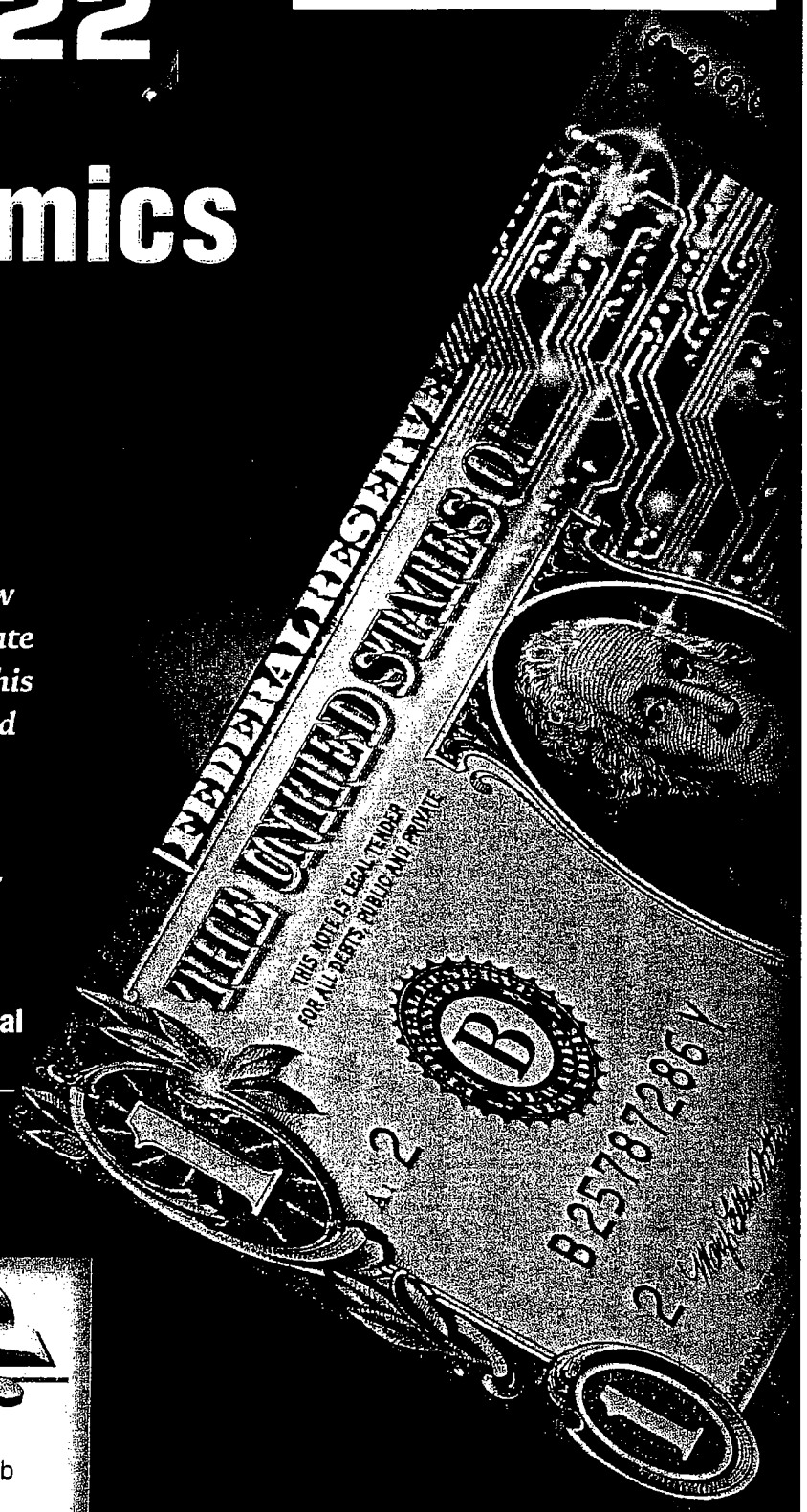
CHAPTER 22

Cybernomics



Why It's Important

Electronic communications enable us to access information, purchase goods and services, and share ideas instantly around the globe. New technologies continue to accelerate the rate of economic change. This chapter will help you understand the new economic environment.

To learn more about how cybernomics affects economic theory and practice, view the **Economics & You** *Chapter 28 video lesson:* **Technological and Social Change and the Economy**

ECONOMICS Online

Chapter Overview Visit the *Economics Today and Tomorrow* Web site at ett.glencoe.com and click on ***Chapter 22—Chapter Overviews*** to preview chapter information.

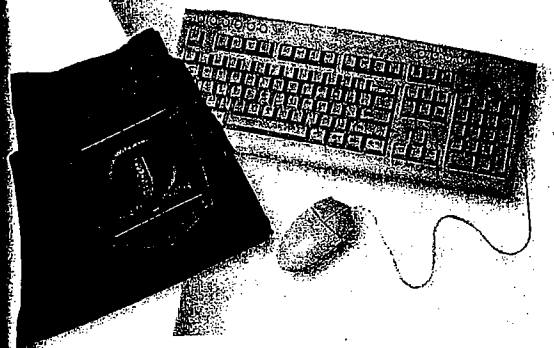
SECTION 1

The Growth of E-Commerce

COVER STORY

BUSINESS WEEK, MARCH 22, 1999

In certain Levi Strauss & Co. stores, you can plug in your measurements at a Web kiosk and have custom-made jeans delivered to your home in about two weeks. On cable-TV's Disney Channel, little bug-like creatures called Zoogs tell kids to log onto Disney's Web site to send fan mail to their favorite stars. What is going on here? Both cases illustrate a combination of traditional and cyberspace marketing.



READER'S GUIDE

Terms to Know

- microchip
- cybernomics
- Internet
- World Wide Web
- Web sites
- e-commerce
- frequency marketing

Reading Objectives

1. How is the Internet affecting the way companies do business?
2. Why are marketers collecting information about your purchases?
3. How does e-commerce benefit the consumer?

Most people have 20 digits, better known as fingers and toes. Numbers, also called digits, are so vital to our lives today that people have labeled our era "the digital age." We identify ourselves by credit card numbers, PINs (personal identification numbers), and Social Security numbers. Numbers measure and track everything from blood pressure to national opinion, from personal checking accounts to the federal debt.

The invention that brought us the digital age also helps institutions manage all this information. The **microchip,** or integrated circuit—smaller than a thumbnail—is one of the most remarkable inventions of our lifetime. This chapter will explain

microchip: *a tiny electronic circuit that processes and digitally transfers information*

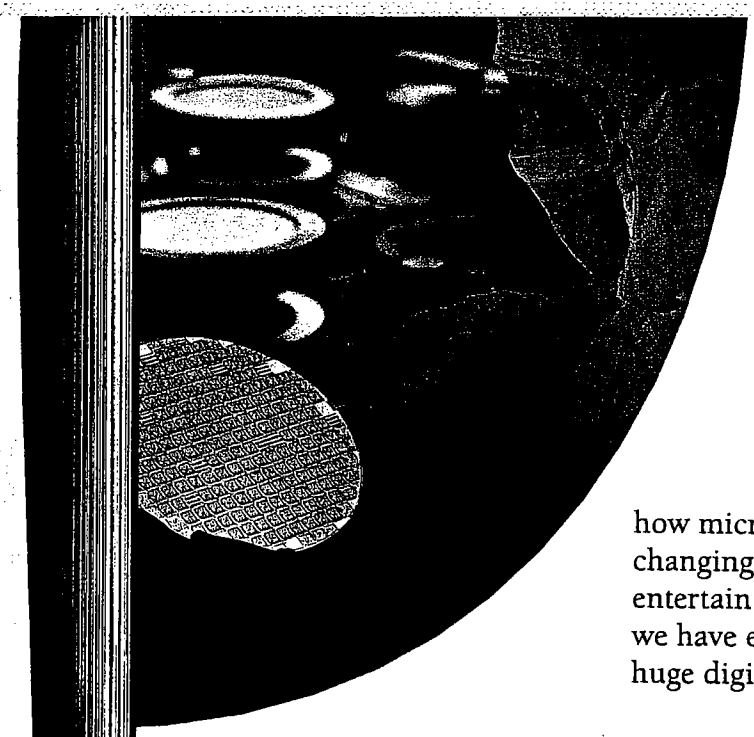


FIGURE 22.1

Microchips Microchips, the building blocks of our electronic age, are made up of tiny rectangles of silicon circuits constructed with thousands, perhaps millions, of transistors. An electronic marketplace is made possible by millions of microchips, shown being manufactured here. ***Why is our economy sometimes called a "digital economy"?***

how microchips in a network of interconnected computers are changing how we communicate, produce, consume, educate, and entertain ourselves. See **Figure 22.1.** Some economists believe we have entered the age of **cybernomics**—economics driven by a huge digital machine, the Internet.

cybernomics: *an economic system driven by Internet commerce*

Internet: *a worldwide system of interconnected computers that store, process, and share information*

World Wide Web: *part of the Internet, used for communications among consumers, business, governments, and other organizations*

Web sites: *electronic World Wide Web locations that store information to be viewed or downloaded*

Business on the Internet

The **Internet** is a network of computers that enables people everywhere to access and exchange information instantaneously. Its growth has been remarkable. **Figure 22.2** shows how the spread of computer and Internet use compares to the spread of earlier technologies.

Use of the Internet accelerated as the prices of computers and Internet access fell. Meanwhile, the store of information on the **World Wide Web**—the most popular use of the Internet—grew both in the amount of information available and the number of Web sites. **Web sites** are electronic locations on the World Wide Web that store information which may be viewed or downloaded onto another computer.

E-Commerce Web sites connecting businesses, private organizations, government offices, and educational institutions make locating information and global communication extraordinarily easy. The Internet provides businesses in particular with the opportunity to directly reach suppliers and consumers. By 2010 e-commerce is expected to bring in revenues of more than $1 trillion in the United States alone. No one really knows just how quickly this market will continue to develop.

The entire business landscape is changing. Companies that have painstakingly built their supply chains suddenly find that anyone using the Web can bypass their chains. New companies spring up nearly overnight, competing with well-known businesses that have spent years building their customer bases. *Business Week*

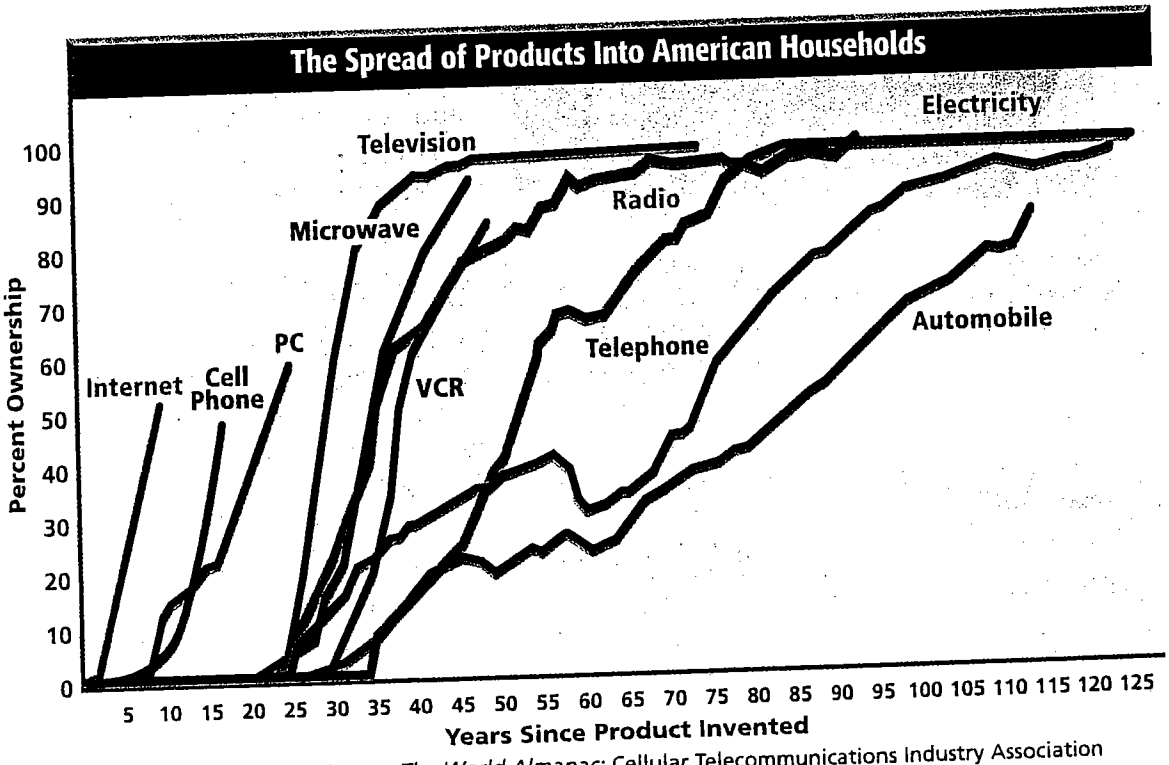
magazine called **e-commerce,** or electronic business, "perhaps the most sweeping transformation of the corporate landscape in decades."

e-commerce: *electronic commerce on the Internet (also referred to as e-business)*

E-commerce is both enticing and risky. Companies with intelligent e-commerce plans can reap huge profits, while less thoughtful business planners may waste billions of dollars and precious time. Planners must decide among a bewildering array of possible business models. Various combinations of advertising, subscriptions, commissions, fees, and direct sales can generate increased electronic business revenue—or cause huge losses. What works well for one company may be the wrong choice for another. Competition is fierce because both the market and the competitors encompass the whole world.

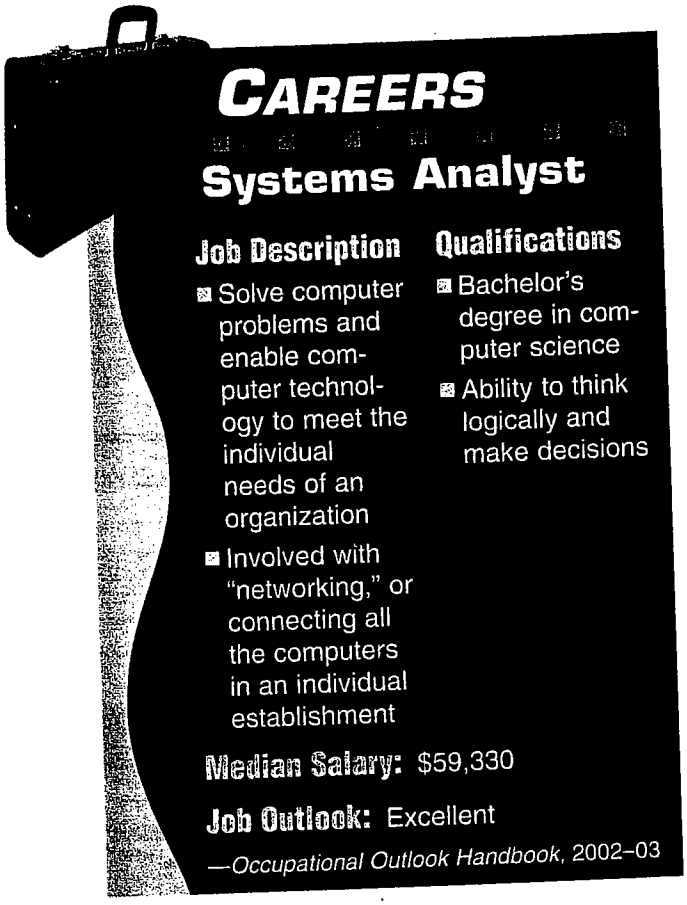
FIGURE 22.2

Spread of Technology It took about 95 years for 90 percent of American households to own a telephone. ***About how long did it take for 30 percent of American households to own an automobile? A television? A personal computer?***



Sources: Bureau of the Census; *The World Almanac;* Cellular Telecommunications Industry Association

By the late 1990s, many businesses began to realize that they really did not have a choice whether to go online. A competitor on the Web could grab customers, causing investors to flock to the more innovative company and sending the rival company's stock into a tailspin.



The Customer Wins

Whether it is a business-to-business transaction or a retail sale, e-commerce shifts the balance of power to the customer. This happens because the Web reduces distances. Instead of spending hours driving around comparison shopping, a Web shopper can quickly gather information about products and vendors almost anywhere.

Businesses have found that the virtual distance between producers and consumers has disappeared. In this new world of cybernomics, the buyer is ruler. If one seller cannot deliver a superior product at a competitive price in real time, another seller will. The realization that any business can directly reach a final consumer is changing the relationships among producers, wholesalers, distributors, retailers, and consumers. Buyers are driving this change, skipping agents, dealers, and distributors to deal directly with producers.

A Marketing Revolution

Technology is generating a marketing revolution. Many producers are bypassing regular channels of trade and reaching out to customers directly. Dell Computer, for example, grew twice as fast as other personal computer manufacturers by allowing buyers to customize their own PCs online.

frequency marketing: *marketing directed by stored information about the frequency of a customer's use of a product*

Marketing Changes Today computers help companies serve consumers through **frequency marketing.** By tracking our purchases, company computers determine what we want and how often we want it. Marketers can then use such information stored in databases to build customer loyalty by providing the precise goods and services we demand. For example, Amazon.com's Web

site automatically suggests a list of books based on the types of books the customer ordered the last time he or she visited the site. More than ever before, marketing is consumer driven.

Cybercommunities Is e-commerce a new kind of self-service that creates an impersonal relationship between buyer and seller? Not necessarily. Savvy Web managers are finding that the best way to build a customer base is to establish a cybercommunity. People around the world are beginning to associate in virtual communities on the Web. Assembling people with common interests and needs, and serving those needs, is the new direction for businesses, especially those that add a personal touch to selling. Companies are also developing creative ways of responding to customer E-mail, providing answers to questions, and offering customers technical assistance.

For example, The Home Depot has become a virtual service provider as well as a store that offers home supplies. It gives small contractors access to its Web site where they can order materials, tell the supplier when and where to deliver them, find a plumber or an electrician, and learn how to schedule work.

Practice and **assess** key skills with ***Skillbuilder Interactive Workbook, Level 2.***

SECTION 1 Assessment

Understanding Key Terms

1. **Define** microchip, cybernomics, Internet, World Wide Web, Web sites, e-commerce, frequency marketing.

Reviewing Objectives

2. Analyze how the Internet is affecting the way companies do business.
3. Why are marketers collecting information about your purchases?
4. **Graphic Organizer** Create a diagram like the one below to explain how e-commerce benefits the consumer.

Applying Economic Concepts

5. **Market Structure** E-commerce has helped the consumer in many ways, particularly by reducing the time it takes to comparison shop. Another benefit is lower prices. Why is it less likely that businesses can control the prices of goods or services when they sell on the Internet?

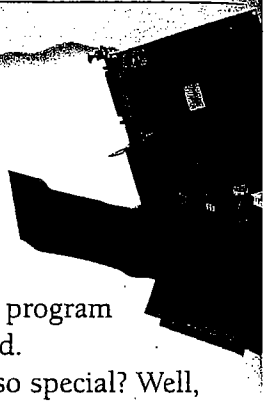
Critical Thinking Activity

6. **Making Comparisons** Select three well-known retail stores in which you have shopped. Search the Internet to find out if they are using the Web for advertising, promotions, or sales services. Make a chart rating the Internet services for all three. Share your chart with the rest of the class.

BusinessWeek

SPOTLIGHT ON THE ECONOMY

Chips That Mimic the Human Senses



Check It Out! In this chapter you learned how computers, using microchips, are affecting industry, commerce, and economic choices. In this article, read to learn how digital-signal processing chips will soon affect the convergence of computers, telecommunications, and consumer electronics.

You may not have realized it, but you've probably used digital-signal processing chips a dozen times today. Listening to a compact-disk over breakfast was one instance. So was using a modem to check your E-mail. Driving your car involved several electronic systems powered by these specialized chips. They are also found in cell phones, personal-computer sound systems, digital cameras—and the list goes on.

But that's nothing compared with what's coming. Industry experts predict that by 2005, the convergence of computers, telecommunications, and consumer electronics will push demand for digital-signal processing (DSP) to 10 times what it is today. These chips will then be at the heart of almost every electronic gadget you touch, from new stereo systems and smart home appliances to office machines and factory equipment. DSP chips that can understand speech will replace touchpads and push-buttons on all kinds of products—including VCRs that you can program by telling them what to record.

What makes these chips so special? Well, DSP could stand for digital sensory perception, because these slices of silicon are the nerve cells that connect electronic devices to the real world. They're honed to deal with things like sounds, images, pressure, temperature, electrical currents, and radio waves. They chop these analog signals into digital bits, then perform specialized operations, such as compressing the bits gushing through telephone lines. And they do this at blinding speed.

Think About It

1. **What will cause the demand for DSP chips to increase dramatically in the next few years?**
2. **Why, according to the article, could DSP stand for digital sensory perception?**

SECTION 2

A New Economy?

Cover Story

The Boston Globe, June 25, 2003

The question . . . is whether the political, business, and civic communities can cooperate with the universities to deliver the maximum benefit. . . . The stakes are clear. In the new global economy, the key to global success is knowledge. The asset with the greatest leverage in a knowledge economy is the modern research university, an asset Greater Boston possesses in abundance.

. . . [Boston] universities actually added jobs in the last two years, a claim no other sector can make.

Reader's Guide

Terms to Know

- telecommunications
- Information Age
- knowledge economy
- weightless economy
- innovation

Reading Objectives

1. What changes caused the new environment called the Information Age?
2. How does the knowledge economy differ from the industrial economy?
3. How does innovation affect economic growth?

During the nineteenth century, the Industrial Revolution began to dramatically change society, especially in the Western world. The introduction of steam power produced both a social and economic revolution.

In the 1900s, discoveries and inventions in **telecommunications,** or electronic communications, brought us radio, television, satellite uplinks, and cable access. The computer revolutionized information storage and manipulation. When telecommunications and computer technologies began to merge, the immediate results were dramatic. Will the new environment, now being called the **Information Age,** have as great an effect on human life as did the Industrial Revolution? Many people believe it will.

telecommunications: *communications over long distances, assisted by technology*

Information Age: *the period when telecommunications and computer technology gave information significant economic value*

Global *Economy*

Web Site Challenges

Although the United States leads the world in Internet usage, many American companies face cultural, legal, and linguistic challenges in setting up Web sites in other countries. Experts note that many Europeans feel that American sites have too many distracting "bells and whistles." European sites are more plain and consumer-oriented. Something as simple as the colors used on the Web sites could turn off users. In America, for example, red is the color of love. In Spain, however, it is associated with socialism. ■

The Knowledge Economy

New terms are springing up to describe the economic changes that we see today. The **"knowledge economy"** and the **"weightless economy"** describe an environment in which ideas and information are at least as valuable as more tangible goods. There are many elements in this new economy: information and communications technology; intellectual property, such as patents and brand names; technical information, such as biotechnology and engineering; and stored data in libraries, databases, and videos.

knowledge economy: *economy in which information is the key to growth*

weightless economy: *term coined to identify an economy based on products that are not tangible*

Knowledge Products What are the differences between the knowledge economy and the industrial economy? First, knowledge products are not used up physically by consumers. Unlike a candy bar or a pair of shoes, computer software is not consumed by use. In fact, the more often it is used, the more valuable it may be to the consumer.

Second, a knowledge product knows no spatial boundary or geographical distance. Two people on opposite sides of the globe can simultaneously be using the same software transmitted by a satellite circling high above the earth. Third, knowledge products consist of both the product and the idea behind it. When you buy a database program, for example, you are purchasing both the disk (the product) as well as the computer programming that allows you to organize your data into fields and records (the idea).

Finally, the development of knowledge products requires creative minds and highly trained technicians. After the prototype or original is built, however, thousands of copies are easily and cheaply reproduced.

ECONOMICS *Online*

Student Web Activity Visit the *Economics Today and Tomorrow* Web site at ett.glencoe.com and click on ***Chapter 22—Student Web Activities*** to learn more about the knowledge economy.

A Change or a Revolution?

A number of leading economists believe that the "new" economy is not really so revolutionary. They believe that other factors, such as shifts in the labor market and declining wages, explain why the United States

had fuller employment without inflation in the 1990s. They point out that periods of rapid growth in productivity have generally accompanied fundamental innovations. The harnessing of electricity and the inventions of the automobile, radio, and television each spurred a period of expansion, for example.

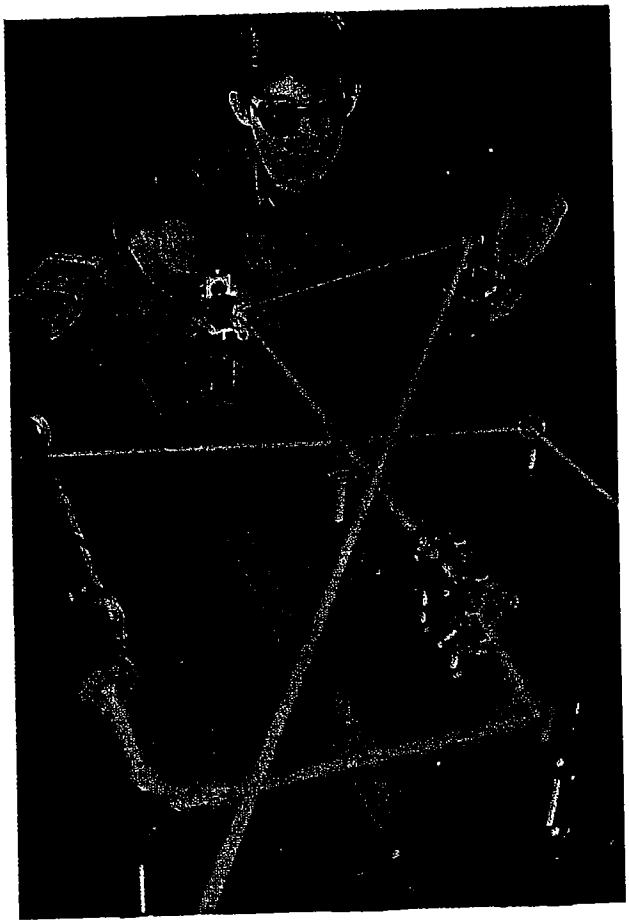
Most economists do agree that innovation is a significant factor in the world's changing economy. **Innovation** is the introduction of new products and/or delivery systems that dramatically affect large segments of the population. See **Figure 22.3.**

innovation: *development of new products, systems, or processes that have wide-ranging effects*

Waves of Innovation For years economists assumed that the output of an economy could be measured by the effect of two basic inputs—capital and labor. The exception was the law of diminishing returns—at some point adding more inputs gave a smaller and smaller increase. Yet, this explanation did not account for several large bursts of economic growth during certain periods of history. Until recently, economists had not included innovation in their equation of economic output. Innovation intrigues economists because it can affect national growth and GDP in unpredictable ways. For instance, who would have guessed before 1920 that the automobile would change America's economic and social environment the way that it did?

FIGURE 22.3

Innovation Highly trained technicians create products that contribute to a growing economy. ***How do innovations affect economic growth?***

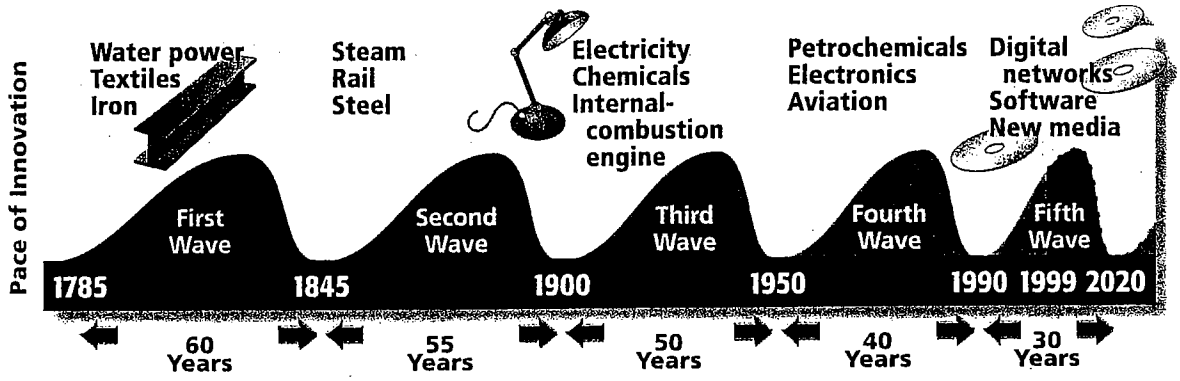


Schumpeter Cycles Economist Joseph Schumpeter was the first to suggest that a normal healthy economy would never be in equilibrium because entrepreneurs would sometimes disrupt it by innovations. Schumpeter studied the history of long business cycles and concluded that each new cycle starts when a set of innovations comes into general use. Each upswing stimulates investment and expansion, as shown in **Figure 22.4** on page 574.

The significance of the knowledge economy may be measured by its effect on individuals and nations. Information and communications technology firms are the growth leaders in the United States economy. The Bureau of Labor Statistics forecasts that computer-related jobs will average more than a 70 percent increase in a ten-year period. Whether the "new economy" is really revolutionary or simply the old economy plus the innovation factor, however, economists today face compelling challenges. You will learn more about these challenges in Section 3.

FIGURE 22.4

Schumpeter's Waves Schumpeter's waves or cycles included the innovations of waterpower for producing textiles (1785); the age of steam locomotives (1845); and the introduction of electricity accompanied by the internal-combustion engine (1900). After he died in 1950, other economists using Schumpeter's model added two more waves–the age of petrochemicals, electronics, and aviation (1950) and the current convergence of telecommunications and computers (1990).



Practice and **assess** key skills with ***Skillbuilder Interactive Workbook, Level 2.***

SECTION 2 Assessment

Understanding Key Terms

1. **Define** telecommunications, Information Age, knowledge economy, weightless economy, innovation.

Reviewing Objectives

2. What changes caused the new environment called the Information Age?
3. How does the knowledge economy differ from the industrial economy?
4. **Graphic Organizer** Create a chart like the one below, then list and give examples of "products" of the knowledge economy.

Knowledge Product	Example(s)

5. How does innovation affect economic growth?

Applying Economic Concepts

6. **Knowledge Economy** What evidence suggests that the knowledge economy will have a significant impact on United States GDP?

Critical Thinking Activity

7. **Drawing Conclusions** Develop a questionnaire concerning the significance of the knowledge economy to your future. For example, you might ask such questions as: How will the knowledge economy affect career choices in the future? How will it affect entertainment and transportation? Survey your classmates with the questionnaire, then enter the results into a database. What conclusions can you draw from the responses you received?

Evaluating Primary and Secondary Sources

Primary sources *are original records of events made by people who witnessed them. They include letters, journals, legal documents, drawings, photographs, and artifacts.* Secondary sources *are documents created after an event occurred. They pull together many sources and provide an overview of events.*

- Identify the author of the document.
- Identify when and where the document was written.
- Read the document for its content.
- Identify the author's opinions and bias.
- Determine what kind of information the document provides and what is missing.

LEARNING THE SKILL

To interpret primary and secondary sources, follow the steps listed on the left.

PRACTICING THE SKILL

Read these excerpts about the Chicago World's Fair of 1893, then answer the questions below.

"The Fair helped change Americans' reactions to technology. It became the vehicle for the hopes and dreams of Americans, as they saw in it a reflection of their own progressive nature and bright future. . . . Visitors were meant to see that one of the most potent agents of change in their society–electricity–was not to be feared, but celebrated."
–*World's Columbian Exposition*, xroads.virginia.edu

"Men who . . . had never touched an electric battery–never talked through a telephone, and had not the shadow of a notion what amount of force was meant by a watt . . . had no choice but to sit down on the steps . . . ashamed of [our] childlike ignorance. . . . Chicago asked in 1893 for the first time the question whether the American people knew where they were driving."
–Henry Adams, *The Education of Henry Adams*, 1907

1. Which document is a primary source? Why?
2. Which document is a secondary source? Why?
3. How does each source view technology?

APPLICATION ACTIVITY

Look through the letters to the editor in your local newspaper. Summarize any primary sources cited.

Practice and **assess** key skills with ***Skillbuilder Interactive Workbook, Level 2.***

SECTION 3

Issues in Cybernomics

Reader's Guide

Terms to Know

- day trading
- intellectual property
- consumer-credit laws
- distance education

Reading Objectives

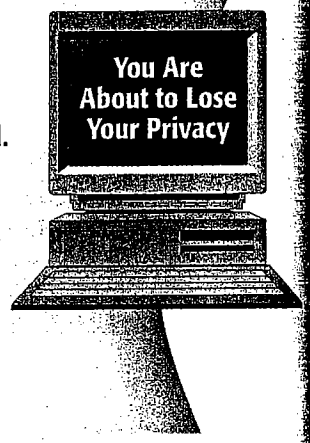
1. Why is some trading on the Internet considered risky?
2. How is intellectual property being stolen?
3. What is being done to protect consumers' privacy?

Cover Story

The Capital Times & Wisonsin State Journal, July 3, 2003

American consumers fundamentally misunderstand how Internet companies use their personal information, according to a new survey that concludes tougher federal privacy laws are needed. The study . . . said 86 percent of surveyed adults believe companies should be required by law to standardize the promises they make on Web sites about how personal information will be protected.

The findings renewed demands for fresh U.S. privacy laws even as the threat of terrorism and heightened security to meet it have supplanted privacy as a cornerstone for technology policy debates in Washington.



Today's policy makers face momentous issues that will determine our future economic environment. Many of these issues are the result of rapidly changing technology.

Ensuring Safe Internet Trade

The Internet has reduced the cost of entry for companies willing to sell goods electronically. Little or no inventory, a small staff, and a modest outlay of capital for the server is all it takes to start a business. How can you trust startup companies that you know only through the Internet? Internet users themselves may provide the best answer. Because of the ease of communication,

news of unscrupulous dealings spreads rapidly across the Web and into the electronic media.

One of the fastest-growing forms of online trade is in securities, because electronic brokers have substantially lowered the cost of such trade. Securities trading on the Internet can be very risky, however. The urge to gamble by purchasing stock online has led people into financial trouble.

The term that describes rapid stock trading going on in cyberspace is **day trading.** Unlike brokerage firms, day-trading firms do not really execute customer trades. Instead they set up Internet connections and computers that let the clients come to their "offices" and trade among themselves. Day-trading firms get a commission on all sales, so they encourage people to make trades.

day trading: *buying and selling securities directly over the Internet*

Some people make money day trading. Many others, however, lose money fast. The Securities and Exchange Commission receives hundreds of complaints about online investing, including those of discouraged small investors who lost student loan money or retirement funds. The government must balance the consumer's right to a free market with the need for consumer protection.

Protecting Intellectual Property

Copyright laws are supposed to protect **intellectual property**—a creation whose source is someone's intellect, rather than physical property. Recorded music is an example of intellectual property that has been difficult to protect. Pirating of recorded CDs has been widespread. Some people pirate intellectual property for profit, while other Internet users share software and music at no charge.

intellectual property: *creations of a person's intellect that are protected by copyright; for example, written works and music*

Economic Connection to... Geography

Learning Knows No Boundaries

Students in Australia's outback have for years learned via radio waves. The vast distances in Australia and sparse population in the outback prevented typical schools from operating. At one time, this type of schooling seemed highly unconventional.

Today, however, online learning has spread throughout the United States and other countries. The number of people taking undergraduate and graduate courses online is expected to increase to 2.81 million in 2005, accounting for 20 percent of all higher-education students. For people who don't have the time for in-class learning, or who live across the country from their favorite university, online learning is the answer. ■

In 1999 a coalition of more than 110 music, computer, and consumer-electronics firms published a standard for future players of online music files. The standard blocks the playing of illegal copies of newly released songs and does not allow their distribution over the Internet.

A future digital-rights system could let the publisher decide what rights go with the product. The controls would be both in the software and hardware. For example, digital "tags" in the software represent certain rights, such as the right to transfer the information to another device. Future personal computers—hard-wired with a copyright chip—would interpret the "tag."

Protecting Consumer Privacy

The computer has invaded people's privacy. Advances in computing have made it possible for institutions to collect all kinds of personal information that used to be unrecorded, such as credit card or bank debt, telephone calls, items bought at particular stores, and the movement of one's automobile. Hospitals and schools are constructing vast databases with information ranging from your report card to your DNA. See **Figure 22.5.**

The potential abuses of databases are troubling. Who is watching out for your privacy? National and state government privacy statutes have been in place for many years. **Consumer-credit laws** gave individuals the right to examine their credit beginning in the 1970s, for example. Today an entire industry is growing around security. Software programs are being developed to keep hackers and thieves from infiltrating Web bank accounts, E-mails, and corporate purchasing networks.

consumer-credit laws: *laws passed to protect consumers by giving them access to their credit records*

Developing Nations

How will the information revolution affect developing economies? Some economists believe that information and communications technologies can enable developing countries to "leapfrog" stages of development, thus narrowing the gap between rich and poor.

For example, many countries are rapidly expanding cellular telephone and wireless technology, thereby shortening the time that might have been required to reach rural areas via wired networks. Developing countries can also take advantage of **distance education,** which connects teachers to students through telecommunications. Wireless technology can bring education to remote areas much more quickly and economically than traditional systems.

distance education: *education provided via telecommunications technology*

FIGURE 22.5

Privacy When you visit the doctor or go to school, personal data are collected. New laws may regulate the distribution of such data. ***How could a file of personal data be misused against an individual?***

The wide gap in schooling between developing and industrialized nations, however, is dramatic in the area of computer education. In addition, developing nations often have little appreciation for intellectual property rights. These facts support those economists who believe that the information revolution will widen the divergence between developing and industrialized countries.

It is vital that we keep up with the issues discussed in this section, because an informed citizenry affects leadership. The Information Age provides us with a way to do this. The new technology allows us to keep in touch, both with the issues and with our leaders to influence the critical decisions that will create a challenging cybernomic future.

Practice and assess key skills with ***Skillbuilder Interactive Workbook, Level 2.***

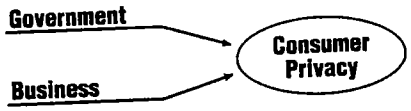
SECTION 3 Assessment

Understanding Key Terms

1. **Define** day trading, intellectual property, consumer-credit laws, distance education.

Reviewing Objectives

2. Why is some trading on the Internet considered risky?
3. How is intellectual property being stolen?
4. **Graphic Organizer** Create a diagram like the one in the next column to explain ways that government and business are helping to protect consumer privacy.



Applying Economic Concepts

5. **International Growth and Stability** Do you think the gap between rich and poor nations will widen in the future? Why or why not?

Critical Thinking Activity

6. **Making Predictions** What do you think will be the privacy issues of the next few years as telecommunications and computing power increase?

People & Perspectives

Steven Spielberg

ENTREPRENEUR (1947–)

- **One of Hollywood's most successful directors and producers: credits include *Jaws, Raiders of the Lost Ark, E.T. The ExtraTerrestrial, Jurassic Park, The Color Purple, Back to the Future, Schindler's List, Amistad, Saving Private Ryan, A.I.***
- **Attended California State University at Long Beach**

Combining advances in technology with a great gift for storytelling has made Steven Spielberg an extraordinarily successful entrepreneur and resulted in millions of happy moviegoers. He attributes many of his biggest movie hits to early childhood memories. Spielberg's movie *Close Encounters of the Third Kind* was inspired by watching a meteor shower with his father, a fervent science-fiction fan. Reflecting on his creative gift, Spielberg explains:

"Once a month the sky falls on my head, I come to, and I see another movie I want to make. Sometimes I think I've got ball bearings for brains; these ideas are slipping and sliding across each other all the time. My problem is my imagination won't turn off. I wake up so excited I can't eat breakfast. I've never run out of energy. . . . I got it from my mom."

Spielberg's interests, however, are not limited to movies. Much of Spielberg's attention today is focused on DreamWorks SKG, a studio that he created with Jeffrey Katzenberg and David Geffen. DreamWorks created a joint venture with Sega and Universal Studios to satisfy Spielberg's interest in video arcades. Steven Spielberg draws inspiration from his seven children:

"There are films that I feel that I need to make, for a variety of reasons, for personal reasons, for reasons that I want to have fun, that the subject matter is cool, that I think my kids will like it."

Checking for Understanding

1. **What personal characteristics make Steven Spielberg a successful entrepreneur?**
2. **As part of the "knowledge economy," how may movies affect future innovation?**

CHAPTER 22 Summary

ECONOMICS Online

Chapter Overview Visit the *Economics Today and Tomorrow* Web site at ett.glencoe.com and click on ***Chapter 22—Chapter Overviews*** to review chapter information.

SECTION 1 The Growth of E-Commerce

- Numbers, also called digits, are so vital to our lives today that people have labeled our era "the digital age."
- **Microchips** in a network of interconnected computers are changing how people communicate, produce, consume, educate, and entertain themselves.
- Some economists believe we have entered the age of **cybernomics**—economics driven by a huge digital machine, the **Internet.**
- **Web sites** connecting businesses, private organizations, government offices, and educational institutions make locating information and global communication extraordinarily easy. The Internet provides businesses in particular with the opportunity to directly reach suppliers and consumers.
- **E-commerce** is expanding rapidly, affecting both business-to-business relationships and consumers.
- In this new world of cybernomics, the buyer is ruler. If one seller cannot deliver a superior product at a competitive price in real time, another seller will.
- Marketers can now track purchases electronically and organize cybercommunities of people whose needs they serve.

SECTION 2 A New Economy?

- The **Information Age** may be as significant as was the Industrial Revolution in affecting human society.
- The **knowledge economy** includes communications technology, intellectual property, and stored data.
- Some economists believe that new concepts are needed to explain how the knowledge economy differs from earlier economic concepts and principles.
- Most economists agree that **innovation** affects economic growth cycles.

SECTION 3 Issues in Cybernomics

- Cybernomics has raised important issues. Decisions being made by policy makers today will help determine your economic future.
- Among the important issues today are ensuring safe Internet trade, securing **intellectual property** rights, protecting consumer privacy, and helping developing nations catch up with the rapidly changing global economy.
- Communications technology provides access to knowledge and **distance education,** but we must make wise choices that help create a better economic future.

CHAPTER 22

Assessment and Activities

Self-Check Quiz Visit the *Economics Today and Tomorrow* Web site at ett.glencoe.com and click on ***Chapter 22—Self-Check Quizzes*** to prepare for the Chapter Test.

Identifying Key Terms

Write a paragraph about cybernomics using all of the following terms.

- microchip
- cybernomics
- Internet
- World Wide Web
- e-commerce
- intellectual property
- frequency marketing
- innovations

Recalling Facts and Ideas

Section 1

1. Why is e-commerce on the Internet considered both enticing and risky?
2. How has e-commerce shifted the balance of power to the customer?
3. How do computers help marketers know what products you want?

Section 2

4. What revolution changed people's way of life in the nineteenth century?
5. What elements are included in the knowledge economy?
6. Why are knowledge products called weightless?
7. How does the use and consumption of knowledge products differ from traditional products?
8. Over what issues do economists studying the information revolution disagree? On what do most economists agree?
9. How did economist Joseph Schumpeter explain the several large bursts of economic growth during certain periods of history?

Section 3

10. Give an example of intellectual property that has been difficult to protect.
11. Who is most at risk in day trading on the Internet?
12. How has the computer invaded people's privacy?
13. What are the two positions that economists have taken regarding how the information revolution will affect developing economies?

Thinking Critically

1. **Understanding Cause and Effect** Why did many businesses feel compelled to go on the Internet in the 1990s?
2. **Making Generalizations** Write a paragraph expressing whether you believe the Information Age will have as far-reaching effects on society as did the Industrial Revolution.

3. **Categorizing Information** On a table like the one below, rank the four issues presented in Section 3 according to the level of their importance to you. Then rank the same issues according to how they affect the global economy.

Issues as they affect me	Issues as they affect the global economy
1.	1.
2.	2.
3.	3.
4.	4.

Applying Economic Concepts

The Role of Government Choose one of the following areas and write a short position statement on what, if anything, the federal government should be doing about it:

- Assuring personal privacy
- Regulating telecommunications
- Protecting intellectual property
- Regulating securities trading on the Internet

Cooperative Learning Project

Scarcity of resources means that even governments must consider trade-offs and opportunity costs. Organize into four groups, each representing a congressional committee charged with addressing one of the four issues mentioned in Section 3 of this chapter. Prepare an argument supporting your issue and seeking resources to study and resolve it. Present your arguments to the class.

Reviewing Skills

Evaluating Primary and Secondary Sources Read the excerpt in the next column, then answer the questions that follow.

"In 1984, when I got a job as a field service marketing manager for a large computer manufacturer, I thought I was the only dummy on the block, that everyone else was a genius. But I found out that a lot of people in techie jobs had nontechnical backgrounds–just like me.

Unless you're designing software or are in research and development, where technical degrees are necessary, you can find good jobs in technology. Fear of technology is a waste of time. Dump the fear."

–William A. Schaffer, European development manager for software and technology at Sun Microsystems, 1999

1. Is this a primary or a secondary source? How do you know?
2. When was this document written?
3. What was the general feeling of the person who wrote this document?
4. What kind of information is missing from this passage?

Technology Activity

Using the Internet Probably the most information about privacy for Internet users is to be found on the Net itself. Use a search engine to find out what is being written. Key in *privacy* and/or *encryption* and scroll down through the articles. Make a list of the kinds of sites and news articles that are available.

Analyzing the Global Economy

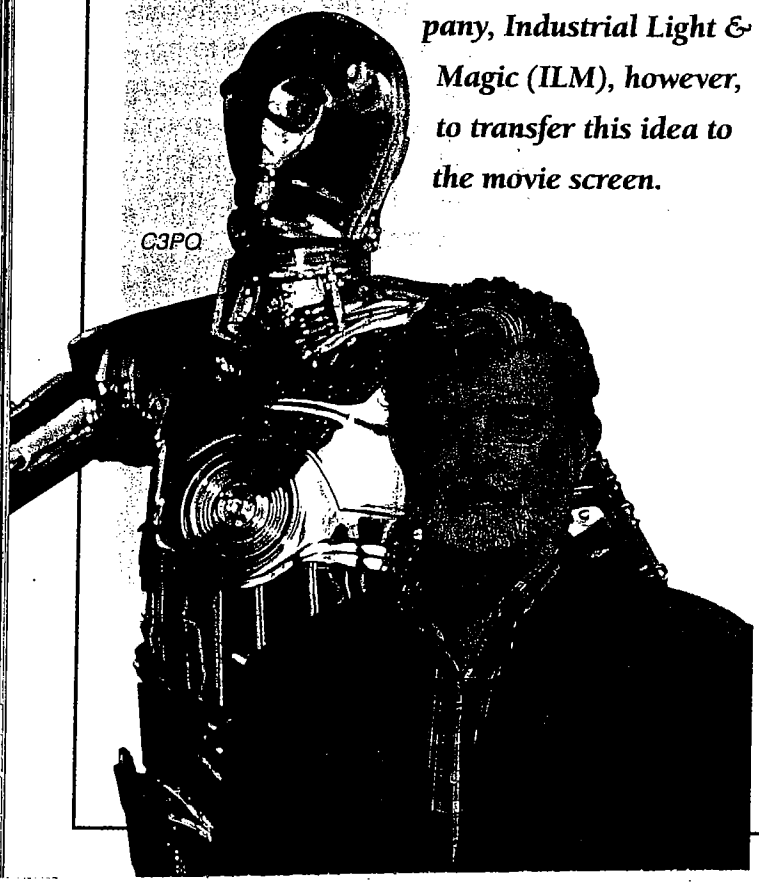
Visit the United Nation's UNESCO Web site. Open the Yearbook and click on "Culture and Communications." Reference tables here will help you compare the progress of communications technology around the world. Print out a chart, study it, and write a summary report.

CASE STUDY

Focus on Free Enterprise

Industrial Light & Magic

Chewbacca, C3PO, Darth Vader, Jar Jar Binks, R2-D2, and Yoda. These memorable characters, and the world they inhabit, sprang from the fertile imagination of filmmaker George Lucas. When Lucas first thought up the world of* Star Wars, *he had an idea of what everything should look like. It took Lucas's special effects company, Industrial Light & Magic (ILM), however, to transfer this idea to the movie screen.



C3PO

Beginnings

When George Lucas first took the idea of *Star Wars* to Hollywood studios, he had no luck in getting their backing. Science-fiction movies rarely made money. Finally, 20th Century Fox agreed to back the movie, providing a budget of $9 million. One area in which Fox offered little help was special effects. So in 1975 Lucas set up his own company called Industrial Light & Magic to develop special effects for *Star Wars*.

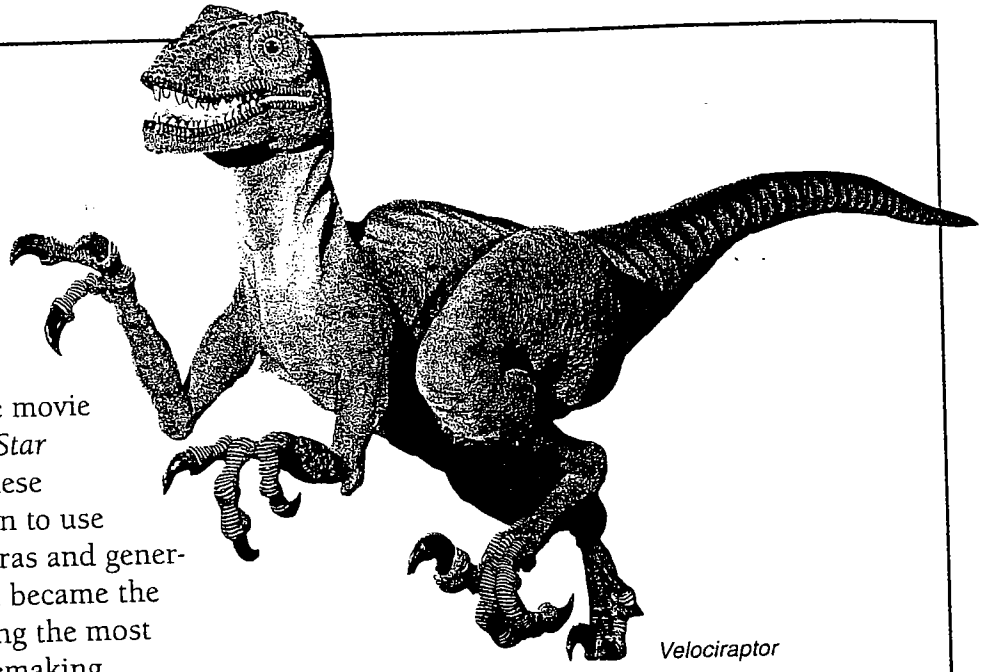
Unconventional Working Environment

ILM was unlike other companies—either in the movie business or business in general. Except for a few managers, the vast majority of employees were straight out of college. There were no set working hours—ILM was essentially open 24 hours a day. There were few hard-and-fast job descriptions. As well as doing their own jobs, design artists might also be called upon to make models and operate cameras.

Although ILM's work practices were unconventional, they proved very effective. In less than 18 months, the ILM team had completed the *Star Wars* special effects. Although Lucas expressed disappointment with the finished product, the public did

George Lucas

not agree. The movie became a huge box-office success.



Velociraptor

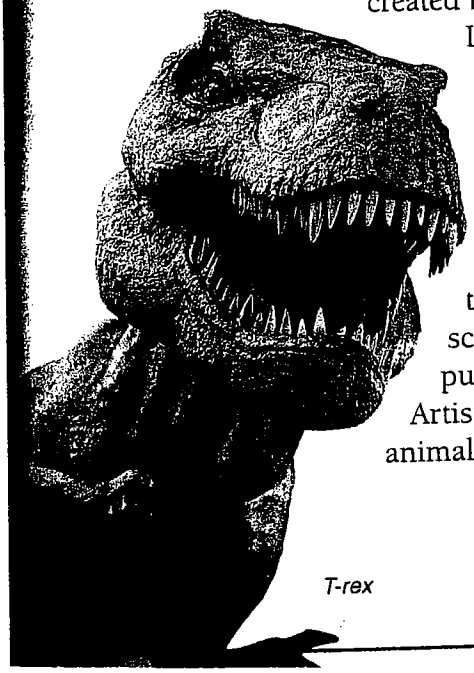
Building a Reputation

Lucas immediately plowed his profits from the movie into two more episodes of *Star Wars*. While working on these movies, the ILM team began to use computers to control cameras and generate images. Over time, ILM became the industry's leader in applying the most recent technology to moviemaking.

Digital Effects

In 1993, ILM changed moviegoers' expectations forever with the digital effects it used in the film *Jurassic Park*. Audiences were stunned when they first viewed the digitally created dinosaurs on the big screen—nothing so realistic had ever been done before. Nearly everyone who saw the movie wandered out of the theater asking, "How did they *do* that?"

Steven Spielberg, who directed the film, had seen early digital footage created by the artists at ILM. He immediately scrapped plans to use stop-animation dinosaurs, instead urging ILM to create all the dinosaur scenes using computer graphics. Artists at ILM studied animal behavior and movement, filmed themselves running around their parking lot, and generally dove into the "minds" of dinosaurs to create the most believable special effects ever.



T-rex

This technological innovation, along with dazzling artistic creativity, soon won ILM the attention of other moviemakers. Many times when a movie required stunning visual effects, ILM was called in—earning the company critical and financial success. ILM has won 14 Academy Awards for Best Visual Effects. In addition, ILM has provided the special effects for more than half of the top 15 box-office hits of all time.

Free Enterprise in Action

1. **How was ILM different from most other companies in the movie business?**
2. **What attracted other moviemakers to ILM?**