

CS 4001: Computing, Society & Professionalism

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Week 15: Work and Wealth (Part II)
April 20, 2017

- Please take the CIOS Survey!!
- <http://b.gatech.edu/cios>

Introduction

- Information technology and automation affecting workplace
 - Increases in productivity
 - Globalization of job market
 - Organization of companies
 - Telework
- Impacts of information technology on society
 - Digital divide

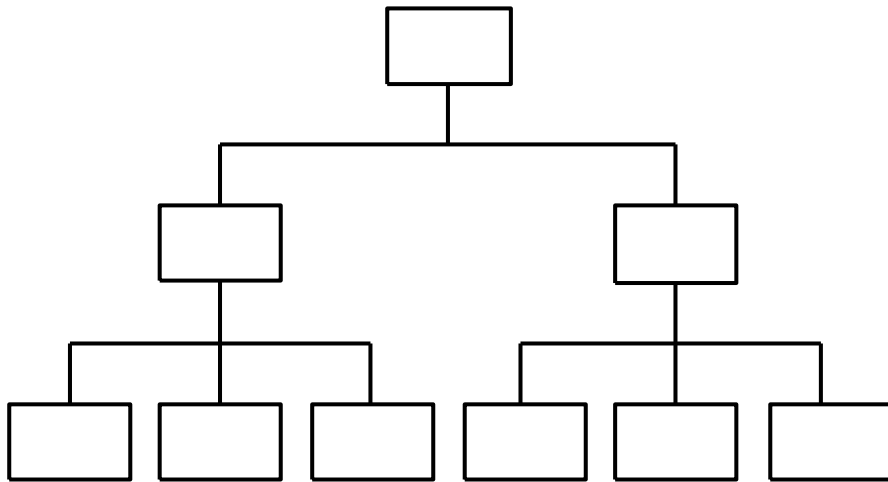


Workplace Changes

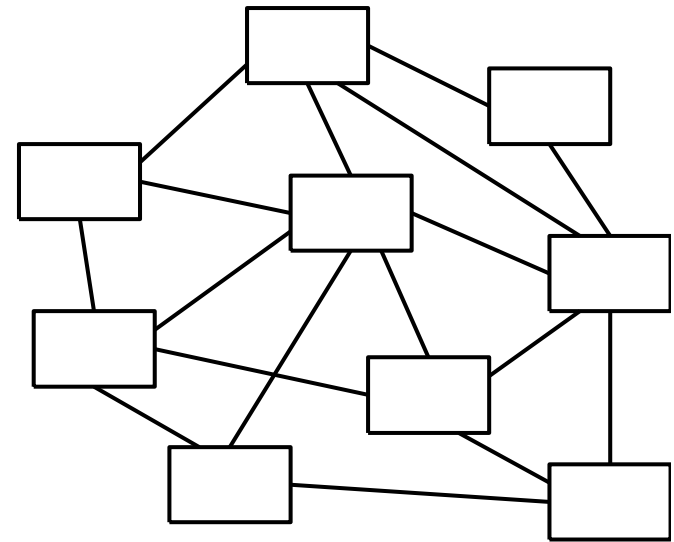
Organizational Changes

- Information technology integration into firms
 - Automating back office functions (e.g., payroll)
 - Improving manufacturing
 - Improving communication among business units
- Results
 - Flattened organizational structures
 - Eliminating transactional middlemen (supply-chain automation)

Inexpensive Interactions Lead to Flexible Information Flow



(a)



(b)

Winners, Losers in the Workplace of the Future

Higher Demand

Computer engineers
Computer support specialists
Systems analysts
Database administrators
Desktop publishing specialists

Lower Demand

Bank clerks
Procurement specialists
Financial records processing staff
Secretaries, stenographers, and typists
Communications equipment operators
Computer operators

Telework

- Employees work away from traditional place of work
- Examples
 - Home office
 - Commuting to a telecenter
 - Salespersons with no office
- About 20% of Americans do some telework

Advantages of Telework

- Increases productivity
- Reduces absenteeism
- Improves morale
- Helps recruitment and retention of top employees
- Saves overhead
- Improves company resilience
- Helps environment
- Saves employees money

Disadvantages of Telework

- Threatens managers' control and authority
- Makes face-to-face meetings impossible
- Sensitive information less secure
- Team meetings more difficult
- Teleworkers less visible
- Teleworkers "out of the loop"
- Isolation of teleworkers
- Teleworkers work longer hours for same pay



The Rise of Robots

Rise of the Robots?

- Some experts suggest most jobs will be taken over by machines
- Artificial intelligence: Field of computer science focusing on intelligent behavior by machines
- Rapid increases in microprocessor speeds have led to various successes in AI
- What will happen as computers continue to increase in speed?

Notable Achievements in AI since 1995

- Computer-controlled minivan “drove” on freeways across USA in 1995
- IBM supercomputer Deep Blue defeated chess champion Gary Kasparov in 1997
- Honda’s ASIMO android can climb and descend stairs and respond to human gestures and postures
- Electrolux introduced robotic vacuum cleaner in 2001
- Five autonomous vehicles successfully completed 128-mile course in Nevada desert in 2005
- Watson trounced two most successful human *Jeopardy!* champions in 2011

Stanley, the Autonomous Vehicle



Watson Wins *Jeopardy!* Challenge




Robot Chef


- <https://www.youtube.com/watch?v=SNy6fEuPWbc>

Moral Questions Related to Robotics

- Would intelligent robots demoralize humanity?
- What if a malevolent human puts intelligent machines to an evil use?



Discussion Point 1: Is it wrong to create machines capable of making human labor obsolete?



Discussion Point 2: Is it wrong to work on an intelligent machine if it can't be guaranteed the machine will be benevolent toward humans?



The Digital Divide

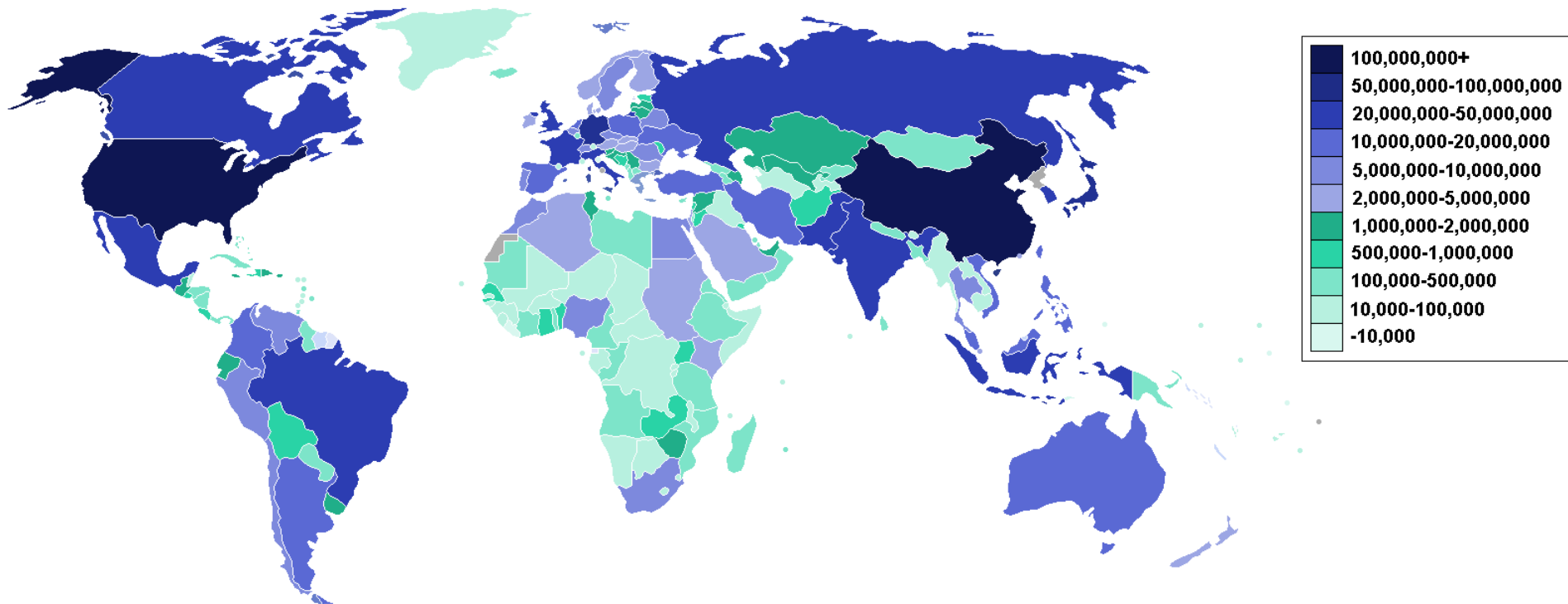
Concept of the Digital Divide

- Digital divide: Some people have access to modern information technology while others do not
- Underlying assumption: people with access to telephones, computers, Internet have opportunities denied to those without access
- Concept of digital divide became popular with emergence of World Wide Web

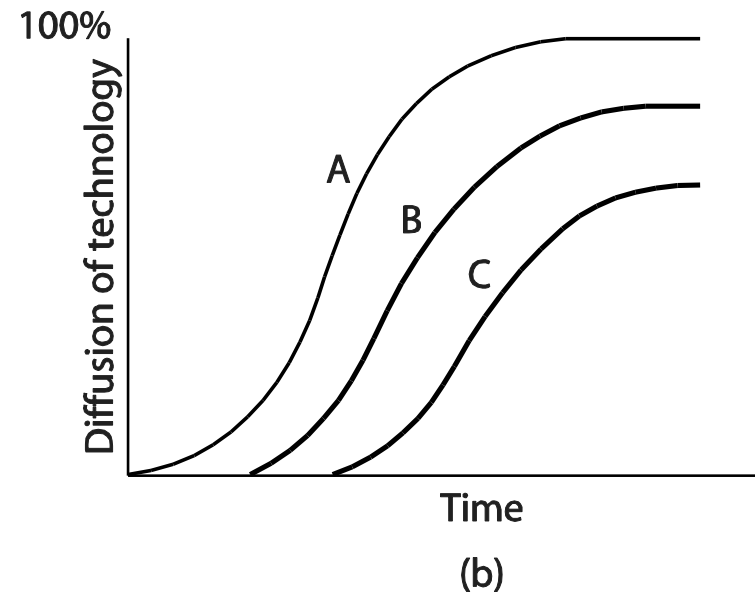
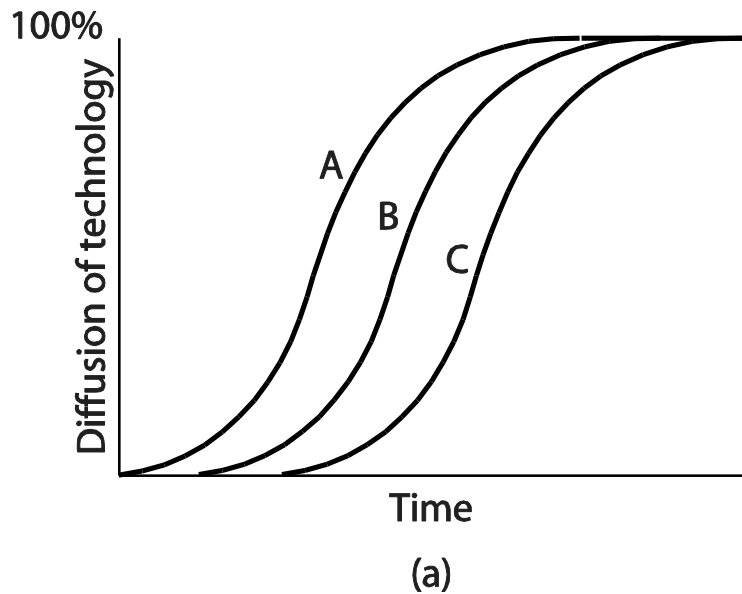
Evidence of the Digital Divide

- Global divide
 - Access higher in wealthy countries
 - Access higher where IT infrastructure good
 - Access higher where literacy higher
 - Access higher in English-speaking countries
 - Access higher where it is culturally valued
- Social divide
 - Access higher for young people
 - Access higher for well-educated people

Percentage of People with Internet Access, by World Region



Two Models for Technological Diffusion



Models of Technological Diffusion

- Technological diffusion: rate at which a new technology is assimilated
 - Group A: highest socioeconomic status
 - Group B: middle socioeconomic status
 - Group C: lowest socioeconomic status
- Normalization model
 - Group A adopts first, then Group B, finally Group C
 - Eventually A use = B use = C use
- Stratification model
 - Group A adopts first, then Group B, finally Group C
 - A use > B use > C use forever

Critiques of the Digital Divide

- DD talk suggests the difference between “haves” and “have nots” is simply about access
- DD talk puts everyone in two categories, but reality is a continuum
- DD implies lack of access leads to less advantaged social position, but maybe it is the other way around
- Internet is not the pinnacle of information technology