professional and academic readers. A variety of people are professionally concerned with questions such as whether the start-up or field trial of a new service is likely to succeed, at what price and on what timescale; what issues need to be addressed to maximize the chances of success; how research can play a useful part in the process; and how, by whom, in what order, and to what ends the service is likely to be taken up. These people principally are found in firms, large and small, that are trying to make a success of new ventures in this field, but they also include those in the public and private sectors who are planning and implementing the use of new media in a diverse range of organizational settings, such as government agencies, education institutions, and community organizations as well as businesses. The policymakers and regulators who set rules that affect the take-up and use of new services and technologies are involved as well. All the foregoing comprise one of the intended audiences for this book.

The other principal audience comprises academics who teach and conduct research in this area and students who seek to learn the history of new media start-ups along with the associated planning and implementation processes. Journalists who cover technology and general readers with an interest in new media will also find the volume useful. While our analysis is anchored in several areas of media theory and draws inferences to further those areas, the book is not intended as a primer on media theory that uses new media as examples to teach the theory. In focusing on the current new media environment and on useful lessons from when earlier media were new, we do not offer a cultural critique of new media. Other researchers (e.g., Brian Winston) claim this territory and cover it much better than we could.[1]

We discuss failures as well as successes. These terms have their customary meanings: success or failure relative to the goals when a new product was introduced. In places, however—principally in chapter 6, when we discuss the "failures" that preceded the Web—we question the use of these terms. Ken-

neth Lipartito's radical critique of the concept of success and failure is particularly relevant.[2] Failures can provide useful and important lessons, and something would be seriously wrong in any large, contemporary industrial economy in which most launches of new media products and services succeeded. Since there are increasingly compelling reasons to bring innovations to market before there can be certainty—if ever there can be—as to their success, too few failures would signal too little dynamism.

New media may fail at a particular time, but the underlying concept may go on to succeed at some future time—maybe after more than one false start in the interim. Facsimile transmission provides an example: except for limited purposes, such as sending weather maps, it had several false starts after first being demonstrated in the middle of the nineteenth century, before the telephone was invented. (Transmission originally occurred over telegraph lines.) We explore difficulties that arise when new media are introduced into markets or organizational settings. There are many difficulties; mistakes are inevitable. Too often, however, we have noticed that people unwittingly make mistakes that others have made before. If knowledge of what has gone wrong in the past helps some readers working in the industries concerned at least to make new mistakes, then their successors can learn something new from them.

A well-known companion of many publicity campaigns in support of new media is hype—unwarranted exaggeration about the wonders of some new technology. It can be harmful in a number of ways. It can set false expectations among end users, who are then disappointed by the reality of the new media technology or service. It can mislead those providing the necessary investment into underestimating costs. Planners may come to believe their publicists' hype and make poor decisions about marketing and service development. In addition, if the bar of expectations is set too high for journalists who cover the media or analysts on Wall Street, good performance may be judged as weak performance.

Fortunately, hype is not inevitable. It did not, for example, feature in the introduction of e-mail. Nor did it surround the transition from the Arpanet to the Internet; the *Information Superhighway* and similar terms came later, helped along by American politicians—especially a future vice president—who seem to have had in mind something even grander than the Internet has yet become.

Uncertainty is a core characteristic associated with new media. Will the technology work as intended? Do people want it? How do you communicate about a product that is very new? Many far-from-obvious lessons can be learned from those who have already traveled down this road. While they cannot eliminate uncertainty, they can certainly reduce it.

As the next section describes in more detail, part 1 of the book examines processes that occur at two different levels. At the concrete level (what actually

happens), one chapter looks at users' adoption of new media, while another explores suppliers' implementation of new media. At the abstract level (understanding what really happens or is expected to happen), one chapter examines research, and another examines forecasting.

To provide in-depth examples illustrating these processes and to add detail to them, part 2 of the book provides a set of case studies of particular media or families of closely related media. Most of the chapters in this section examine how particular media or families of media progressed to success or failed to do so. One chapter, however, focuses on an established medium, broadcast television, describing how it was affected by subsequent media innovations, and another shows how much a highly successful family of media—those delivered via the Internet—owes to a series of earlier new media that failed to live up to expectations.

Part 1: Processes

Successful new media affect individuals, families, firms, industries, government, and society as a whole only as a result of the host of decisions by different people to adopt them. Because of the centrality of the adoption process, it forms the subject of the opening chapter, which describes common patterns that occur as one looks at the field across new media and through time. Many of these patterns exist—patterns in growth rates, the relationship between price and household income, trends in price over time, and the characteristics of early adopters. Most successful technologies reach a critical mass where growth becomes self-sustaining, but the path to critical mass can differ from one technology to another. Further, an examination of adoption patterns produces a number of surprises: for example, the role of serendipity in helping many technologies to become broadly adopted. Accepted wisdom holds that success requires a new technology to meet an identifiable need. However, many of the most successful technologies entered a marketplace where no apparent need existed. In some cases, latent needs existed. For example, color television met a latent need to see visuals that more closely resembled the real world, even though millions of people had embraced black-and-white television with few complaints about the lack of color. In other cases, new media created demand. For example, it may be argued that video games met a latent need for more entertainment, but it may also be argued that they really created a demand for a new form of entertainment that previously did not exist.

Chapter 1 covers not just successes but also failures. They are of interest both to avoid repeating previous mistakes—not always easy to diagnose even with the benefit of hindsight—and to find candidates for successful future products and services among the near misses of the past. Unfortunately, we

have relatively few reasonably detailed accounts of failures on which to draw not least because those responsible often try to bury the evidence. Also covered is the search for the Holy Grail of many technologists, "killer applications"—content or services that are so compelling that people rush out to adopt the new medium in question. More commonly, however, content and/or services must come together to generate sufficient appeal that people will adopt the technology.

In chapter 2, we turn to forecasting. As the term is commonly used, a forecast is presumed to be based on research and a scientific process that yields quantitative estimates of future adoption rates. In general, forecasting methods, whether they deal with the weather or advertising revenue, have been getting better. There are exceptions, of course, and they can occur even when professional forecasters deal with well-known products or events and have many data points at their disposal.

Forecasts about new media have been highly unreliable. Most have overestimated adoption rates, though some have grossly underestimated the market for a new technology. An example of the former comes from 1998, when a consensus of Wall Street media analysts forecast 30 million satellite telephone subscribers by 2006. In fact, the company that launched satellite telephone service in 1998 went bankrupt the following year. The service was reorganized by two other operators and by 2006 had developed a modest group of approximately half a million users, including emergency workers and people living or working in very remote areas such as oil rigs in the North Atlantic.

A classic example of underestimating demand is McKinsey and Company's reported forecast for AT&T during the 1980s that the total market for mobile phones by the year 2000 would be 900,000 subscribers. On the basis of this forecast and an internal analysis, AT&T pulled out of the mobile phone market, only to reenter it about a decade later by purchasing McCaw Communications at an overall cost of $16 billion.[3] This example illustrates the most obvious reason why forecasts are necessary: to make sound business decisions. Forecasts are also needed in the development and implementation of public policy.

For some decision-making purposes, it may be possible to get by with something less precise than a forecast: a simple prediction about whether a projected new media service will establish itself in the marketplace within a certain time frame. But even these much simpler binary predictions frequently prove incorrect. Of course, if a forecasting team is wrong in such a prediction (whether implicit or explicit), its forecast will inevitably be completely wrong.

Chapter 2 discusses practitioners' poor track record in forecasting the demand for new media products and services, methods used to create the forecasts, and how the business context in which forecasts are often produced appears to contribute to their biases. Even with improvements in practice, how-

ever, one would be unwise to expect substantial improvements in accuracy in the foreseeable future, so we also consider how to make the best of a bad job. To readers with practical interests in the field, the relevance of these issues will be obvious; we expect other readers, aware of how the inability to make accurate forecasts has clearly been a major determinant of how new media have developed during the past half century, to have an interest in understanding the limitations of the process.

Chapter 3 deals with the implementation process. In connection with new media, implementation usually means either putting into effect a plan for the market introduction of a new product or service or—as in a field trial—putting into effect a plan to get a new service into use in a particular organizational or community context. It may sound like a dull, low-level, technical process, stretching from the approval of funding for an exciting concept to the concrete realization of a new service with satisfied users. It often turns out, however, to be a complex, broadly defined, multiphased process encompassing social, technical, and organizational components that, in addition to the installation of a technical system, include managing relationships with partners, dealing with end users, marketing, interacting with equipment suppliers or manufacturers, overcoming a variety of obstacles, managing costs, and much more.

Whether or not one is interested in the implementation process as such, one should recognize that although it has received relatively little attention in the literature about new media, it is more difficult than is generally appreciated and therefore offers many opportunities for failure. Numerous services with strong potential have crashed in flames as a result of poor planning and implementation—for example, many of the trial telemedicine services of the 1970s. After one or more failures in some new media initiative, an important but difficult question has often been to what extent failure indicated that the concept was not viable or that the timing of the initiative was wrong and to what extent it reflected no more than poor implementation.

Implementation of a field trial or the launch of a new product or service almost invariably takes longer than those managing it expect. When it is a matter of bringing new media to the marketplace, the longer-than-anticipated time frames required for implementation also stretch out growth rates and eventual profits, putting more pressure on promises about return on investment for outside investors or parent organizations. Managers then often make compromises regarding critical features of a new service, such as the user interface, to overcome the delays. But these compromises can reduce a new product's appeal and hence its prospects for success. End-user skill levels also come into the picture. The weaker the design of a new media product, the more skill is required of an end user.

Sometimes a new media technology or service must be implemented at a particular site or set of sites—perhaps for the purpose of a trial—in which case the challenges differ somewhat. In addition to the chain reactions of effects that can be caused by allowing insufficient time, these challenges can include turf issues, staff turnover and training, product champions, and budget cycles.

Implementation is generally not for the fainthearted. Chapter 3 seeks both to show why this is the case and to point to some of the more generalizable lessons that have been learned about how to avoid the often seemingly mundane errors that too frequently lead to failure. Some of these errors occur at high levels in organizations and doom the implementation process even before it begins.

Chapter 4, the final chapter in part 1 of the book, concerns the research process. Research on new media has been undertaken from within many disciplines—communication, psychology, economics, and sociology, for example—and on an interdisciplinary basis. Some research is better categorized as belonging to a particular field in which new media may be applied—telemedicine, telecommuting, and distance education, for instance. Doing justice to all of these fields in a single chapter would be impossible, so we focus on *user research* on new media—i.e., research that centers specifically on actual or potential users of new media. (The term should not be confused with *usability testing*, which may be regarded as one of many component activities in the much larger field of user research.) This focus is in keeping with the book's emphasis on users. Moreover, whatever kind of research is undertaken on new media, questions addressed by user research—such as what kinds of people use the products or services in question, how they do so and to what effect, and how better to serve them—are likely to be central.

There have been three eras of user research. The first was devoted largely to two types of topic: ergonomics (*human factors*) relating mainly to the telephone and the effectiveness of new media in education. The second era, starting at the end of the 1960s and lasting roughly a quarter of a century, was devoted largely to teleconferencing, two-way cable television, telemedicine, videotex, and teletext—on the whole, services that fell far short of establishing themselves within the time frames their proponents expected. With hindsight, the second era of user research can be seen as the calm before the storm. Even though the new services whose prospects drove the research were not particularly successful, valuable research results were obtained and methodological lessons learned. The storm arrived with the explosion of new Web-based services and to a lesser extent mobile services. Rather than showing any signs of ending, the storm is continuing with increasing force. The context for user research in its third era differs radically from that in the second era. The amount and variety of

research activity are expanding very fast; users' media environments are changing rapidly; research agendas—whoever's they may be—are changing quickly; and the conclusions of much applied research that might well have been of value in a calmer period are quite likely to have been overtaken by events by the time they are available.

There is little value to trying to examine this storm while we are still in it. Research is changing too rapidly; too much of it has not yet been digested. Conversely, much that remains relevant emerged from user research conducted during the preceding calm and apparently is not widely known. Therefore, our coverage of user research in this chapter concentrates on the second era of it; a number of the case studies, however, draw on research results from the third era.

Part 2: Case Studies

In her outstanding book, *When Old Technologies Were New,* Carolyn Marvin provides a model for trying to understand new media: examining specific new media services of the past.[4] It examines the past as if we were living in it and provides a fresh perspective on technologies (the telephone and electricity) that are more than a hundred years old. This model strongly influences our approach to the six case studies that form the second part of the book, placing an emphasis on how people actually used new media as well as on the strategies employed to encourage adoption and the obstacles that hindered it. These case studies provide in-depth illustrations of many of the ideas explained in part 1.

The first case study provides an example of the interactions between new media and established media, showing how technology, user behavior, and content are interlinked. Specifically, it deals with how new television technologies such as digital video recorders (DVRs), high-definition television (HDTV), video on demand (VOD), and video for mobile phones have affected television viewing behavior and how these changes in behavior are, in turn, leading to changes in programming. Clues about what may happen with the latest generation of new television technologies may be found in an understanding of the history of earlier technologies that affected viewing behavior and subsequently content.

In the earliest days of television, set size and the location of TVs affected viewing behavior and content. Later, remote controls, larger TV sets, color TVs, cable television, multiple TV sets in homes, and the video cassette recorder further affected both behavior and content. These earlier lessons are combined with new research to provide a perspective on the ways in which today's new media alter television viewing behavior.

New media are changing the composition, location, size, and placement in time of audiences as well as their relationship with content. Old mass media models of communication treated audiences as large, passive groups that received content from a relatively few sources at predetermined points in time. The models needed to be revised when large cable television systems began to develop niche audiences for specialized content, and these models need to be revised again now that very large digital cable and satellite systems have begun to destroy the concept of a mass audience while technologies such as DVRs, VOD, and Web video sites free audiences from fixed schedules and allow them to consume content at any time.

The second case study deals with services in which content is generally created by interaction among users rather than for consumption by audiences: video telephones and teleconferencing. The video telephone was anticipated in some of the earliest experiments with television in the 1920s and was offered as a service in Germany during the 1930s. It was demonstrated with great fanfare by AT&T at the 1964 World's Fair (under the trademark Picturephone), and service was introduced in limited markets by the late 1960s. It failed both in the consumer market and as a business service, though some promising applications were developed in criminal justice and health care.[5] Video telephones were reintroduced a few times over the next three decades, failing each time.

Teleconferencing has two primary forms. One is a variation on video telephones — group-to-group video teleconferencing. This service was launched in the late 1960s and early 1970s in the United States and the United Kingdom. Early services were very expensive and had limited success. Over time, however, prices declined, and a modest market emerged by the 1990s.[6] The second form is audio teleconferencing — voice communication among three or more people at two or more sites. The most important form is the now familiar conference call, but initially this service was expensive, and the associated technology was not always reliable. Later, however, prices dropped sharply, technology improved, and it was widely adopted, so much so that it is now taken for granted in business settings and in many homes (e.g., three-way calling).

The value in understanding the history of video telephones and teleconferencing is first that they were subjected to a great deal of research that has widespread applicability and demonstrates how common sense can lead one astray. Second, video telephones keep returning every few years, often introduced by organizations that seem to be ignorant of the product's history; the latest iteration is the Web-based video call. The research reveals why video telephones failed in the past and what obstacles must be overcome if they are to be widely accepted in the future.

We turn next to the Web—or, more accurately, toward the Web. There are two stories about how it developed. One is well known; the other not. The well-known version focuses narrowly on the *technological* development of the Internet as a U.S. Defense Department project that began with the Arpanet in the late 1960s and then expanded to include many universities and research laboratories. Later, key advances in software technology at CERN in Europe and the development of the Mosaic browser at the University of Illinois led to the World Wide Web. The much less well-known version has a broader focus that includes both development of content and attraction of users as well as technology. The content that eventually populated the Web—information, shopping, communication, games, and advertising—already had a long history of development, mainly in the context of videotex and teletext.

Videotex and teletext are now largely forgotten or considered irrelevant failures by those who know about them, although teletext was moderately successful in certain European countries. Both are or were electronic information services. For transmission, videotex used the telephone network, and teletext uses a portion of the broadcast television signal. They began in Britain and spread to a number of other countries in Europe as well as to North America, Japan, and South America. Nearly all of the early services failed (the Ceefax and Oracle teletext services in Britain are notable exceptions; the Minitel videotex service was a limited exception in France), but a few U.S. videotex services eventually emerged with modest success, led by AOL.

From the late 1970s through the mid-1990s, videotex and teletext were the experimental field laboratories for content development. The names of the associated services are largely forgotten—CompuServe, Gateway, Prodigy, The Source, Time Teletext, and Viewtron, among others. Between them, however, they developed advertising, news services, games, shopping, and even auctions; videotex furthered the development of e-mail and forums, which had been introduced on earlier online platforms. All these services led the way to models of content on the Web today. Through the industry leader, AOL, they also brought millions of users to the Web in the mid-1990s. In these ways, videotex can certainly be seen as having played a significant part in the explosive early growth of the Web. Moreover, the reasons why most of these services failed and what was learned in the extensive research with consumers are very relevant to the current new media environment.

Interactive television (ITV), the subject of the fourth case study, offers a good example of a set of new media technologies that failed dozens of times before finally gaining marketplace acceptance. One of the very first demonstrations of television in the 1920s was a form of interactive television. ITV was tried again in the 1950s and in each decade of the twentieth century thereafter, failing in almost all cases. These failures provided many lessons, but subsequent propo-

nents of the technology often did not know those lessons and repeatedly made the same mistakes.

In the early 2000s, ITV started to gain acceptance, first in Europe and then in the United States, through a broad range of applications, including interactive advertising, movies on demand, interactive program guides, and voting about who should be thrown off a reality TV program. Still, many uncertainties remain, such as the best platform on which to offer ITV, what services people want, and how to design interactive content. A core question about whether people want to interact with television has largely been answered, however: people want to interact with TV content, but some want to interact a lot, and some want to interact only a little, as in ordering a movie and then watching it passively for two hours. It is also unclear whether the core attractiveness of ITV is interaction with content or the control, convenience, and customization its services can provide.

Satellite radio provides another revealing case study about the adoption process for new media. The technology was developed originally to provide radio service to remote parts of Africa. In the early 2000s, it entered the U.S. market through two companies, XM and Sirius. Pundits greeted satellite radio with much skepticism, declaring that people would not pay for radio and that radio is a local medium with which a national service could not compete. The pundits were proved wrong, in part because they underestimated the negative attitudes toward terrestrial radio engendered by incessant commercials (as much as 23 minutes per hour); satellite radio has no commercials on its music channels. Doubters also underestimated the appeal of breadth of content and depth in the playlists within each content category. (Many commercial radio stations in the United States play only a couple of dozen songs, all middle of the road, to appeal to the widest audience.)

Satellite radio overcame the "radio is local" mantra in two ways. First, for many terrestrial radio stations, that mantra already no longer held true: they had abandoned local content years ago and carried no local news. Further, some stations were programmed and operated from other cities with no local DJs or content at all. Second, *local* implies *community.* Satellite radio created community in new ways, such as among fans of a particular genre of music or people who grew up in a certain period and identify with content from that period—satellite radio has "decades channels" that offer music, news, and talk about the 1960s, 1970s, 1980s, and so on.

Satellite radio provides concrete illustrations of the adoption process. When early satellite radios were expensive, the operators had to find a group of adopters who were willing to pay the high initial price. Members of a few groups had a strong need for the service—for example, long-distance truck drivers and people who lived in rural areas where there was little radio. As the price

came down, second and third waves of adopters emerged among such people as those with long commutes and owners of luxury cars. Sirius and XM eventually merged, and on the cusp of becoming a mass media service, satellite radio then became a target for other competitors, including Web radio and portable MP-3 players, and found itself weighed down by the high cost it paid for programming stars.

The final case study focuses on the integration of mobile phones into everyday life. Mobile phones have become ubiquitous around the world. Further, their capabilities have expanded well beyond making phone calls—e.g., mobile phones that take photos and motion video as well as play songs, access the Web, and display television programming.

What are the implications of this new mobile phone (or mobile multimedia) environment? At a personal level, many people decorate and wear mobile phones, treating them, like clothing, as extensions of an individual's personality. In addition, some people, mostly the younger generation, have come to depend so much on mobile phones that they abandon traditional wired telephone service. The spread of mobile phones also means that whenever newsworthy events occur in a public setting, someone is likely to capture those happenings in photographs or on video and later share them with news organizations or post them on the Web. Mobile phones have wrought not only changes in lifestyles but also, and more important, changes in perceptions about the world we live in, our sense of time, and the expectation that information and communication should be available anywhere, anytime. For many people, these changes in perception have also led to a new sense of space and the microcoordination of location with others.

Mobile phones also exemplify the need to develop an international perspective on the adoption of new media. A first step in this process is to recognize that there are many differences among countries in adoption rates and in attitudes about and uses of new media. It is not simply the case that some countries lag others in adoption. The technological landscape in each country is affected by cultural and lifestyle differences, regulatory climates, preexisting telecommunication and broadcasting infrastructures, economic differences, and the pricing of services, among other factors.

These differences can make it difficult to know whether a new communication technology or service that is broadly accepted in one country will be readily accepted in another. The broad context for technology adoption in each country must be examined carefully. There were, for example, several reasons why Europe led the United States in mobile phone text messaging: text messages were much cheaper relative to voice calls in Europe than in the United States; no obstacles prevented European users from exchanging messages with users of other networks, as was initially the case in the United States; and the ready

availability of economical prepay models encouraged many European parents to provide mobile phones to their children much earlier than U.S. parents did.

Theory

Some readers may seek an understanding of the state of relevant theory about new media and this book's position in relation to it. We have not set out to create a work about media theory, but this volume is built on and can help to extend a number of theoretical constructs.

By far the most widely known and accepted theory useful in understanding new media is sociologist Everett Rogers's theory on the diffusion of innovations.[7] Rogers's work provides a sound foundation for our treatment of the adoption process. We illustrate a variety of different ways that successful new media can diffuse in accordance with Rogers's theory: for example, the sociodemographic characteristics of innovators and early adopters for one innovation may differ from those for another.

Broad as Rogers's theory is, some factors and issues fall outside it. One of these, considered in chapter 1, is the relevance to the adoption process of the relationship between price and household income. Another is the potential role of seemingly small chance effects in determining the fate of a new product. This is explained by Brian Arthur's theory of positive feedback, which also makes the case that early providers of a new media service have an advantage over later entrants.[8] We demonstrate that this hypotheses is true—sometimes. A third issue falling outside Rogers's theory is the at times devastating impact of an innovation undergoing a process of successive improvements on other products that are already established in a particular market. This is explained by Clayton Christensen's construct of disruptive technologies.[9] The disruption is a dramatic impact as a result of a certain type of reinvention process. The process of reinvention, which occurs when an innovation is changing at the same time as it is diffusing, is an important component of Rogers's theory. Examples of it will be found in a number of the case studies as well as in the chapters on adoption and implementation.

Naturally, some practitioners have hoped that the theory of the diffusion of innovations would provide a basis for forecasting the demand for new media before they have established themselves in use. Attempts to employ it in this way have not, however, succeeded. One reason appears to be the impossibility of making a good estimate of comparative advantage—another of Rogers's key constructs—at an early enough stage.

Another set of basic questions concerns media effectiveness—that is, how well new media compare with established media or other configurations of new media in serving particular purposes of particular types of users. At the start of

the 1970s, social psychologists at the Communications Studies Group in London initiated an important stream of research, investigating different forms of real-time, person-to-person business communication—primarily, in-person, two-way video, and audio-only communication. The main research method was the controlled experiment.[10] In the United States, Robert Johansen and his colleagues at the Institute for the Future[11] and others conducted complementary studies. This research has provided us with a much better understanding of the effectiveness of new media relative to established media for purposes of interpersonal communication. This work is covered in chapter 4, and results obtained from it inform the case study on video telephones and teleconferencing (chapter 6).

Byron Reeves and Clifford Nass expanded our social psychological understanding of media in their classic book, *The Media Equation.*[12] They argue that many people equate a media experience with real life and that interactions with media technology are fundamentally social and natural. We draw from this theory in the case studies about interactive television (chapter 8) and mobile phones (chapter 10). A related theory about social presence, or how a mediated experience can be perceived in the same way as face-to-face experience, was first put forward by John Short et al., in the 1970s[13] but did not gain widespread acceptance in the field. It planted a seed, however, for a large number of studies in the 1990s and 2000s about social presence, identity, and interaction with technology through avatars, multiuser dungeons (MUDs), and social networks on the Web and mobile phones.[14] We draw from this work in the case studies about the Web (chapter 7) and mobile phones (chapter 10).

Some theories from the field of mass communication are very relevant to the study of new media, while others are outdated and need significant modification. Functional analysis theory, which examines the core sociological and psychological functions of media in people's lives, is very relevant to the study of new media. Harold Mendelsohn,[15] Leo Bogart,[16] and Lynn Spigel[17] studied the core functions of television in people's lives, and we draw on their work in our chapters about early online services (chapter 7), how new media affect television viewing (chapter 5), and satellite radio (chapter 9). More recent functional analysis by James Katz[18] about telephones reinvigorated this theoretical paradigm and influenced our chapter on mobile phones (chapter 10). Uses and gratifications theory, rooted in functional analysis and advanced by Jay Blumler and Elihu Katz,[19] emphasizes an active audience that selects what content to view and how they interact with media to fulfill basic needs such as escape, entertainment, and formation of personal identity. This theoretical model is very relevant to all forms of new interactive media. Some theoretical models from mass media research fall short in the conceptualization of audiences, however. In many models, audiences are conceptualized as large, passive collections of

people who are acted on by the media. We prefer the term *users* over *audiences* to signify that people actively engage with media.

Economics theory has much to contribute about new media, though it is not central to our book. By the late 1960s, Bertil Thorngren, a Swedish economist, soon joined by John Goddard, a geographer in England, started to develop empirically grounded theory relating to the geographical patterns of communication by firms and government agencies. This idea quickly came to be seen as potentially useful for projecting the impacts that new telecommunication technologies could be expected to have on transportation and office location, which opened an avenue of research that other economists expanded to include consumers and a larger set of economic issues.

Naturally, considering the high and growing significance of the information sector in national economies, economists have done much work on related issues during the past two decades or so. While many of the issues they have studied, such as those concerning policy, regulation, and industry structure, are not directly related to the subject of this book, others—including, for example, standards, pricing, online auctions, and network effects—are directly relevant to users of new media products and services, as Carl Shapiro and Hal Varian very clearly demonstrated in their celebrated book, *Information Rules: A Strategic Guide to the Network Economy.*[20] More recently, Per Andersson, Ulf Essler, and Bertil Thorngren[21] at the Center for Information and Communications Research in Stockholm have conducted elegant research on the wireless market, and we draw on their work in chapter 10. Eli Noam and colleagues at the Columbia Institute for Tele-Information have conducted wide-ranging economic research about consumer behavior with new media that informs our work in chapter 1.[22]

At the core of our book is how users adopt or fail to adopt new media and, if they adopt a new technology or service, how they integrate it into their everyday lives. A large literature on the sociology of everyday life has grown out of the pioneering work of Erving Goffman.[23] Later, Roger Silverstone[24] and Shaun Moores[25] focused on media use in everyday life, and most recently, Rich Ling[26] has tackled this set of issues in relation to mobile phones. We draw on this research in a number of our case studies. A related body of theory has emerged from the work of historians and political scientists who have examined the introduction of earlier media when they were new from a user perspective. Carolyn Marvin has done excellent work in this area, as have Ithiel de Sola Pool and colleagues[27] and Claude Fischer.[28]

For readers who seek more about new media theory, we suggest Rogers, along with James Katz,[29] and Leah Lievrouw.[30]