

Chapter 24: The Crystal Ball

“Like a force of nature, the digital age cannot be denied or stopped. It has four very powerful qualities that will result in its ultimate triumph: decentralizing, globalizing, harmonizing, and empowering.”

Nicholas Negroponte, in “Epilogue [to *Being Digital*]: An Age of Optimism,” at <http://archives.obs-us.com/obs/english/books/nn/ch19epi.htm>.

Prologue

Nicholas Negroponte has the luxury of being a visionary. He also has the comfort of having been right in the past. While acknowledging the problems that may accompany the advance of the digital age, such as intellectual property abuse, invasion of privacy, and digital divides, he emphasizes how positive effects will outweigh negatives. From an economist’s perspective, his vision can be seen as one where better information flows and small-scale technology (shrinking IT devices) together promote decentralization, leading to greater individual sovereignty and a reduction in the sphere of control of national governments. The latter is a component of globalization, as information flows more freely across national boundaries, and of harmonization, as people share ideas and understand each other better (Frances Cairncross expresses much the same vision).

Finally, the greatest impact of the digital age is in its capacity to give people more tools, to empower them. As Negroponte puts it:

“But more than anything, my optimism comes from the empowering nature of being digital. The access, the mobility, and the ability to effect change are what will make the future so different from the present. The information superhighway may be mostly hype today, but it is an understatement about tomorrow. It will exist beyond people’s wildest predictions. As children appropriate a global information resource, and as they discover that only adults need learner’s permits, we are bound to find new hope and dignity in places where very little existed before.”

This chapter, in keeping with the vision of Negroponte and many other commentators on the information age, looks at the future, but from the (more mundane) perspective of an economist. How will different facets of people’s lives change: how they organize work and leisure, how they interact in communities, how they learn, and how they define and control their identities? What are the broad forces of technological change that will drive these processes, and how will they change economic incentives? Examining these questions is the purpose of this chapter.

24.1 Introduction

The future of the Internet, and of the digital age in general, is often the subject of extreme views. Some express great optimism that it will lead to greater peace and harmony. Others see it as exacerbating and magnifying existing inequalities in life opportunities and outcomes. The truth, as is often the case, probably lies somewhere in between. From an economist's perspective, what matters, as usual, is the balance of supply and demand.

As innovation proceeds in many branches of information technology, the costs of storing, processing and transmitting information will continue to fall. The impact of this cannot be overstated. Already, some microprocessors are less expensive than the plastic boxes that they go into as part of the assembly of complete computers. As costs fall, activities become affordable for broader and broader segments of the population, and new activities become feasible as new software is written to make them possible. The precise directions in which falling costs lead us will depend greatly on what people want, whether it is buying books and groceries online, listening to music, chatting, collaborating on work, or other things altogether.

Section 24.2 discusses the nature and types of technological changes that are occurring, and their broad economic consequences. Subsequent sections take up specific facets of our lives, tracing the particular impacts of lower costs and new possibilities in these various dimensions. In Section 24.3, we examine how the nature of offices and work will change. We argue that firms will continue to be important, and need not shrink as IT becomes ever more pervasive. However, firms will be able to operate in a more geographically dispersed, decentralized manner. For knowledge workers, all kinds of physical ties to particular locations will loosen, though contractual employment ties may not.

Section 24.4 looks at parallel changes within the household. We emphasize that, where household routines are bundled and performed by particular family members, or where there is a set division of labor, switching costs may be high for moving activities (bill paying, some kinds of shopping) online. On the other hand, entertainment activities have already tended to be fragmented and individualized due to previous technological advances, and the digitization of all kinds of entertainment content, together with eventual broadband access, will lead to radical changes in delivery mechanisms and patterns of interaction and enjoyment. Online games provide a major instance of how entertainment is changing in the digital age, with the ability to "live" on an ongoing basis in complex virtual worlds.

In Section 24.5, we discuss various kinds of online communities, and contrast them with traditional communities defined more by geography. Lower set-up costs and entry and participation costs mean that more special-purpose communities can flourish online. Easy entry and exit can also mean less stability and depth of commitment, but where individual interests are deep, that acts as a countervailing force. Commercial interests can serve to stabilize and manage online communities, whether they are games players, book buyers, or collectors participating in online auctions.

Section 24.6 outlines some of the possibilities for the future through the use of IT and the Internet for learning. Automation and interactivity greatly increase economies of scale in an industry that has been characterized for millennia as very labor intensive. The Internet also provides great benefits by removing locational constraints for education and training, just as it does for work and play. In a sense, the temporal boundaries between work, play and learning become blurred as geographical constraints are relaxed: people can switch back and forth among these activities without leaving their computer.

Section 24.7 examines the deep issue of identity. Identity online can be varied, giving us the freedom to be fantasy characters as we please. At the same time, it is subject to manipulation, exploitation and theft. Information technology has created the potential for, and reality of, vast databases of personal information. These can be used in positive ways, but also have negative implications and uses. These issues may ultimately be the thorniest ones we face as the digital age evolves. Section 24.8 offers a summary conclusion to the chapter, and to the book.

24.2 Technology and Economics

Information technology will continue to bring down the costs of storing, communicating and processing information. By the time that practical limits are hit in these aspects of IT, the costs will be so low as to make possible new online activities, and to make current activities more widespread. Shopping, collaborating on work, playing and chatting online will all increase or expand in scope and variety.

Basic advances in hardware design and fundamental software that governs the operation of hardware will help costs to continue to fall. For example, there is a tremendous push on to develop more efficient optical switches that can route data sent over optical fiber cables more quickly. These involve a combination of hardware and software innovation. However, for individual and business activities, these kinds of innovation will represent only greater potential. Even if such advances make high-speed Internet connections universally available at a relatively low cost, demand (of households in particular) will be driven chiefly by the people's wants.

For example, individuals must value the convenience and ease of online shopping to switch to it from more familiar routines that have their own advantages. More proven cases involve online chatting and game playing. In these and other examples, specific software must be written for the particular "application" or activity that is to be available online. While infrastructure is relatively standardized, so that a few designs of hardware and associated software will ultimately fill needs, the potential variety in applications is immense. There is no limit, for example, to the number of computer games that can be devised. The importance of variety is particularly relevant for consumer applications related to entertainment, whereas functional applications for households or businesses may again tend to be standardized.

The economic implications of standardization versus variety are as follows. Producing variety in software requires higher development costs, and this might reduce the pace of innovation. On the other hand, if people are willing to pay enough for variety (new games, new music¹), then this can attract enough entrants to counteract the difficulties of innovation. The increased sophistication and automation of software development, as well as the increasing stock of available software, also work to reduce costs. For example, new computer games often use core software (“engines”) from older games. The new game may be differentiated enough in visual features and detailed possibilities, but the abstract structure may be very similar to its ancestor. Developers of application software also benefit from the falling costs of IT infrastructure.

To summarize the points made so far, technological innovation will continue to drive falling costs of IT infrastructure. This increases the potential demand for activities that rely on this infrastructure. The other cost component for enjoying these activities is that of application software. To some extent, the cost of application software is also driven by the same factors, and will also fall. In the case of entertainment, the demand for continued variety and novelty mitigates the impact of falling IT costs.

Aside from falling costs, another technological and economic driver will be increased reliability. Ultimately, of course, reliability can be reduced to an issue of cost: building enough redundancy into IT infrastructure will increase reliability, but also raise costs. From an economic perspective, lack of reliability can be viewed as risk. Risk can be a major impediment to adoption of a new method of doing things. For example, the risk that sensitive information can be stolen over the Internet acts as a significant barrier to e-commerce. As improved security measures are developed, this risk falls, and brings more individuals and businesses online. Reliability of identities and signatures online are related security issues that are tackled with similar methods based on digital encryption (see Chapter 2). The risk of failure of systems, so that information is lost or not available in a timely manner, is another reliability issue. For e-commerce in general, but online financial services in particular, reliability on this front is critical. Again, increasing how reliably complex IT systems work will make online commerce more routine and widespread.

A third driver of changes in how people live, work and play is speed. We can relate speed to cost also, since time has an opportunity cost. Faster downloads, faster calculations, and faster responses are all related to the falling costs of processing, communicating and storing information in digital form. Speed is especially critical in applications such as streaming media, where a smooth flow of audio or video must be maintained. Technology may directly increase speed in such cases, by increasing transfer rates between two components, or may do so indirectly, as when falling storage costs allow information to be stored at more points on the network.

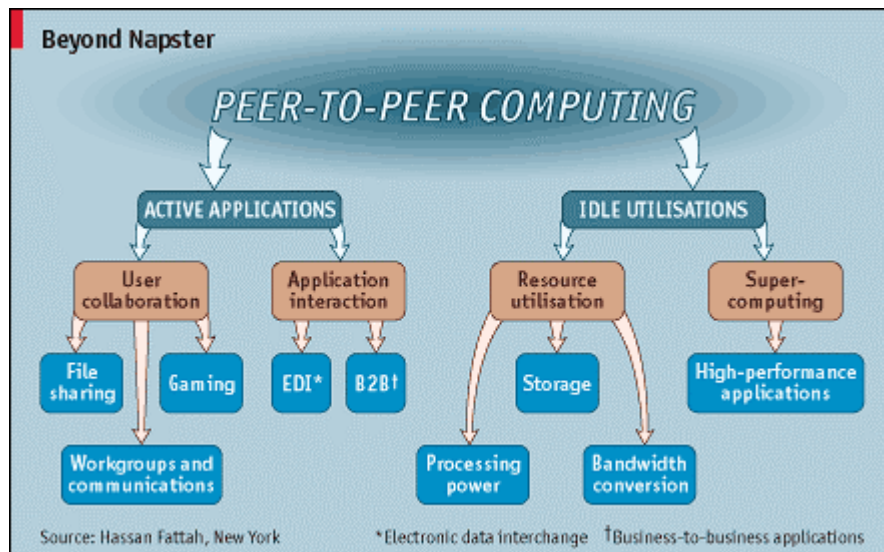
Finally, technological change may make certain kinds of activities possible that were impossible earlier. In many cases, changes here can be viewed in terms of greater

¹ Producing a new song increasingly involves complex manipulation of IT tools.

speed and lower cost, as in the case of e-mail versus traditional postal services. In other cases, the changes may be more fundamental, because the earlier costs were so high as to be prohibitive. For example, dozens of people from all over the world may collaborate on a software project, chat online, or play a computer game together without leaving their homes or offices. Prior to the Internet, such possibilities existed, but were prohibitively costly, unless the distances between the participants' locations were small enough to allow them to assemble in one place.

Many kinds of computations would also be impossible to perform routinely in a timely manner without information technology. For example, any number of stock price charts can be constructed on demand, viewed on the Web, and updated continually. Doing this manually would require so much time as to make them useless as well as prohibitively costly to produce. Peer-to-peer computing (see Figure 24.1), in which the processing power of different computers is linked, or where different machines can share information without mediation by a central server, is an example of how separate innovations in storage, processing and communications can interact with positive feedback.

Figure 24.1: The Uses of Peer-to-Peer Computing



Source: The Economist, June 23 2001, Technology Quarterly Survey, p. 21

Another important example of activities that are feasible but often prohibitively costly is customized online searches. While search engines allow one to perform simple searches by keywords, if one wants to filter the results of the search, organize the information gathered, or otherwise process it, this would typically require considerable extra effort or programming skill. Software agents such as "shopbots" can automate such tasks, gathering and collating price comparison information, for example. These kinds of

“bots” will play an increasing role on the Internet and Web, and may be designed to allow users to have multiple active online personas, much as people now use multiple email addresses and online identities for different kinds of interactions.

A final example of new possibilities for Internet use lies in the realm of access. As the capability to connect to the Internet extends from PCs and laptops to TVs, cell phones, handheld computers, and all kinds of devices, wireless and wired, the range of activities possible will expand. Seemingly far out predictions of intelligent cars and kitchen appliances that can send and receive information over the Internet are becoming reality. Again, one must remember that which uses become common will depend on what people are willing to pay for. If they do not want intelligent refrigerators that order groceries for them, then technological feasibility will not lead to adoption, unless manufacturers force it by bundling in the feature without choice.

Lower costs, greater reliability and speed, and expanded sets of feasible activities are the drivers of changes that will occur in how people live and interact in work and in play. The precise directions in which changes occur will depend on what people value, and what kinds of switching costs they face. Technological change is pulled by perceptions of economic needs, and also often leads to unanticipated consequences for behavior, as it pushes out the frontiers of the possible. Thus predicting the future is like looking into a murky crystal ball, but economics can provide some guidance as to what may happen.

24.3 Office and Work

Information technology and the Internet change what work is done, how it is done, and where. How work is done includes the performance of specific individual tasks, the nature of particular collaborations, and the way in which ongoing work relationships are formally organized (through contracts or within firms). In Chapters 5, 10 and 11 we reviewed some of the economic principles behind the organization of firms, and how the nature of firms is changing through the impact of the Internet and IT in general. We suggested that there are enough reasons why firms will continue to exist, despite increased possibilities for outsourcing. The limiting case of the “virtual corporation” is unlikely to ever be reached, because there are good reasons for firms to act as long run combinations of complementary assets.

From the perspective of workers, firms also provide some risk reduction and bundling roles. Employment contracts provide some degree of income stability, and firms are also able to offer efficient bundles of income and nonpecuniary benefits such as health insurance and retirement plans. While the latter are now more easily available unbundled from jobs, workers may still have good reasons to prefer to be employed with firms, just as firms have good reasons to go on existing.

The bottom line is that, even with further drastic advances in information technology, firms, as organizers of work, will not disappear. Nor is there any indication that they will get smaller, as some writers have argued. There are enough factors

promoting economies of scale and scope, even with advances in information and communications technology. Thus, even though firms may shed “non-core” activities, they will do so through outsourcing to other firms that may provide those services to many such clients, taking advantage of economies of scale themselves.

Of course the Internet does allow some kinds of interactions that are not possible otherwise. Moonlighting – working in outside hours in addition to a regular job – is certainly easier for knowledge workers, since they can advertise online, receive projects, and deliver results with much less physical effort than would otherwise be required. Running a small business is also easier, for similar reasons, and this can lead to some choosing to work for themselves rather than for others. Small retail businesses that are able to shift to the Web may switch from having employees to being one-person operations. If fixed costs are reduced, so that the minimum efficient scale goes down, one can envisage a world where more individuals work independently rather than as employees, but it is difficult to predict that this effect will be major.

At a different, more basic level, what work is done, and how, will clearly change in obvious ways with the advance of IT and the Internet. All kinds of jobs will rely more and more on using information technology, automating previously manual tasks. At the same time, many new kinds of jobs will arise, revolving around the new infrastructure of the Internet: data centers, broadband connections, e-commerce software, and so on. Many of these jobs will be classified as service jobs, continuing a shift away from traditional manufacturing jobs in industrial countries toward services. This prediction is therefore more straightforward.

The location of work will clearly be affected dramatically. Even though workers may still be mainly employees of firms, they may not need to be physically present in the same location. While manufacturing and some kinds of services will always involve physical proximity, much knowledge work can be done at a distance. The Internet (together with the proliferation of access devices) not only allows rich information exchange at a distance between employee and employer, groups of workers can collaborate without being in the same location (see Illustration Box). The technologies underlying such possibilities combine features of the World Wide Web and email to permit structured files to be updated and circulated among collaborators. Zaplet is just one of many firms offering variants of collaborative technologies.

Illustration Box
Web-Based Collaborative Software

Zaplet is an example of a company that offers collaborative software, using Java-based technologies. Here is how they describe some of what they do:

The Zaplet Application Starter Set™ provides ready to use collaborative productivity applications that can be quickly sent as Zaplet appmail [essentially Java applets]. The

Starter Set includes general-purpose applications that address common business tasks and activities, such as sharing files and gathering group input. It also includes examples of applications that can be used for more complex corporate processes, such as forecasting or financial reporting, to complement existing enterprise solutions.

Starter Set applications can be used “as-is” or can be customized by the user at any time by modifying properties, or adding building blocks and pages. The general purpose applications allow users to address common, often ad-hoc activities that occur among project teams and department groups:

Collect and structure feedback.

Use Discussion, Table, and Survey applications to solicit opinions about a topic or document, collect and structure data, and gather feedback.

Share and manage content.

Distribute information, and share and discuss documents and web pages using File Sharing, Inline Document, and Interactive Web Page applications.

Make group decisions.

Use the Poll and File Approval applications to gain consensus, facilitate decision-making, and gather approval on documents. Use Ratings to capture opinions.

Extend existing enterprise solutions.

Provide cross-team, cross-department, and cross-enterprise collaborative capabilities. Zaplet appmail can provide the collaborative functionality and process structure needed to augment existing software solutions for more complex business processes such as customer relationship management, enterprise resource planning, and recruiting management software.

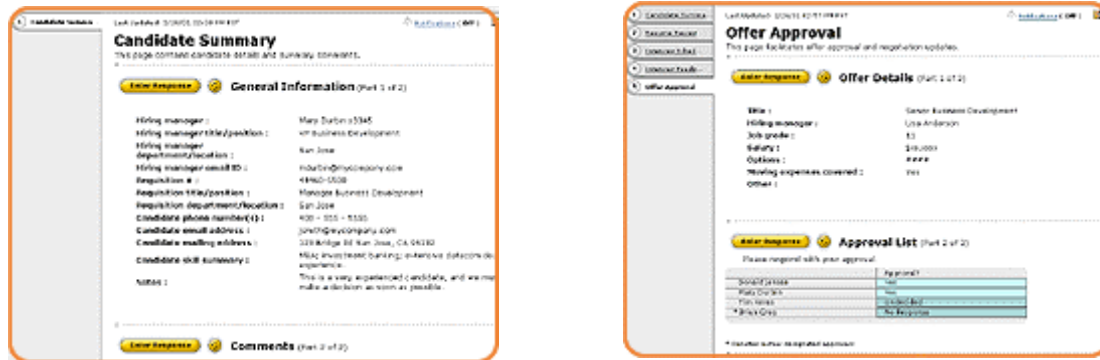
Source: http://www.zaplet.com/products/starter_set.html

In Chapter 21, we emphasized the difference between low and high bandwidth information in the context of job search and matching. Technologies such as those of Zaplet do not tackle the hardest information exchanges, but they offer the possibility of speeding internal business processes associated with recruiting and hiring. For example, six steps in hiring might be:

1. Distribute candidate background
2. Review resume with team
3. Schedule interview
4. Conduct interview
5. Gather interview feedback
6. Approve offer

The Zaplet Recruiting Management Application organizes candidates’ information in one place as they move through the hiring process, speeding steps 1-3, 5 and 6 in the above list, by eliminating the need for meetings, phone calls or emails. Once the application has been sent, it can be adapted to fit the individual process. Figure 24.2 shows hypothetical first and last applet screens in the process. Of course, step 4 still requires old-fashioned face-to-face methods, as discussed in Chapter 21.

Figure 24.2: First and Last Steps in Online Collaboration in Recruiting



We can summarize some of the impacts of IT and the Internet in freeing workers from locational constraints. The most basic effect has been the ability of workers to carry work with them while traveling. Initially, this involved the use of laptop computers. The spread and increased sophistication of email, and the parallel development of the World Wide Web allowed rich communications to occur in addition to individual tasks: files can be emailed back and forth, for example. Large quantities of sensitive business information can now be stored at some headquarters location, and securely accessed remotely, without having to carry it around on portable computers. Beyond simply using remote access while traveling, individuals have been able to perform many bundles of tasks (often constituting entire “jobs”) without going into the office (“telecommuting”), making the “office” anywhere there is a computer and an Internet connection. Work collaborations via the Internet are only the latest, ongoing extension of this process of making location less important for certain kinds of work.

More complex collaborations than the Zaplet example will involve software development, product design and other cases where the key work involves knowledge inputs. All these developments will increase the extent to which teams of workers are freed from the constraints of physical location. Much of this change is incremental, but the overall effect will be to loosen the physical ties of workers and firms. However, this should not be confused with loosening economic or contractual ties, as we have stressed earlier in this section.

24.4 Home and Play

Just as the Internet will not destroy firms, it will not destroy families and households. However, it does offer the potential for increased fragmentation of activities. Any leisure activity that involves a high fixed cost and shared use pushes toward jointness in consumption. The family piano, radio and TV have been successive examples of household entertainment technologies that have initially created new reasons for “togetherness”. Technological changes push down the cost of the “access devices”, as well as making it possible to deliver a much greater variety of content. Hence, radios, TVs and music systems can be purchased in multiple quantities and enjoyed separately by individuals within a household. Information technology offers this possibility to a greater degree than ever before, as costs fall and the variety of available content rises, both seemingly at exponential rates.

Figure 24.3: Yahoo! Games Online



Some household activities have always been divided: it would be inefficient for every household member to participate in all chores, for example, and there has always been some division of labor in multiperson households. Understanding traditional divisions of household chores is important for understanding how activities may change

or not. For example, if the mail is traditionally sorted and assigned by one member of the household, with various bills and personal correspondence being placed in strategic locations for different family members to see, simply shifting some bills online, where they are outside this coordinated process, may meet with resistance. The general purpose PC may be less suitable for this task, until the point is reached where many households have individual Internet access for each member, with home networking. No doubt such scenarios will take hold in the future, but they will be slower in coming than some might expect. Another example of barriers to change is when sets of activities are bundled together, as in the case of grocery shopping and other errands. Until enough of the activities in the bundle can be moved online, it may be difficult to shift just one component of those activities. Again, this means that the challenges of successful supply of online services are considerably greater. Hence, despite the rapidity of technological change, where five or ten years have made an enormous difference in costs and possibilities, fundamental changes in household routines can take a generation or more.

Whereas altering household management and maintenance activities is difficult because they are interlinked, or because they are tied into a particular division of labor, entertainment is more susceptible to change. Going to the movies is unlikely to be tied to shopping. Renting a video may be linked to grocery shopping, but not in a particularly close way. Furthermore, children are often major consumers of entertainment products and services, and their ability to switch to different modes of delivery may be unconstrained by household routines. This is not to suggest that adults are not significant consumers of entertainment – in fact, “adult entertainment” has found a profitable and pervasive niche online.

Staying with more general entertainment, it is clear that some of the most rapid changes in leisure habits are occurring here. Since text, music and video can be digitized, the Internet becomes a prime vehicle for delivery of all kinds of entertainment-related digital content. The only bottleneck lies in the speed of connections that homes have access to. While turmoil in the telecoms industry in 2001 temporarily has slowed down momentum, one can expect that broadband connections will eventually become available and affordable for the great majority of homes in industrialized countries. In addition, the problems of protecting copyright will be dealt with, if not perfectly, certainly at a level sufficient to make digital distribution economically viable (see Chapter 19). One can predict, therefore that the Internet will become the primary means for delivery of and access to entertainment content.

While listening to music and watching videos can be relatively passive and solitary activities, other forms of online entertainment are more interactive. The interaction may be only with a piece of software, as in many computer games, or it may be with other people as well, as is possible with more and more games that can be played online. Interactive entertainment is also a good characterization of online chatting, which has proved to be hugely popular.

Illustration Box What is a Virtual World?

The following information comes from the Ultima Online web site, just one of the many examples of online role-playing games in complex virtual worlds:

Also referred to as a Persistent State World (PSW), a Virtual World is a place you co-inhabit with hundreds of thousands of other people simultaneously. It's persistent in that the world exists independent of your presence, and in that your actions can permanently shape the world. The fact that you exist with other real people from around the globe adds a level of immersion that must be experienced to be believed.

What if you could take on a new persona? One that you could make into anything you wanted. That wasn't limited by physical, economic, or social restraints. That could be anything and everything you ever imagined. If you've ever felt like you wanted to step out of yourself, your life, into one that was full of fantasy and adventure – virtual worlds offer you this opportunity.

In Ultima Online you'll find people from every time zone in the world playing day and night - truly making it an experience like no other. When you log-in to Ultima Online Renaissance, you are not merely playing a game, you are joining a community that spans the globe.

There has yet to be a virtual world that has even come close to the number of things you can do in Ultima Online. There are thousands of items in the game that you can make, buy, or carry and with over dozens of unique skills to master, you'll never run out ways to continuously evolve your character and your online persona.

Thousands of game masters, counselors, interest volunteers and companions are in the game night and day to make sure that the world of Ultima Online stays fresh and exciting.

Source: <http://www.uo.com/visitor/whatisvw.html>

Online game playing involves more than games conventionally thought of as “computer games”. Traditional card, board and tile games are all played online, through portals such as Yahoo!, or through specialized game sites. While games such as bridge, chess and mahjong are supported by advertising revenues, computer games rely on two channels. Some use online play options as ways of increasing sales of games on CDs. Others offer monthly subscriptions, typically in the range of \$10 per month. Games may be the shooting variety, strategy games, or elaborate role-playing fantasy games in numerous choices of complex virtual worlds (see Illustration Box), where players construct characters and build up those characters' lives and experience over many hours of play. Interestingly, at one stage a market developed for characters in some games of this type, as some players were willing to pay to get ahead. Game sites responded by trying to stop such trading, since for many other players it destroyed the pleasure of the game. In effect, trading for such characters created a negative externality for other players.

The powerful basic appeal of virtual worlds means they are likely to continue growing in popularity. While they do not replace real existence for most players, they provide a more intense dose of fantasy and story telling than is possible with any other medium. There can be all kinds of virtual worlds besides the medieval world of Britannia in Ultima Online: futuristic (e.g., Fallout Tactics), cutting across space and time, with their own rules and logic. Individuals can have multiple identities, change identities, and endlessly explore. Once people are freed from ties to mundane reality, there are few limits to the variety of what they can do online. It is an easy prediction that these kinds of online activities will continue to grow rapidly, as they fulfill basic human needs for a few dollars a month!

24.5 Communities

Online games players are one example of communities that exist online. The traditional definition of a community was based on shared location. The Internet has rapidly destroyed distance for all kinds of special interest communities. The players of Ultima Online, for example, live in over 100 different countries. There is no other conceivable way in which hundreds of thousands of individuals from so many different places could interact so effectively and consistently. On-the-fly language translation software overcomes barriers of language in these virtual worlds.

Games players form online communities of interest even if they do not play online. Players of fantasy role-playing board games who prefer face-to-face interaction may still use the Internet to swap news, stories and ideas. Not just games, but all kinds of hobbies and interests become the basis for online communities. The lack of entry barriers, or low costs of entry and exit mean that individuals may explore and change as their interests change. A woman may be part of one online community when she is pregnant, another when she is a mother of a toddler. Low set-up and access costs mean that individuals may belong to multiple online communities to satisfy varied interests. They also imply that sub-communities to satisfy narrower interests are also relatively easy to create. For example, the Ultima Online community includes several subgroups within its virtual world, including the Fishing Council of Britannia, Conservatory of Bardic Arts, and Britannian Order of Woodworkers. These groups have their own privately hosted web sites, where they share specialized information about aspects of the game that interest them.

As is the case with physical communities, online communities try to develop rules of etiquette and other social norms that make life more pleasant for everyone. In chat rooms where there is no controlling authority, strong disapproval from other members may act as a check on objectionable behavior. In cases where there is a moderator on top, the moderator plays a role in managing etiquette problems or norm violations. Using Ultima Online as an example once more, there are explicit admonitions to be polite, avoiding shouting, aggression, and snooping. These are not that different from the norms we observe in our everyday lives. However, here is what the web site advises about looting:

Looting. Also in somewhat poor taste and it can get you killed. Looting the corpse of another player will flag you as gray, marking you as a "criminal", meaning any other players can kill you without repercussion.

This is somewhat different from our daily social norms! Those in charge of the game can formally deal with complaints of harassment online, based on a publicized harassment policy. Derogatory behavior and undue manipulation of game mechanics constitute harassment, but not, of course, player killing and thievery!²

Some online communities are entirely voluntary, focused around entirely around noncommercial interests and motives. In other cases, the formation of the community is essential, at some level, for an activity with commercial implications. People play games for entertainment, but they may also pay for the privilege of belonging to particular game-playing communities. Still other kinds of communities are incidental to, but related nevertheless, to commercial activities. We have discussed in several previous chapters how online firms that provide a service or sell products also try to create communities from their customers, thereby enhancing the value of their offerings, as well as raising switching costs for their customers. Amazon.com and eBay are two well-known examples, of course. Amazon uses customer reviews, and enables book buyers with similar interests to interact and share views and news. EBay offers the same kinds of possibilities for its buyers and sellers, who may often be hobbyists and collectors with shared interests. The value of the firm becomes not only its core offering (books and music, or auction services) but also the community that it creates, mediates and manages.

A final point to note about online communities is that they may vary considerably over time. This is a consequence of low set-up, entry and participation costs. If members of online communities have low investments and low switching costs, their membership may not be deep or long lasting. Furthermore, the greater variety of online options also puts pressure on participation in any one activity, given that time is the ultimate resource constraint ("bots" will not relax this constraint for activities where human participation at some level is the source of the satisfaction!). None of these observations is surprising, nor are they necessarily negative. They are merely consequences of the different economics of online communities.

In 1995, Harvard political scientist Robert Putnam published a celebrated article called, "Bowling Alone: America's Declining Social Capital". He used the decline of league bowling as a symbol of what he argues is the general decline of civic engagement in the US. While there may indeed be some truth to this hypothesis, it is also possible that some forms of community engagement are reappearing in online forms. We have mostly discussed entertainment and hobbies so far as bases for shared interest, but concerns about schools (as parents), the environment (as residents) and public life in general (as citizens) all find expression in online communities, whether these are email lists, electronic bulletin boards, or more formal organizations and endeavors. Again, it is

² According to the policy: "Note that this does not include player killing in Trammel. Trammel was created as a safe land where players cannot harm other players, and violating the intended game mechanics in that area is not considered a valid play style." See http://support.uo.com/gm_9.html.

possible that involvement may become shallower as a result, but the fact that the Internet can dramatically lower participation costs should have positive long-run effects on community creation. Hence America's social capital may not decline as much as is feared, if at all.

Many of the online communities that are formed to deal with serious societal issues, or are extensions of physical efforts, are as global in nature as the Ultima Online gaming community. Religion, politics, and social concerns all find expression online, and while the medium is new, so that participants are still learning how to use it for these purposes, and while low entry barriers can introduce undesirable elements, the Internet represents a tremendous potential for promoting individual and social expression. Certainly, the global communities of interest include dissident groups that challenge dictatorships and attempted monopolies of information. These are all developments that will continue to thrive, and affect global politics dramatically in the long run, if our crystal ball is clear enough!

24.6 Learning

Over the broad sweep of history, education has increased in terms of length and the breadth of availability. Literacy was once the preserve of priests and pundits, but is now something that is considered to be a basic human right. Nevertheless, a large fraction of the world's population is illiterate. This is in stark contrast to the frontiers of education, which now push out to life-long research positions, where individuals can spend their whole lives adding to their knowledge, and reaping the benefits of those additions.

At whatever level one considers learning, it is clear that the Internet and Web will lead to profound long-run changes in how education is supplied and demanded. Fundamental economic problems of delivery of learning have included high fixed and variable costs. Information technology used in online learning has the potential to bring these costs down by an order of magnitude. If one computer can provide access to the material in thousands of textbooks, offer programmed lessons, and opportunities for exploration that would be impossible otherwise, the possibilities are vast for making education available to many who now have little or no opportunity (see Illustration Box and Figure 24.4).

The hole-in-the-wall computer is only an experiment, and an extreme case, but it shows what is possible. At different levels, students in countries all over the world can use the Internet to learn more effectively, to get a lower-cost education, and to continue learning while they work to support themselves and their families. We discussed some of the details of these possibilities in Chapter 21. In the future, these opportunities will grow. Universities and schools will themselves be able to use the new technologies to enhance their offerings, but new entrants into the education and training industry will thrive on people's demand for learning. If anything, this is as basic a need of human beings as the kinds of entertainment we discussed in a previous section. In most cases, the technologies to provide large-scale education in a form that satisfies how people

naturally learn (interactively, through experimentation, and at individual paces with varying breaks) have not been available. Information technology changes that, and the Internet provides the delivery mechanism. Teachers will never be replaced, but their role will change, and will be substantially complemented by automated processes governed by software.

Illustration Box

The Hole-in-the-Wall Experiment

What if you put a computer in a hole in a wall near a slum? And do nothing else. Sounds silly. But the results were remarkable. Here is the description of the first of such experiments, in a suburb of New Delhi, in India:

The Kalkaji experiment

The experiment was the first of its kind, started in early 1999, when a computer was placed at the outside boundary wall of Kalkaji offices of NIIT [National Institute of Information Technology] in New Delhi. The computer was accessible from the outside through an opening in the boundary wall and therefore, the name "Hole-In-The-Wall". The idea behind conducting this experiment was to see whether there would be people interested in using an unmanned Internet based kiosk out in the open, without any instructions. And secondly, to ascertain whether an unmanned kiosk can be operational without any supervision in an outdoor location. The wall where the computer was placed is adjacent to a slum. This slum has a number of children ranging from 0-18 years, some of who do not go to school and a few, who do, go to government schools. However, these schools lack resources, good teachers and student motivation. These children are not particularly familiar with the English language.

The results of the experiment have been quite exciting. Within three months of opening up the Internet kiosk to the public, it was found that the children, mostly from the slum, had achieved a certain level of computer skills without any planned instructional intervention. They were able to browse the Internet, download songs, go to cartoon sites, work on MS Paint. They even invented their own vocabulary to define terms on the computer, for example, "sui" (needle) for the cursor, "channels" for websites and "damru" (Shiva's drum) for the hourglass (busy) symbol. By the fourth month, the children were able to discover and accomplish tasks like creating folders, cutting and pasting, creating shortcuts, moving/resizing windows and using MS Word to create short messages that too in the absence of keyboard. When the issue of whether the kiosk should be removed from the boundary wall arose, the children strongly opposed to the idea. The parents also felt that the computer was good for their children. The kiosk continues to be operational till today with approximately eighty children are using it per day.

Source: <http://www.niitholeinthewall.com/>

Figure 24.4: The Hole-in-the-Wall Computer



24.7 Identity

In Chapter 14, we examined issues of online identity and privacy from the practical viewpoint of firms trying to estimate the different willingnesses to pay of different types of consumers. We noted that information technology in general makes it possible for large databases of information on individuals and households to be compiled and used, with the Internet and Web providing a particularly efficient, and perhaps insidious way to gather information. We noted that the level of anonymity on the Internet is much lower than many people believe. While services such as those offered by Anonymizer.com (see Figure 24.5) provide protection in some areas, many people are more concerned about how personal information (necessary for e-commerce) that they provide to firms is used. The issues of concern go beyond simple privacy, to crimes such as fraud and identity theft. In Chapter 22, we examined some recent government debates and responses to these kinds of online privacy and identity concerns, in the context of the United States.

The flip side of the issue of protecting one's "real" identity from intrusion and theft is the ability to create new identities online. This extends beyond using different email addresses and aliases in chat rooms, to creating complete virtual identities online. The latter capability is harmless in the context of an online fantasy game such as Ultima Online, but obviously can lead to problems where used for deception or fraud. In the long run, the use of virtual identities will increase, as people use software "bots" for automated search tasks on the Internet. One can imagine bots designed to interact and learn about each other, much as intermediaries might have acted between courtly lovers in medieval times.

A final issue with respect to identity is that of management of information and authentication of identities. Consumers may find it difficult to keep track of passwords, logins, and information that they provide to sellers of products and services, and yet sellers need some way of authentication. Our offline identities include names, addresses,

phone numbers, credit card numbers, and social security numbers. Services such as Microsoft's "Passport" authentication service offer a single sign-in service that gives consumers a key for multiple Web sites. While this approach provides convenience and assurance, it gives Microsoft excessive control of consumer communications. In addition, Microsoft appears to be trying to use its operating system monopoly to speed adoption of Passport. The concern in this case is that consumer information becomes concentrated in the hands of a large firm.

Figure 24.5: Anonymous Web Surfing



Personal information floating around in cyberspace, or concentrated in the databases of large firms, problems of authenticating identities, protecting them from theft or distortion, use of identifying information in inappropriate ways – these are all serious issues of the information age. In some sense, the genie is out of the bottle – there is no way we can return to a world where identities are purely local and personal information is known only by those who know you personally. The best outcome will be one where individuals are able to control their personal information as much as possible, and where organizations, whether public or private, are restricted in the kinds of personal information they can collect and store. Intermediaries may well arise to help individuals manage the control and release of personal information, as in Hagel and Singer's

conception of infomediaries (Chapter 10). At the same time, these infomediaries themselves must establish trust, since they will control sensitive information. Individuals may prefer, and ultimately have access to automated, decentralized means of managing their identity information, but they may need infomediaries to provide some authentication role.

24.8 Conclusion

Electronic information technology and the Internet are the latest, most dramatic step in a process of increased human capabilities to store, process and transmit information – think about writing, printing, photography and double entry bookkeeping as precursors of the kinds of changes we are witnessing now. In the long run, the lower cost of sharing information has always seemed to lead to better social outcomes, destroying knowledge monopolies and improving human capabilities. None of these effects is automatic – exclusion of groups from access to new technologies and their benefits can hurt them in absolute as well as relative terms. Furthermore, change is always accompanied by some disruption and new problems, with their attendant costs. Technology does not provide solutions here either. Nevertheless, social organization does seem to adapt, and information technology may be one of the more benign innovations in human history. If so, the digital age is rightly an Age of Optimism.

Summary

- Lower costs, greater reliability and speed, and expanded sets of feasible activities are the drivers of changes that will occur in how people live and interact in work and in play.
- Internet-based communication and collaboration will free many workers and firms from the constraints of physical location. This should not be confused with loosening economic or contractual ties: firms will continue to thrive as organizers or work.
- Household maintenance and management routines will move online only when they overcome current methods of bundling or dividing up chores. Entertainment is already more individualized, and digital content will mostly move online when there is widespread broadband access for households.
- Lower set-up costs and entry and participation costs mean that more special-purpose communities can flourish online. Easy entry and exit can also mean less stability and depth of commitment. Commercial interests can serve to stabilize and manage online communities.
- The automation and interactivity associated with IT greatly increase economies of scale in the provision of education and training. The Internet also provides great benefits by removing locational constraints for education and training, just as it does for work and play.
- Personal information floating around in cyberspace, or concentrated in the databases of large firms, problems of authenticating identities, protecting them from theft or

distortion, use of identifying information in inappropriate ways are among the most serious issues of the information age, with partial solutions but no perfect answers.

Questions

1. We may think of the separations between work, play and learning as determined by fixed costs in supply and on the demand side. Explain this statement, and suggest what happens as the fixed costs go down. Give examples.
2. It is conceivable that one could create multiple online identities, for various purposes, from shopping to work to play. Some of these identities could be linked to facets of one's real identity, while others could be unconnected. What would be the advantages and disadvantages of such a world?
3. What are potential difficulties or bottlenecks in bringing the potential benefits of the digital age to the majority of the world's population? Are they technological, economic, or political problems?