

DIGITAL MEDIA AND INNOVATION

MANAGEMENT AND DESIGN
STRATEGIES IN COMMUNICATION



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RICHARD A. GERSHON

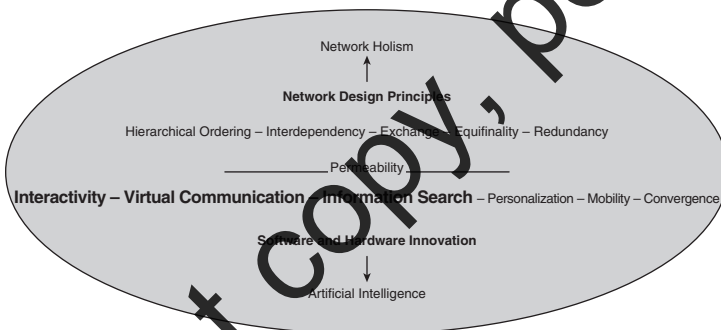


CHAPTER 8

Digital Media and Innovation I

Interactivity, Virtual Communication, and Information Search

Introduction



Today, the Internet has become steadily woven into all aspects of work and leisure. It has grown in size and complexity due to the many contributions of its users, including powerful search engines, unique Web site design, aggregation of content, EC, and social media, to name only a few. The Internet

has transformed the world's business and social environments. In this chapter, I use the term *digital lifestyle* as a way to describe how various kinds of media and IT are used to enhance the way we live. From smartphones to smart houses, today's media users have come to expect certain things from the computer and communication devices they use.

Digital Media

Digital media represents the artistic convergence of various kinds of hardware and software design elements to create entirely new forms of communication expression.

Digital media has transformed the way we communicate and access information.¹ Booking a flight and vacation on Booking.com or Expedia is a very different value proposition than working with a travel agent. Purchasing a set of songs on iTunes or Pandora is an altogether different shopping experience than walking into a music store. And streaming a movie via Netflix on a high-definition television (HDTV) set or a computer tablet has given new meaning to the term *video on demand* (VOD). Digital media in the 21st century requires a special appreciation for speed, mobility, and convenience. Today's Internet user expects to access the web—anytime, anywhere. Location should never be an obstacle.

Digital Storytelling

Digital media has proved to be a major game changer when it comes to visual presentation. Digital storytelling is the art of using enhanced media and information tools to tell a story. From online newspapers to a highly engaging Web site display, digital storytelling assumes a wide range of electronic media narratives that might include text, still and moving imagery, and enhanced sound effects as well as being nonlinear and interactive. Such stories no longer conform to the conventions of traditional storytelling.² The personal diary has given way to public demonstrations of one's ideas and opinions using the power of the Internet and social media. Nowhere is this more evident than in social media sites like Facebook and Twitter. The once iconic photograph album has become more decidedly multipurpose in approach with digital imprints now available on one's phone, computer tablet, or Facebook account.

In the next two chapters, we will explore the second half of the ITS model by focusing on seven signature features. They include: 1) Interactivity, 2) Virtual communication, 3) Information search, 4) Personalization, 5) Mobility, 6) Convergence, and 7) Artificial intelligence (AI). (See Table 8.1.) Accordingly, we consider both the social and technological consequences of digital media and intelligent networks on people and organizations. One problem in measuring the technological consequences of innovation is untangling cause-and-effect relationships. As Rogers (1995)³ points out, once a primary innovation has been fully diffused into a system, there is no going backward. Basic patterns of social and organizational behavior are forever changed.

Principals of Digital Communication and Binary Logic

Historically, older forms of communication and information technology, including radio and television broadcasting, vinyl records, and VHS tapes are considered analog forms of communication. An *analog signal* (or analogy) is a representation of something else. It is a continuous signal that can be physically measured. One of the major problems associated with analog systems of communication are their susceptibility to unwanted noise. Consider, for example, that a traditional telephone

Table 8.1 Digital Lifestyle: Signature Features	
<i>Digital Media Features</i>	<i>Applications and Examples</i>
Interactivity	<ul style="list-style-type: none"> • Human–Computer Interface Design • Video on Demand (VOD) <ul style="list-style-type: none"> ◦ Netflix, YouTube, HBO Go • Cloud Computing
Virtual Communication	<ul style="list-style-type: none"> • Private Virtual Networks • Global Virtual Teams <ul style="list-style-type: none"> ◦ Videoconferencing, Skype, Facetime • Social Media <ul style="list-style-type: none"> ◦ Facebook, Twitter, Linked-In
Information Search	<ul style="list-style-type: none"> • Querying the Internet • Content Service Providers <ul style="list-style-type: none"> ◦ Google, Yahoo ◦ Wikipedia, Trip Advisor ◦ Web MD, Vacation Rental by Owners
Personalization	<ul style="list-style-type: none"> • Digital Video Recording <ul style="list-style-type: none"> ◦ Cable, IPTV, DBS • Personalized Music Playlist <ul style="list-style-type: none"> ◦ iTunes, Pandora, Rhapsody • Personalized Web Site <ul style="list-style-type: none"> ◦ Facebook, LinkedIn page
Mobility	<ul style="list-style-type: none"> • Laptop Computers • Smartphones <ul style="list-style-type: none"> ◦ Google Calendar, Yahoo Weather • Global Positioning Services (GPS) <ul style="list-style-type: none"> ◦ Google Maps and Navigation
Convergence	<ul style="list-style-type: none"> • Digital Photography • Filmmaking and Special Effects • High-Definition Television (HDTV)
Artificial Intelligence	<ul style="list-style-type: none"> • Personalized Recommendation Software • Robotics • Virtual Reality

performs the function of translating one’s voice into an electrical signal and transmitting it via a long distance network of switches, routers, and amplifiers. Each time the signal is re-amplified, there is the potential to introduce unwanted noise into the transmission. The same problem occurs with recording formats as well. When using an analog tape recorder, the signal is taken straight from the microphone and laid

onto tape. If one wants to make a tape of a tape, each successive generation suffers a degradation in quality. Whereas, in an all-digital link, the signal is an exact replication of the original, thus eliminating any unwanted noise factors. The cut-and-paste function on a computer provides a simple illustration. If one types the word *innovation* and copies it, the quality and accuracy of the paste function is the same whether it's the first repeat or the one hundredth. This is the reason why a copy of a CD is as good as the original.

All forms of digital communication are based on the principle of binary logic, which presumes that a signaling system is essentially in one of two states: open or closed. Binary logic uses the numbers 1 and 0 arranged in different sequences to exchange information. The numbers 1 and 0 are called bits from the word *binary digit*, which is the lowest possible unit of information that can be transferred or handled.⁴ A byte is an eight-bit train; that is, one byte equals eight bits. A digital signal is made up of pulses of discrete duration, that is, a stream of bits that are either on or off. Digital signals are sent as a sequence of pulses of fixed width and amplitude. (See Figure 8.1.)

Pulse Code Modulation. Traditional analog technologies and devices are incompatible with digital signaling and communication. Consequently, the situation requires a conversion process, whereby the analog signal is converted into a digital format. Consider, for example, the task of converting a Bruce Springsteen music album recorded in the 1970s into a CD. Pulse code modulation (PCM) is a conversion process, whereby the analog signal is sampled and converted into binary format, that is, a sequence of 1s and 0s.⁵ The conversion process requires two steps: 1) Sampling and 2) Quantizing (companding). (See Figure 8.2.)

The first step in the conversion process involves sampling the analog signal at regular time intervals. The goal is to accurately reflect the original signal. The higher the level of sampling per second, the more accurate the reflection of the original signal. *Sampling rate* refers to the number of times the analog signal is sampled per second.⁶ The sampling rate must be at least twice the highest frequency component of the analog source to faithfully reproduce the signal when it is converted into digital form. The second step in the process involves quantizing the sampled pulse, that is, forcing it to occupy a discrete set of 1 and 0 values.⁷ The information is now fully digitized. Once the information has been converted to digital format, distribution and storage costs have been significantly lowered. There is an inherent economy of

Figure 8.1 Digital Data Signal

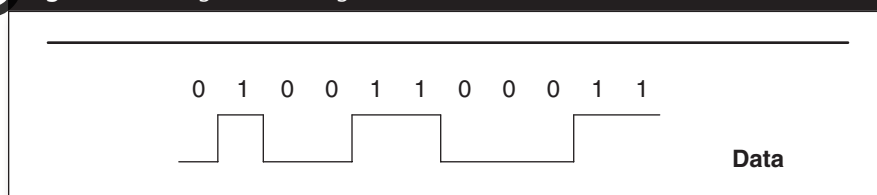
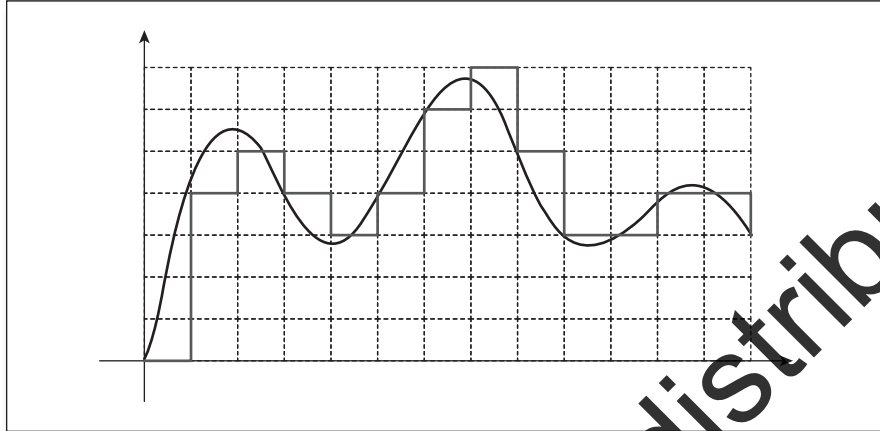


Figure 8.2 Pulse Code Modulation

scale. A CD is much less expensive to produce when compared to vinyl records. An MP3 music file can be transmitted and stored electronically for a fraction of the cost when compared to the production and delivery of a CD.

More Efficient Use of Bandwidth

The electromagnetic spectrum is a fixed and limited resource. Yet all wireless services, including television, smartphones, and satellites (to name only a few) depend on available spectrum. The critical challenge for broadcasters, cable television operators, and Internet service providers is how to optimize and make more efficient use of the electromagnetic spectrum. The term *bandwidth* refers to channel width or information carrying capacity. As an example, FM radio requires 200 KHz. of bandwidth to provide an acceptable signal to a potential radio listener. In contrast, a typical TV signal requires 4 MHz. of bandwidth. By the time one adds in sound (vestigial sideband) and a little buffer space, a TV signal requires 6 MHz. of bandwidth. The implementation of HDTV requires about two times as much information carrying capacity than was originally needed with analog TV. The solution, therefore, is to create a system that compresses existing bandwidth space allocations more efficiently.

Digital Video Compression

Digital video compression (DVC) refers to digitizing and compressing video pictures so that they may be processed, stored, and distributed with greater flexibility and ease. DVC refers to the technical ability to reduce the size of video signals so that they can be more efficiently transmitted and stored. Digital TV relies on a compression and encoding scheme known as Motion Picture Experts Group 4 (MPEG-4) to fit its high-resolution images into a lesser amount of bandwidth space. MPEG-4 reduces the amount of data to about 20 percent of the original

amount.⁸ MPEG-4 is the industry standard for Internet video streaming as well as satellite television broadcasts.⁹

DVC operates on the premise that some of the data present before compression is not essential for achieving good picture quality. Video compression operates off a grid system using square-shaped groups of neighboring pixels (often called *macroblocks*). These pixel groups are compared from one frame to the next, and the video codec sends only the differences within those blocks.¹⁰ The term *lossy* is used to describe those situations where there is a high degree of redundant information within the video display. DVC works well in those situations where there is limited or no motion. The court surface, during a televised basketball game, for example, can be repeated with very little transmitted data. DVC is fully utilized by diverse technologies such as: 1) Cable television, 2) Direct broadcast satellite (DBS) television, 3) Internet video streaming, and 4) Video games.

MP3

MP3 is a patented digital audio encoding format that utilizes compression technology. MP3 is designed to greatly reduce the amount of data required to represent the audio recording while still providing a faithful reproduction of the original recording. The German company Fraunhofer-Gesellschaft is credited with being the principal developer of MP3 software technology. The lead technology designer was Karl-Heinz Brandenburg, who was a specialist in mathematics and had been researching methods for compressing music since 1977.¹¹ The speed and efficiency of producing Internet-delivered music using MP3 file-sharing software was a major game changer by transforming the cost structure of music recording and distribution on a worldwide basis. The combination of the Apple iPod and iTunes would eventually create the first sustainable music downloading business model of its kind.¹² It is a business model that has been replicated by others including Pandora, Spotify, and Rhapsody.

Interactivity

The principle of interactivity suggests the ability to engage in two-way communication. Interactivity can include a whole host of digital media activities ranging from interactive television to video games to virtual reality simulations. The principle of interactive communication in its earliest form can be traced back to the beginning use of touch-tone telephony that replaced rotary dial telephones in the 1970s. Touch-tone telephony utilized a concept known as *dual-tone multi frequency*, whereby each button on the telephone handset consists of two frequencies. Touch-tone provides the basis for interactive capability with a host telephone system or computer. The goal of touch-tone was to give businesses and other organizations the ability to create a menu structure of services that the user could access by pushing select number keys.

Cable Television and Interactive Communication

A good example of interactive communication can be seen in the early developments of cable television and the ability of the user to engage in pay-per-view (PPV) television and home shopping. A cable television system is capable of not only transmitting audio, video, and data signals from the headend point to the subscriber's home but can likewise send those same signals in a reverse direction. Early supporters of interactive television realized that two-way capability would allow a cable system to offer its customers a wide variety of enhanced information services.¹³ The first generation of two-way interactive cable television involved home shopping channels (i.e., Home Shopping Network, QVC, etc.) that relied on hybrid networks, that is, cable television from headend source to home and telephone communication from home to the program source.¹⁴ During the decades of the 1980s and 1990s, the second generation of interactive cable television evolved with the development of PPV television. PPV involves charging the user by the program rather than by the program channel. PPV has taken several years (and many failed attempts) to develop and has proved to be modestly successful in the delivery of special event programs (sports and concerts) as well as adult entertainment.

Video on Demand. VOD represents the third generation of PPV services and enables the cable television viewer to access feature films and concerts on request. VOD allows the user to choose programming from a large selection of titles and program categories that are hosted on a remote server. Starting in the 1990s, VOD was being touted as cable television's answer to the emerging success of the videotape and later DVD rental industry. While cable television was able to promote select forms of VOD programming, most notably, professional boxing matches, music concerts, and adult entertainment, VOD did not live up to its promise.

Digital Video Recorders and Video Streaming. Today, cable television has become much more than a conveyor of television entertainment. Cable television has become the all-essential broadband link into people's homes, thus enabling a fourth generation of interactive capability that relies on digital video recording technology as well as video streaming via the Internet. The emergence of the digital video recorder (DVR) in the late 1990s and early 21st century gave the television viewer increased control in terms of time shifting, that is, the ability to watch programs when it was convenient to the user. The DVR provides an on-screen guide of scheduled television programs, whose features include the ability to record selected programs for later viewing. One of the important features for the consumer is the ability to record one's favorite television programs for later viewing, including the ability to skip over commercial TV ads.¹⁵

In the 21st century, VOD is reasserting itself in an altogether unexpected way. The major game changer emerged in the form of Netflix, which in 2004 demonstrated the possibility of streaming movies via a broadband connection directly to the end user's digital television set. Video streaming involves sending information and entertainment content via the Internet in a digitally compressed format. The programming is displayed on the host television set or computer screen in real

time. Netflix would be a catalyst for change, opening up the door for other video services, including Hulu, YouTube, and HBO Go. Advancements in HDTV and Dolby stereo sound have made video-streamed programming a much more attractive value proposition for the consumer.

Over-the-Top Video Services. Also important to the discussion is the future of over-the-top (OTT) video services, that is, television programming that can be video streamed via the Internet to various kinds of portable devices like laptop computers, computer tablets, and smartphones. Instead of subscribing to cable or Internet Protocol TV, the consumer elects to use the Internet as the main delivery system for his/her television viewing experience.¹⁶ This is interactivity in its most essential form. The user is interacting with the television service provider by expressing clear preferences for select forms of television programming as well as viewing platform. More and more subscribers are engaged in what is known as *cordcutting*, whereby, the subscriber cancels one's basic cable television subscription and elects instead to use one's Internet feed for the purpose watching television. Such interactions have given new meaning to the term *video on demand*.

Human/Computer Interface Design

Today, interactive communication is the starting point for all discussions concerning how users interact with the various media and communication devices they use. Much of the research on interactivity concerns how users interact with various communication devices, including computers, smartphones, and video game systems. One group of scholars view interactivity as a function of the medium itself. This is particularly true when it comes to the development of things such as smartphones and video game systems. Here, the emphasis is on hardware and software devices. Steuer (1992), for one, argues that the interactivity of mediated communication depends on three main characteristics: *speed* (i.e., how quickly a device responds to a user's commands), *range* (i.e., the level of control permitted by the device), and *mapping* (i.e., the degree of correspondence between a user's actions to control the device and how it responds to those actions).¹⁷

In contrast, a second group of scholars look at interactivity from the vantage point of the communication process itself. Interactivity resides in the perceptions and experiences of those who directly participate in the actual communication. This perspective is more closely associated with computer-mediated communication. According to McMillan (2002) interactivity occurs at varying levels and degrees of engagement, ranging from social networking sites to video game participation.¹⁸ Here the emphasis is on the communication of ideas, information, and shared meaning among communicants.

Interactivity and Knowledge Transfer. Interactivity has to do with the knowledge transfer between a person and machine or between a person and a larger set of community users. To fully appreciate the breadth and scope of this idea, one needs to have an appreciation for the early work in human/computer interface design. In 1963, Douglas Engelbart of the Stanford Research Center pioneered the

development of the computer mouse, which was later advanced by the Xerox Corporation in the 1970s. The computer mouse functions as a pointing device that detects and highlights text and visual displays on a two-dimensional screen. The computer mouse frees the user to a large extent from using a keyboard. It was a simple but masterful form of ergonomic design that greatly improved the way in which people interfaced with computers.¹⁹

Engelbart's research and design contribution demonstrated a systems theory perspective using the principles of coevolution as it might apply to the use of technology. In biological terms, each party in a coevolutionary relationship exerts synergistic pressure on the other, thereby affecting each other's evolution. The classic example is bees and the flowers they pollinate. Both have coevolved so that each has become dependent on the other for survival. Engelbart reasoned that the state of knowledge and information display is only as good as the available technology to manage it. He thus set out to create an interface design that would be faster and more efficient in terms of manipulating information on a screen.

Graphic User Interface (GUI). The development of the GUI icons by Xerox Corporation and later Apple in the 1980s further advanced the cause of human-computer interface design. A GUI offers graphical icons and visual indicators as opposed to text-based interfaces and/or typed command labels to fully represent the information and program selections available to a user. GUI has become a standard feature on all Apple, Microsoft, and Linux-based operating systems. Touch-screen technology came along in the 1980s and was used in a variety of automated banking and tourist attractions, including ATM machines and information kiosks. Today, touch-screen capability has become a standard feature found in various kinds of digital appliances, including laptop computers, mobile smartphones, computer tablets, and global positioning navigation systems (GPS).

Speech Recognition. The next and evolving generation of interface software involves speech recognition systems evidenced by the work being done in the military and health care fields. Speech recognition software allows the user to dictate into a computer or handheld recorder, thus enabling an electronic text version of the spoken words to appear on the users' screen. Each successive generation requires less formatting of the software (i.e., identifying specialized words). Also, the software adapts to the user by keying in on select words and phrases and storing them in its internal memory. A variation on speech recognition systems are voice command systems using Bluetooth technology in cars.²⁰ Bluetooth represents an industry standard for personal wireless communication devices, referred to as personal area networks. Bluetooth provides a way to connect and exchange information between Bluetooth-compatible devices such as laptop computers, smartphones, and music sound systems using unlicensed short-range radio frequencies (i.e., typically 1–100 meters). Bluetooth simplifies the discovery and setup of services between devices. The voice command system can set up and execute a hands-free cellular telephone call as well as call up music and traffic reports from the vehicle's radio, DVD, or iPod control system.

Cloud Computing

The expression “putting something on the cloud” refers to the idea of storing information and data on a remote host site. Cloud computing provides both storage as well as the delivery of information services over a virtual platform using the networking capability of the Internet. Cloud computing represents an altogether different form of interactive communication. Users are able to access such services on demand. In general, the public is most familiar with public cloud services. Public cloud computing involves making available information and entertainment services to the general public by a third-party vendor. The services are hosted by the vendor and are offered free of charge or on a pay-as-you-go basis. Examples include: Google, Gmail, Calendar, Apple iTunes, Amazon.com web services, Facebook, and Pandora. The third-party vendor is responsible for managing the entire service. The end user has little control over where the data is stored and whether or not it can be available at any given time.

Private Cloud Services or community clouds operate within the firewall or boundaries of an organization. Private clouds are managed internally by an organization and are therefore responsible for organizing and securing all information. As a result, the organization will typically make a major financial commitment in software and hardware capability as well as utilizing in-house expertise to manage information flow throughout the entire transnational organization. Examples might include the international banking and airline industries. In general, there are three types of cloud computing service models including 1) Infrastructure as a service, 2) Platform as a service, and 3) Software as a service.

Infrastructure as a Service (IaaS). This represents the most basic kind of cloud support model. IaaS refers to those kinds of facilities that provide business users with extra storage space on a remote server. The basic premise is that cloud service providers manage an organization’s complete data information needs remotely and host all information via a series of virtual links. The principle advantage is cost savings by not having to manage and host one’s own database system of documents and records.

Platform as a Service (PaaS). PaaS is a category of cloud computing services that provides a highly refined computing platform and set of subsystems. In this model, the user creates a set of software tools using programs and/or a library from the provider. The user also controls the software deployment and configuration settings. The cloud service provider helps to advance the network, servers, storage, and other services. Examples of PaaS might include a community based geographic information system (GIS).

Software as a Service (SaaS). This service model is used for purposes of software deployment. The cloud service provider licenses various kinds of software applications on demand to customers as needed. The end-user does not manage or control

infrastructure planning as it pertains to the network, servers, operating systems, storage, or software applications. Instead, SaaS provides a cost-effective alternative from having to purchase software support outright as well as simplifying maintenance and support. In a sense, the organization is leasing the software as compared to having to purchase it outright. All updates are automatically fitted into the software as a service. SaaS has proved to be a useful approach for start-up companies with limited resources that don't want to make the large up-front investment in software.

With the growth of cloud computing comes the associated challenges of information security. Both business as well as individual users who have their information stored on a third party's server are subject to security and compliance standards of operation to ensure the protection of their information. Preserving security on the cloud is one of the major concerns by users who chose to store their data remotely. The overriding concern is the control of data: how data enters a system, where it resides, how it is managed and processed, and who can access it. One of the important compliance issues is data loss. A single point of failure or intrusion could prove catastrophic for business and individual users. To offset this possibility, cloud computing service providers build in redundancy (i.e., backup systems) to ensure safety and security.

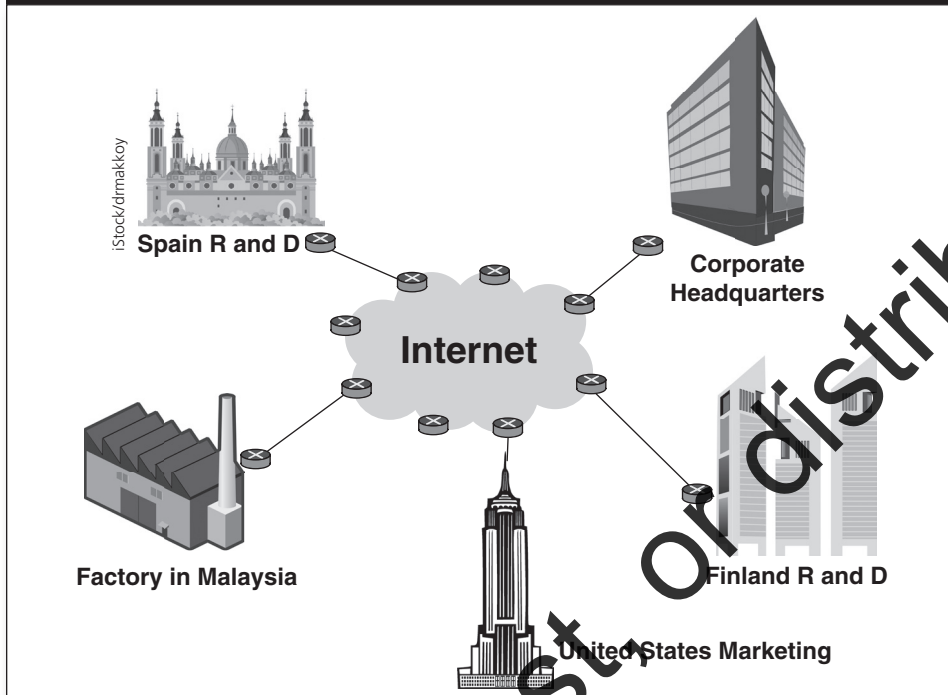
Virtual Communication

The term *virtual communication* can be used to describe the artificial space and network linkages connecting a separate and dispersed group of users using various forms of computer and communication technology. From Skype to the international business videoconference, the common denominator with all forms of virtual communication is the ability to create a simulated environment. The communication itself can be both synchronous (real time) as well as asynchronous (different times). The selection and type of communication technology is based on how much information content the sender wishes the receiver to have. Researchers Daft and Lengel (1986) refer to this as *media richness*.²¹ The difference in quality and depth varies according to the communication medium.

Virtual Private Networks

A *virtual private network* (VPN) is a computer network that uses a public telecommunications infrastructure such as the Internet to provide remote users (or departments) secure access to their organizations' networks. A VPN can range in size and scale of operation from the transnational media corporation that operates on multiple continents to a major medical hospital that must provide secure health-care information to physicians and other medical professionals located in a variety of clinics and adjoining facilities. The major requirement is the ability to provide immediate and secure information available only to the organization and its affiliate sites.²² (See Figure 8.3.)

Figure 8.3 Virtual Private Network



The word *virtual* can sometimes be misleading. The connections made between people and organization both within and outside an organization are quite real. As Reed (2014) reminds us:

The seemingly placeless, ethered world of the Web is not possible without millions of very earthbound terminals, CPUs, hundreds of thousands of miles of cords and fiber optic cables. . . . No matter how lost we may get imaginatively in cyberspace, those seemingly virtual spaces are possible only because of a massive array of material objects anchored in geographically specific places.²³

Intelligent Networking and International Business Communication

Social and scientific terms like *knowledge economy*, *information society*, or *digital age* do not lend themselves to precise definition or meaning. What is beyond dispute, however, is the role of intelligent networks in helping to advance the transmission, storage, and display of media and information content within the context of international business communication. The knowledge economy involves the full integration of transnational business, nation-states, and technologies operating at high speed. It is a global economy that is being driven by free-market capitalism and the power of intelligent networking.²⁴ The knowledge economy stands in marked contrast to many of the basic patterns and assumptions of the Industrial age. The

once highly centralized business has given way to the transnational organization that operates in multiple countries throughout the world. Instead of time and communication being highly synchronized, today's working professional lives in a digital world of asynchronous and virtual communication that allows for the international collaboration of projects regardless of time zones, geographical borders, and physical space. We have entered the era of global virtual teams where work is produced across multiple time zones and geographic spaces.²⁵ As Eli Noam (2001) points out, "The knowledge economy has become a society of networks. We don't talk with people; we network with them."²⁶

Virtual Private Networks and the Transnational Corporation. The transnational corporation (TNC) is a nationally based company with overseas operations in two or more countries. Strategic decision making and the allocation of resources are predicated upon economic goals and efficiencies with little regard to national boundaries. The TNC has become a salient feature of our present-day global economic landscape.²⁷ Through a process of foreign direct investment, the TNC relies on the use of advanced IT as a way to stay globally connected. At the heart of transnational business operations is the importance of organizational control, which describes the need for a system-wide method for managing, tracking, and evaluating a TNC's domestic and foreign operations. Organizational control provides the ability to centralize decision making, thereby giving senior management the tools necessary to plan, allocate resources, and take corrective action to meet changing international conditions. The intelligent network has become the vital nervous system enabling the TNC's multiple divisions and subunits to function independently while being part of a larger communication network. As a consequence, traditional divisions and departmental hierarchies tend to be flatter, thereby permitting direct communication between and among organizational players.²⁸

Global Virtual Teams. International project teams are the key to smart, flexible, and cost effective organizations. A global virtual team represents working professionals from a TNC's worldwide operations assembled together on an as-needed basis for the length of a project assignment. They are staffed by working professionals from different countries. More and more, the transnational organization uses global virtual teams as part of a larger effort to share international expertise across the entire TNC. The global virtual team offers up certain distinct advantages, including shared access to information, collaborative research and design work, reduced travel costs, and so on. Advancements in communication technology and intelligent networking have elevated the principle of teamwork to a whole new level in terms of collaborative effort.²⁹

At the same time, global virtual teams bring with them a unique set of challenges. Foremost are issues pertaining to trust involving differences of culture, geographic dislocation, complex problem solving, and the effective collaboration of ideas. Specifically, how does one creatively engage a group of people that one has never physically met and trust that everyone is equal to the task?³⁰ The global virtual team presents a unique set of challenges in terms of blending the technical efficiencies of virtual communication with the practical needs of creating a cohesive international project group.

Skype. Skype is a free voice over IP (VOIP) service that allows users to engage in a computer-to-computer videoconference. Skype, which is an acronym for sky and peer, was created by Janus Friis (Denmark) and Niklas Zennström (Sweden) in cooperation with Ahti Heinla, Priji Kasesalu, and Jaan Tallinn (Estonia). Skype was first released to the public in August 2003. It was later acquired by Microsoft in 2011 for \$8.5 billion. Telephone calls placed to other Skype subscribers are free of charge, while calls to landline telephones and mobile phones are charged via a debit-based user account system. What makes Skype unique is that it represents the first generation of real-time full-motion video telephony. Skype can be accessed not only on computers but on any video display monitor, whether it be an HDTV or a mobile phone.

Videoconferencing. One of the standard tools for the global virtual team is the videoconference. The videoconference provides an electronic meeting format using video images and audio sound. People are typically linked together at two or more locations via an Internet connection, telephone switch, or satellite. A two-way videoconference is the quintessential example of virtual communication. The videoconference permits the exchange of information, data, and/or drawings between two or more people at separate locations. The organizational videoconference has become a standard feature of transnational communication and serves as an alternative to face-to-face meetings. This can include both point-to-multipoint videoconferences using structured conference meeting rooms as well as Internet-based conferencing.

Videoconferencing offers transnational corporations (TNCs) some distinct advantages, including 1) Information exchange, 2) Increased productivity, 3) Cost savings, and 4) Employee training. First and foremost, the TNC videoconference is about information exchange. This gives the large-scale organization a level of productivity and efficiency that would otherwise be unavailable. The TNC videoconference can link together marketing and engineering teams and, thereby, eliminate the need for travel, hotel, and lodging expenses associated with travel. It also contributes to increased productivity as key management people are in the office and not in transit. Videoconferencing companies like Cisco and Polycom have tried to simplify the conferencing process by introducing easy meeting setups as well as making the design of the conferencing rooms (including table shape, wall colors, and backdrop) look as though all participating members are seated in the same room. This stands in marked contrast to older videoconferencing systems that required dedicated and expensive room-based facilities that were difficult to set up.³¹

Alternatively, an Internet-based videoconference can provide a low-cost way to electronically link members of the TNC. Today, nearly all desktop, laptop, and tablet computers are equipped with a webcam and microphone. Software applications like Skype, FaceTime, and Go to Meeting make international project meetings and consultations a fairly routine exercise. In addition, a prearranged webinar can provide transnational employees with a timely method for obtaining educational training and information updates. Typically, the webinar is scheduled ahead of time and involves an information specialist as well as written materials

as part of a larger information package. Videoconferencing, both simple and complex, gives greater impetus for the TNCs to operate globally and makes practical the ability to exchange information. Today's business professional is no longer constrained by issues pertaining to time and geographical location. Videoconferencing and webinars make real-time business communication possible, enabling business professionals to have the ability to remain productive without the need for extensive travel.

Virtual Communities

One of the more compelling aspects of virtual communication has to do with the various kinds of online relationships that are formed as a result of using the Internet and the different forms of computer-mediated communication. One important consideration is *social presence theory*, which describes the degree to which a medium is perceived as conveying the presence of the communicating participants.³² The social presence of the communicating participants depends on a variety of factors, including the full range of verbal and nonverbal cues as well as the technology and modality. Computer-mediated communication, and specifically the Internet, has proved to be a fertile ground for those scholars interested in exploring the importance of information exchange and shared meaning.³³ The term *homophily* is used to describe communication networks based on a similarity of interests (i.e., occupation, personal interests, and political causes).

The Internet, for one, brings together people who share a common interest. A number of writers refer to such networks as *virtual communities*.³⁴ Nowhere is the principle of virtual communities more evident than in social networking sites like Facebook, Twitter, and LinkedIn.³⁵ Social networking allows individuals to present themselves and maintain connections with others. As friends and acquaintances join Facebook or Twitter, they become part of a larger social grid that matters to the individual. It creates value to the individual by adding to one's social capital.³⁶ Because that person's friends are connected to other friends on the network, there is the opportunity to virtually expand one's circle of friends and acquaintances.³⁷ Each new person and extended link adds value and dynamism to the overall network (i.e., network evolution).

Twitter. Twitter is an online social networking service that enables users to send and read short 140-character text messages, called *tweets*. Twitter provides an immediate electronic gateway for the millions of registered users who wish to comment or express a viewpoint. Registered users can read and post tweets, but unregistered users can only read them. Twitter enables people to exercise a basic human impulse, the ability to communicate with large numbers of people at a time.³⁸ Twitter is the brainchild of Jack Dorsey, who as a kid growing up in St. Louis was fascinated with dispatch routing systems, that is, short and punctuated emergency communication used by police, fire, and rescue as well as commercial enterprises such as taxis.

Dorsey first came up with the idea that became Twitter while attending New York University. His experience using instant messaging prompted him to wonder whether it was possible to combine the immediacy of instant messaging with the mobility of an online dispatching system. He later approached Odeo business partners Biz Stone, Evan Williams, and Noah Glass with his idea. At a daylong brainstorming session, Dorsey introduced the idea of an individual using a Short Message Service (SMS) to communicate with a small group of users. The name *Twitter* reflects chirps from a bird, that is, short bursts of information. Twitter was launched in July 2006 and became its own company in April 2007. Since then, the service has achieved worldwide popularity. Twitter is one of the Internet's ten most widely visited sites. As Levinson (2013) points out, Twitter gives the user a powerful electronic platform by which to "inform, amuse or outrage" other Twitter users.³⁹

As a social network, Twitter revolves around the principle of followers. On Twitter, the pound sign (or hash) turns any word or group of words that directly follow it into a searchable link. The hashtag allows the user to organize content and track discussion topics based on those key words. Clicking on that link enables the user to comment. Similarly, the @ sign followed by the user name is used for replying to other users. When the user chooses to follow another Twitter user, that user's tweets appear in reverse chronological order on the user's main Twitter page. If the user follows twelve people, he/she will see a mix of tweets scrolling down the page: music recommendations, political commentary, football results, and so on. A word, phrase, or topic that is tagged at a greater rate than other tags is said to be a *trending topic*. Trending topics become popular either through a deliberate effort by users and/or because a major event breaks into the public conversation space. Twitter provides users with an immediate and accessible platform, albeit 140 characters, with which to comment about topical events and people. This is made easier by the fact that Twitter works well with mobile phones.

Twitter's popularity and general use tends to spike during prominent events whether it's a World Cup soccer match, a political or entertainment scandal, or comments on the death of a public figure. Twitter has increasingly become an accepted form of communication used in business and professional settings. The Twitter platform has been adopted by a number of major health organizations, including the World Health Organization (WHO), the Center for Disease Control (CDC), and the National Institute for Health (NIH). Twitter provides a unique platform to convey health messages as well as medical alerts using the power of social media.⁴⁰

Information Search

Searching for information represents the most essential reason why someone uses the Internet, namely, to gather information about topics and issues that are important to the user. A search engine is a software tool that helps the user perform key word searches and locate specific information available on the Internet. The search engine in combination with hypertext linking provides structure and

makes the Internet more accessible to navigate. Search engines come vary in size and scope, starting with general information search engines like Google, Yahoo, Bing, and Ask. Different countries of the world have an equivalent version Google, such as Google India or Google Brazil, that accommodate differing search queries by language and more specialized information and news focus. Alternatively, some countries of the world have their own general search engine equivalents such as Baidu.com and Qq.com, which are the two leading search engines in China and rank in the top 10 most frequently visited Web sites worldwide according to Alexa Internet Inc.

Less understood by the general public, however, is the importance of specialized search engine Web sites like WebMD (health care), Trip Advisor (travel), and Kelley Blue Book (automobile comparison shopping) that offer the user a more dedicated focus. The specialized search engine is responsible for organizing information resources that are distinct to a particular discipline or area of specialization. The specialized search engine is uniquely positioned to assist the individual who has more defined information needs. Typically, a search engine works by sending out a spider to fetch as many documents as possible within a defined set of research parameters and databases. This is followed by a software program called an indexer, which reads these documents and creates an index based on the words contained in each document. The search engine uses a proprietary algorithm to create a set of listings that corresponds to the user's query. WebMD, for example, advertises itself as the number one search engine site for obtaining information about health issues. The WebMD Website, available at <http://www.webmd.com/> provides useful medical news and information about a variety of health issues as well as information related to finding doctors, hospitals, and specialized treatment centers. Specialized Web sites such as Web MD, Trip Advisor, and Kelley Blue Book are very attractive to advertisers. They speak to the importance of narrowcasting, albeit for the Internet.

Planning and Design Considerations

The basic reason for creating a specialized search engine is simple. By becoming a major gatekeeper of people's online experience, Internet search companies hope to build a set of loyal users who will rely on them not only for trusted information but to buy goods and services as well. Many of today's better-known search engines (e.g., Google and Yahoo) are considered multilevel Internet companies. They have positioned themselves as full-service information sites with links to a variety of information, entertainment, and adjoining services. For a company like Google, Internet search is the foundation to a whole host of value-added services such as YouTube, Google Maps, Google Translate, Google Scholar, and so on. Similarly, Yahoo has created its own full-service ecosystem as well, including news, weather, finance, food, and Flickr.

Two important features found in all search engine sites are the aggregation of content and personalization. The primary responsibility of a search engine is to collate data from a variety of information sources around the world. This is accomplished through international alliances and distribution relationships. The search

engine is responsible for the organization and arranging of information, thus making it possible for key word and context-based search information. A successfully designed search engine should contain the best features of an encyclopedia, phone directory, and newsletter. The aggregation of content enables the user to comparison shop. The user should be able to locate and compare professional service providers both locally and nationally. Search engine software permits registered users to receive personalized information in the form of specialized content (e.g., daily news briefings, weather and stock reports, newly released articles, commentaries, etc.). In sum, the key to building a successful search engine is to make it an essential part of the user's Internet experience.

Power Applications (or Apps)

Central to any discussion pertaining to digital lifestyle is having an appreciation for the importance of software applications (or apps). An app is a specialized software program that can be downloaded to various kinds of mobile devices, including smartphones, computer tablets, and equivalent devices. The app allows the user to engage in different kinds of activities for purposes of information searches, utility (calendar, weather, airline reservation, etc.), and entertainment (music, video games, etc.)

User Generated Content

The Internet has proved to be the great equalizer by affording its users the opportunity to generate some of the most important and robust content found on the web. The term *user generated content* (UGC) refers to the idea that the content found on many of today's most widely used Web sites is created by the very consumers who use it. UGC can include a variety of online content such as postings, blogs, videos, customer reviews, discussion forums, photographs, and so forth.⁴¹ As an example, Facebook, YouTube, and Wikipedia are made possible by their many users who input information, photos, or video about themselves or contribute as volunteer specialists about a topic for which they possess an expertise. Clemencia Rodriguez (2010) refers to this as citizen media.⁴² UGC is made possible by a number of technological, social, and economic drivers.⁴³ The combination of high-speed Internet access coupled with various input devices (i.e., laptop computers, smartphones, and tablets) makes the creation and uploading of information ever more accessible. Both social media and EC Web sites strongly encourage its users to input information as well as to comment and react to other postings. Some of the more notable UGC Web sites can be seen in Table 8.2.

Widely Used Apps

It is beyond the scope of this book to consider the tens of thousands of apps that have become part of today's digital media environment. But it may prove helpful to focus our attention on a few select apps that have proved to be real innovators in the

Table 8.2 Notable Examples of User Generated Content

1. Facebook
2. Wikipedia
3. YouTube
4. Trip Advisor
5. Twitter
6. Vacation Rental by Owner
7. LinkedIn
8. Craigslist
9. Blogger
10. Tumblr
11. Angie's List

field of media and communication. One of the ways to gauge the relative success of an app is to look at its national and international ranking as part of the listing service developed by Alexa Internet Inc., which is a California-based subsidiary of Amazon.com. Alexa tracks the browsing behavior of an estimated 30 million Web sites worldwide. The information is stored and analyzed, forming the basis for the company's global ranking system of Internet Web sites. Table 8.3 provides a listing of the top ten Internet Web sites worldwide according to Alexa. Each of the said Web sites has its own equivalent mobile app version. It is interesting to note that most of the examples shown are a combination of information search as well as UGC.

Table 8.3 The Ten Most Widely Used Global Internet Web Sites

1. Google.com	Google is the world's preeminent Internet search engine. The launch of its key word search advertising program in 2001 provided the basic business model that would propel Google forward as a major communications company.
2. Facebook.com	Facebook is the world's preeminent social networking site. Facebook reaches an estimated 1.4 billion users worldwide.
3. YouTube.com	The site is the best known video-sharing Web site. Most of the content featured on YouTube is user generated, which includes video clips, TV clips, music videos, amateur content, and so on.
4. Yahoo.com	The site is internationally recognized for its search engine, Yahoo directory, mail, news, weather, online mapping, and so on.

5. Baidu.com	Baidu is the leading Chinese-language search engine. Baidu offers multimedia content, including more than 740 million web pages, 80 million images, and 10 million multimedia files.
6. Wikipedia.org	Wikipedia is the world's largest online encyclopedia. Wikipedia's contributed articles are written by volunteers around the world, and nearly all of its articles can be edited by anyone with access to the Wikipedia Web site.
7. Twitter.com	Twitter is an online social networking service that enables users to send and read short 140-character text messages, called tweets. Users can access Twitter through smartphones and other mobile devices.
8. Qq.com	Qq.com is China's largest and most-used Internet service portal owned by Tencent, Inc. Today, Qq.com tries to provide its users with one-stop shopping in terms of information search, EC, and so on.
9. Taobao.com	Taobao Marketplace is the preeminent EC site for Chinese consumers. Shoppers choose from a wide range of products and services.
10. Amazon.com	Amazon.com is the world's preeminent EC site. Amazon has redefined online shopping for billions of people worldwide. The value proposition is exchange efficiency that includes selection, convenience, and/or low prices.

SOURCE: Adapted from information presented by Alexa.com.

Wikipedia. A wiki is a piece of server software that allows users to freely create and edit web page content using a simplified mark-up language. A wiki provides the basis for UGC as it allows the contributor to add information to a source page as well as enabling him/her to engage in an open editing process. Wikis are often used to create collaborative Web sites and to promote a sense of collective ownership of Web site information and material. The best-known example of a wiki is Wikipedia, the world's largest online, open-source encyclopedia. Wikipedia was started by Jimmy Wales and Larry Sanger and is operated by the U.S.-based nonprofit group Wikimedia Foundation.⁴⁴ Wikipedia's contributed articles are written by an estimated 100,000 active volunteers around the world working in 270 languages. Nearly all of its articles can be edited by anyone with access to the Wikipedia Web site.

Wikipedia has taken the place of the once important encyclopedia. Wikipedia's ease of access makes it the number one starting point when the user wants to conduct a preliminary search or answer starting questions like "who is" and "what is" about a topic. Critics of Wikipedia, for example, target the Web site's biases and inaccuracies and its policy of favoring consensus over credentials in its editorial process. It should be noted that the *Encyclopedia Britannica*, arguably the best of its kind, ended its last print edition in 2010. Wikipedia raises the specter of the permeability predicament to a whole new level. As writer Andrew Keen (2007) points out,

(Continued)

(Continued)

[Wikipedia] is a press with a peculiar sort of vanity, raising up the amateur to a position of prominence exceeding that of the salaried experts who do what they do for money. Wikipedia claims to be amassing the world's largest real estate of knowledge and yet Wikipedia's readers seem to revel in its very lack of authority.⁴⁵

TripAdvisor. TripAdvisor is a travel Web site providing directory information and consumer reviews of hotels, restaurants, and destination sites throughout the world. TripAdvisor was founded in February 2000 by Langley Steinert, Stephen Kaufer, and several others. TripAdvisor is another example of UGC. On its Web site, TripAdvisor provides its readers with a general comments sheet as well as a standardized rating system per hotel. The reviews provide the basis for an overall rank-ordered rating system of hotels within a given city. In addition, TripAdvisor provides its readers with both professional photographs (supplied by the hotel) as well as user-generated photos.⁴⁶ As one writer put it, TripAdvisor "has become an indispensable part of the social fabric of the traveling process."⁴⁷ A successful rating by TripAdvisor has become an essential marketing tool for hotels wishing to court international visitors. Herein, lies the real power and appeal of TripAdvisor—the ability to provide firsthand observations and experience from those travelers who have stayed at a certain hotel now under consideration by a prospective visitor. TripAdvisor is free to users, who provide most of the content, and the Web site is supported by an advertising business model. In 2004, TripAdvisor was purchased by Interactive Corporation (IAC), parent company to Expedia. IAC spun off its travel group of businesses under the Expedia, Inc. name in August 2005. TripAdvisor has more than 125 million reviews and opinions on more than 3.7 million places to stay, places to eat, and things to do, including more than 775,000 hotels and accommodations, making it the largest travel Web site in the world.⁴⁸

Discussion

From Skype to TripAdvisor, digital lifestyle is about taking the power of intelligent networks and information and making it work in entirely new ways. However, not all changes in the fast unfolding digital economy are for the better. Browsing in an old used book store is a thing of the past. Gone are the days of interesting and sometimes useful conversations with knowledgeable salespeople at the local music store. Both kinds of retail shops are steadily giving way to the vacuum efficiency of Amazon and EC delivery. And likewise, newspapers in the West are struggling with falling circulation and advertising revenues amid the onslaught of Internet-based news. The traditional newspaper is steadily being displaced by the computer tablet. Many readers cannot tell the difference between credible news, sensationalism, and the amateur blog. As Keen (2007) points out, in the era of blogging (and everyone is entitled to my opinion), the Internet celebrates the noble amateur over the expert.

It's sometimes easy for misinformation and rumors to proliferate on the web, where social media touts popularity rather than reliability.⁴⁹ The ever-increasing reliance on new technology has become a catalyst for change, setting into motion a number of unintended consequences. Texting and driving, cell phones going off in restaurants, and Internet cyberbullying are part of the new digital reality. There is no going backward.

Digital lifestyle also brings with it a certain measure of social and technological inequality. Social scientists refer to this as the problem of the *digital divide*. There is a gap that separates different regions of the world with respect to the availability of communication and information technology. As Eric Schmidt and Jared Cohen (2013) point out, in the digital age connectivity takes on a broader meaning than simply creating efficiencies and putting people together. Everyone will derive some benefit from connectivity but not equally.

Soon everyone on earth will be connected. With five billion more people set to join the virtual world, the boom in digital connectivity will bring gains in productivity, health, education, quality of life and myriad other avenues in the physical world—and this will be true for everyone, from the most elite users to those at the base of the economic pyramid. But being “connected” will mean very different things to different people, largely because the problems they have to solve differ so dramatically.⁵⁰

High Tech—High Touch

In his book, *Megatrends*, author John Naisbitt (1982) describes the challenge of trying to find the right balance between the material wonders of technology and the spiritual demands of our human nature. He refers to this as the need for “high tech—high touch.”⁵¹ Great technology and innovation can be a thing of beauty as evidenced by a well-designed Web site or a virtual reality gaming system. High-touch includes activities that keep us in touch with our basic humanity. They link us to our primary self. The effective use of technology and balanced living can be mutually supportive. The field of education is made better by having well-constructed Web sites and e-learning displays that enable classroom instructors to post a class syllabus or reading assignments, engage in online class discussion, provide special contact links for class projects, and so forth. What doesn't change is the responsibility of being a highly motivated and engaged instructor. Nothing takes the place of inspired teaching. Similarly, Facebook provides a high-tech way of sharing information with one's friends, family, and colleagues, but it remains our special obligation to tell stories that are purposeful and worth telling.

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