

Ethics in Information Technology, Second Edition

Chapter 9 *The Impact of Information Technology on the Quality of Life*

Objectives

- What impact has IT had on the standard of living and worker productivity?
- What is being done to reduce the negative influence of the digital divide?
- What impact has IT had on reducing the costs of healthcare?

The Impact of IT on the Standard of Living and Productivity

- Gross domestic product (GDP) per capita
 - Most widely used measurement of material standard of living
- Standard of living in the U.S. and Western countries
 - Has improved for a long time
 - Rate of change varies as a result of business cycles
- Productivity
 - Amount of output produced per unit of input
 - Measured in many different ways

The Impact of IT on the Standard of Living and Productivity (continued)

- United States
 - Labor productivity growth has averaged roughly 2 percent per year for the past century
 - Living standards doubled about every 36 years
- Innovation
 - Key factor in productivity improvement
 - IT has an important role

Comparison of Labor Productivity Rates (Compounded Aggregate Growth Rate)

TABLE 9-1 Comparison of labor productivity rates (compounded aggregate growth rate)

Years	United States	France	Germany
1839–1937	1.9%		
1950–1960	3.6%	5.2%	6.3%
1960–1973	2.6%	5.1%	5.0%
1973–1980	1.0%	3.4%	3.3%
1980–1990	1.4%	2.9%	1.9%

TABLE 9-1 Comparison of labor productivity rates (compounded aggregate growth rate) (continued)

Years	United States	France	Germany
1990–1995	1.1%	1.5%	2.1%
1995–2000	2.0%	1.1%	1.5%
2000–2005	2.1%		

Source: McKinsey Global Institute, "Whatever Happened to the New Economy?," November 2002.

The Impact of IT on the Standard of Living and Productivity (continued)

- Relationship between investment in information technology and U.S. productivity growth is complex
 - Rate of productivity from 1995 to 2005 is only slightly higher than the long-term U.S. rate
 - Possible lag time between
 - Application of innovative IT solutions
 - Capture of significant productivity gains
 - Many other factors influence worker productivity rates besides IT

Fundamental Drivers for Productivity Performance

TABLE 9-2 Fundamental drivers for productivity performance

Reduce the amount of input required to produce a given output by:	Increase the amount of output produced by a given amount of input by:
Consolidating operations to better leverage their scale	Selling higher-value goods
Improving performance by becoming more efficient	Selling more goods to increase capacity and use of existing resources

The Impact of IT on the Standard of Living and Productivity (continued)

- Additional factors can affect national productivity rates
 - Growth rates differ according to the business cycle
 - Outsourcing and offshore outsourcing can skew productivity
 - U.S. labor market is more flexible
 - Competitive markets for goods and services provide greater incentives for technological innovation and adoption

The Impact of IT on the Standard of Living and Productivity (continued)

- Additional factors can affect national productivity rates
 - Difficult to measure real output of
 - Accounting
 - Customer service
 - Consulting
 - Greatest benefits from IT investments don't always yield tangible results
 - Intangible benefits

The Impact of IT on the Standard of Living and Productivity (continued)

- Difficult to quantify how much use of IT has contributed to worker productivity
 - IT is required to remain in business
 - Similar to
 - Electricity
 - Telephones

The Digital Divide

- Standards of living refers to a level of material comfort measured by
 - Goods
 - Services
 - Luxuries
 - Availability of technology
- Digital divide
 - Gulf between people who do and don't have access to information and communications technology

The Digital Divide (continued)

- 1 billion Internet users worldwide
 - Only 20 million live in less developed nations
- Divide exists between economic classes in the same country
- Must be bridged to
 - Improve emergency responses
 - Enhance learning
 - Improve access to educational and economic opportunities

The Digital Divide (continued)

- E-Rate Program
 - Authorized as part of the Telecommunications Act of 1996
 - Helps schools and libraries obtain access to state-of-the-art services and technologies at discounted rates
 - Supported with up to \$2.25 billion per year from fees charged to telephone customers
 - Administered by the Universal Service Administrative Company (USAC)

The Digital Divide (continued)

- E-Rate Program
 - Has not gone well
 - Abuse
 - Fraud
 - Waste
- Ed-Tech Program
 - Enhancing Education through Technology
 - Part of No Child Left Behind Act (NCLB)

The Digital Divide (continued)

- Ed-Tech Program goals
 - Improve academic achievement through the use of technology in schools
 - Assist children in crossing the digital divide
 - Encourage the effective integration of technology

The Digital Divide (continued)

- Ed-Tech Program seven-step approach
 - Strengthen leadership
 - Consider innovative budgeting
 - Improve teacher training
 - Support e-learning and virtual schools
 - Encourage broadband access
 - Move toward digital content
 - Integrate data systems

The Digital Divide (continued)

- Optimization technologies make computing and communication
 - Better
 - Cheaper
 - Faster
 - Available to larger segments of the world's population
- \$100 laptop
 - Media Lab at Massachusetts Institute of Technology (MIT)
 - Media Lab Asia

The Impact of IT on Healthcare Costs

- Healthcare costs are
 - Soaring out of control
 - 15.3 percent of the U.S. GDP
- U.S. companies are
 - Shifting costs to employees
 - Eliminating healthcare coverage altogether for retirees
- Causes for cost increases
 - Use of more expensive technology
 - Shielding of patients from true cost of medical care

Healthcare Spending in Industrialized Countries as Percentage of GDP

TABLE 9-3 Healthcare spending in industrialized countries as percentage of GDP

Country	Healthcare spending as percentage of GDP
United States	15.3%
Switzerland	10.9%
Germany	10.7%
Canada	9.7%
France	9.5%

Source: "Health Insurance Cost," National Coalition on Health Care Web site, www.nche.org/facts/cost.shtml.

The Impact of IT on Healthcare Costs (continued)

- Development and use of new medical technology "accounts for one-half to two-thirds of the increase in healthcare spending in excess of general inflation"
- Gain control over soaring healthcare costs by improving
 - Patient awareness
 - Technology costs

Electronic Health Records

- Healthcare is slow to implement IT
- Opportunity to capture and record patient data through IT use
- Now it is nearly impossible to assemble the paper trail into a health history
 - Can result in diagnostic and medication errors
 - Ordering of duplicate tests
 - Compromises patient safety

Electronic Health Records (continued)

- Electronic health record (EHR)
 - Summary of health information generated by each patient encounter in any healthcare delivery setting
 - Can be used to generate a complete electronic record of clinical patient encounter
 - Used in only 13 percent of U.S. hospitals
 - \$78 billion to \$400 billion could be saved each year

Primary Reasons to Implement Electronic Health Records

TABLE 9-4 Primary reasons to implement electronic health records

Motivations	IT managers and professionals	Physicians and nurses
The need to improve clinical processes or workflow efficiency	87%	85%
The need to improve quality of care	82%	87%
The need to share patient information among health-care practitioners and professionals	89%	71%
The need to reduce medical errors and improve patient safety	81%	73%

Source: Gilhooly, Kym, "Rx for Better Health Care," *Computersworld*, January 31, 2005. (This table shows only the top four reasons of the 12 listed in the original table.)

Electronic Health Records (continued)

- National Health Information Network (NHIN)
 - Calls for the broad adoption of interoperable EHRs and other e-health initiatives by 2014
 - Protect patient privacy
 - Find a consistent way to identify each patient
 - Domain name system for patients
 - Much like the one that drives the Web

Use of Mobile and Wireless Technology

- Healthcare industry
 - Leader in adopting mobile and wireless technology
- Common uses of wireless technology
 - Access and update EHRs at patients' bedsides
 - Scan bar codes on patient wristbands and on medications
 - Locate healthcare employees wherever they are

Telemedicine

- Employs modern telecommunications and information technologies
- Provides medical care to people who live far away from healthcare providers
 - Reduces need for patients to travel
- Store-and-forward telemedicine
 - Acquires data, sound, images, and video from a patient
 - Transmits it to a medical specialist for assessment later

Telemedicine (continued)

- Store-and-forward telemedicine
 - Does not require the presence of both the patient and care provider at the same time
 - Recognizes problems
 - Intervenes before high-risk situations become life threatening
- Live telemedicine
 - Requires the presence of patients and healthcare providers at the same time
 - Often involves videoconference

Medical Information Web Sites for Lay People

- Reliable information on a range of medical topics is available on the Web
- People can
 - Learn more about healthcare services
 - Take more responsibility for their own well being
- Health providers and employers
 - Offer useful online tools to members and employees
 - Go beyond basic health information

Health Information Web Sites

TABLE 9-5 Health information Web sites

URL	Description
<i>WebMD.com</i>	Access to reference material and online professional publications from Thomson Healthcare Information Group, Stamford, Connecticut
<i>cancer.org</i>	The American Cancer Society
<i>oncology.upenn.edu/</i>	The Abramson Cancer Center at the University of Pennsylvania
<i>looksmarthealth.com</i>	A comprehensive health Web site with information on diet and nutrition, disease treatment and therapy, herbal remedies, baby care, sex, and other topics
<i>americanheart.org</i>	The American Heart Association
<i>heartdisease.about.com</i>	A good starting place to learn about heart disease and cardiology
<i>diabetes.org/home.jsp</i>	The American Diabetes Association
<i>niddk.nih.gov</i>	The National Institute of Diabetes, Digestive, and Kidney Diseases
<i>cdc.gov</i>	The Centers for Disease Control and Prevention
<i>medicinenet.com/script/</i> <i>main/hp.asp</i>	Helpful source for medical information, including symptoms and signs, procedures and tests, medications, and a medical dictionary
<i>heartburn.about.com/</i>	Information on what causes heartburn and how to prevent it
<i>alzheimers.org/</i>	Alzheimer's Disease Education and Referral Center
<i>urologychannel.com/</i>	Provides clear, accurate information about urologic conditions (for example, erectile dysfunction, HIV, AIDS, kidney stones, STDs), including overviews, symptoms, causes, diagnostic procedures, and treatment options
<i>osteo.org</i>	The National Institutes of Osteoporosis and Related Bone Diseases

Summary

- Gross domestic product (GDP) per capita
 - Measure of the material standard of living
- Productivity
 - Amount of output produced per unit of input
 - Harder today to quantify benefits of IT investments on worker productivity
- Digital divide
 - Gulf between people who do and don't have access to modern information and communications technology

Summary (continued)

- Use of IT in healthcare industry includes
 - Electronic health records (EHRs)
 - Wireless technology
 - Telemedicine
 - Web-based health information