Chapter 4
Digital Systems and the Design of Work

Jason C. H. Chen, Ph.D.
Professor of MIS
School of Business Administration
Gonzaga University
Spokane, WA 99258
chen@gonzaga.edu

Learning Objectives
• Understand how IT has changed the nature of work.
• Define virtual organizations and how they work.
• List the technologies that are used to support communication and collaboration.
• Explain telecommuting and the technologies that support telecommuting.
• Discuss how managers need to manage virtual teams, and the challenges this creates.
• Understand how attitudes impact technology acceptance in organizations.

Opening Case - American Express (Q/A)
1. What is the “Blue Work” program?
   ➢ It represents a flexible workplace: staggered hours, off-site work areas (such as home), shared office space, touch-down space (laptop-focused, temporary), and telecommuting.

2. What was the impact of Blue Work?
   ➢ American Express saves $10 million annually. Productivity improvements, office expense savings, employee satisfaction are all up. Managers are happy too.

3. What was the strategic thrust behind the Blue Work program?
   ➢ American Express viewed workplace flexibility as a strategic lever. Also, AmEx had a corporate focus on results rather than hours clocked.

Opening Case - American Express (cont.)
4. What are “hub,” “club,” “home,” and “roam” employees?
   ➢ Hub: Work in the office;
   ➢ Club: Share time between the office and other locations;
   ➢ Home: Work at home at least 3 days a week;
   ➢ Roam: Are on the road or at customer sites

INTRODUCTION
• Chapter 3 explored how IT influences the design on organizational level issues, and manager’s issues both physically and virtually.
• Chapter 4 looks at the impact of IS on the way work is done by individual workers.
• It explores:
  – the changing nature and design of work,
  – IT’s impact on different types of workers, and
  – the rise of new work environments

Chapter Overview: Approach to Work
• Technology has now brought the approach to work full circle:
  – Time and place of work are increasingly blended with other aspects of living
  – Combined with newer collaboration, social and mobile technologies, and cloud computing.
• People now can do their work in their own homes at times that accommodate home-life and leisure activities.
• They are able to enter cyberspace
  ➢ working remotely and on virtual teams
  ➢ the impact of IT on collaboration and communication
MEASURES OF IS SUCCESS

1. HIGH LEVELS OF USE
2. USER SATISFACTION
3. FAVORABLE ATTITUDES
4. ACHIEVED OBJECTIVES
5. FINANCIAL PAYOFF

Two Important Models

- **Framework for work design impact** (Figure 4.1)
- **TAM** (Figure 4.9)
  - Technology Acceptance Model (Figure 4.9)
  - CUSTOMER PERCEIVED VALUE
  - Gaining acceptance for IT-induced Change

WORK DESIGN FRAMEWORK

- A simple framework can be used to assess how emerging technologies may affect work.
- Increasingly, places are being constructed in cyberspace using Web 2.0 tools that encourage collaboration.
- Employees can work at home via cyberspace and at times that accommodate home-life and leisure activities.
- This framework is useful in designing key characteristics of work by asking key questions (see figure 4.1). Such as:
  - What work will be performed?
  - Who is going to do the work?
  - Where will the work be performed?
  - When will the work be performed?
  - How can IS increase the effectiveness of the workers doing the work? (How can IT support collaboration?)
  - How can IT enhance the efficiency/satisfaction of the worker doing these tasks?

**WHAT:**
What will be performed? (e.g., operations, sales, management)

**WHO:**
Where will the work be performed? (e.g., at the office, at home, on the road)

**WHEN:**
When will the work be performed? (e.g., 9-5, 24/7, flexible scheduling)

**HOW:**
How can IS increase the effectiveness of the workers doing the work? (e.g., unfreeze-refreeze, Kotter’s 8 steps to managing change, technology acceptance model)
HOW INFORMATION TECHNOLOGY CHANGES THE NATURE OF WORK

IT Has Changed Work

IT has:
- Created **new types** of work
  - Bureau of Labor Statistics: IT employment in the USA is at an all-time high of 4.9 million
  - New jobs such as:
    - Data scientists/data miners
    - Social media managers
    - Communications managers
  - IS departments also employ:
    - Systems analysts, database administrators, network administrators, and network security advisors.
- Enabled new ways to do traditional work
- Supported new ways to manage people/technology

How IT Changes Traditional Work

- Changes the way work is **done**
  - Broadens skills; faster but more tasks
  - Sometimes IT disconnects us from the tasks
  - Sometimes people can perform more strategic tasks
  - Few staff are engaged in order entry any longer
  - Crowdsourcing is now possible at very low cost (M.Turk)
- Changes how we **communicate**
  - More asynchronous and more irregular
  - Social networking has provided new opportunities for customer interaction
  - Collaboration allows a firm to look “big” with new tools

How IT Changes Traditional Work (cont.)

- Changes **decision-making**
  - Real-time information; more information available
  - Data mining can identify new insights
  - Ideas can be gleaned from social networks
  - Middle management ranks have shrunk as Leavitt/Whisler predicted
- Changes **collaboration**
  - Work is now more team oriented; more collaborative
  - Sharing is easier than ever, using multiple methods
  - Crowdsourcing can now provide quick answers from tens, hundreds, or even thousands of people
  - We now can disconnect PLACE and TIME (Figure 4.2)

New ways to **connect**
- Many employees are always connected
- Lines between work and play are now blurred
- For many, home technologies are better than work technologies

New ways to manage **people**
- Behavior controls – direct supervision
- Outcome controls – examining outcomes not actions
- Personnel controls – pick the right person for the task
- The digital approach provides new opportunities at any of those three levels (Fig. 4.3)

Figure 4.2 Collaboration Technologies Matrix: Examples of key enabling technologies

<table>
<thead>
<tr>
<th>Team Works in the Same Place</th>
<th>Team Works at Different Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting room technologies</td>
<td>Electronic bulletin boards</td>
</tr>
<tr>
<td>Face-to-face meetings</td>
<td>Document sharing systems (wikis)</td>
</tr>
<tr>
<td>Document sharing systems (wikis)</td>
<td>Document sharing systems (wikis)</td>
</tr>
<tr>
<td>Video conferencing</td>
<td>E-mail</td>
</tr>
<tr>
<td>- Chat rooms</td>
<td>- Microblogs (e.g., Twitter)</td>
</tr>
<tr>
<td>- Texting (SMS) and instant messaging (IM)</td>
<td>- Texting (SMS) and instant messaging (IM)</td>
</tr>
<tr>
<td>- Document sharing systems (wikis)</td>
<td>- Document sharing systems (wikis)</td>
</tr>
</tbody>
</table>
Theory and Practices

It is personal and informal. Manager is often individually based.

But specific countries differed in the “yes” votes:

- Mobile workers work from anywhere (often while traveling)
- Remote workers = telecommuters + mobile workers
- Virtual teams include remote workers as well as those in their offices, perhaps scattered geographically

Virtual teams have a life cycle (Figure 4.4)

Where Work is Done: Mobile and Virtual Work

- Much work can be done anywhere, anytime
- People desire the flexibility
- Telecommuting = teleworking = working from home or even in a coffee shop
- Mobile workers work from anywhere (often while traveling)
- Remote workers = telecommuters + mobile workers
- Virtual teams include remote workers as well as those in their offices, perhaps scattered geographically

- Virtual teams have a life cycle (Figure 4.4)

Telecommuting: Global Status

- A poll of 11,300 employees in 22 countries: 1 in 6 telecommute
- When employees in 13 countries were asked if they need to be in the office to be productive:
  - Overall 39% said “yes”
  - But specific countries differed in the “yes” votes:
    - Only 7% in India, but
    - 56% in Japan
    - 57% in Germany

Fig. 4.3 Changes to Supervision/Evaluations/Compensation/Hiring

<table>
<thead>
<tr>
<th>Traditional Approach: Subjective Observation</th>
<th>Digital Approach: Objective Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervision</td>
<td>It is personal and informal. Manager is usually present or relies on others to ensure that the employee is present and productive.</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Behavior controls are predominant. Focus is on process through direct observation. Manager sees how employee performs at work. Subjective (personal) factors are very important.</td>
</tr>
<tr>
<td>Compensation and Rewards</td>
<td>It is often individually based.</td>
</tr>
<tr>
<td>Hiring</td>
<td>Hiring is done through meetings with HR personnel with little concern for computer skills.</td>
</tr>
</tbody>
</table>

Fig. 4.4 Key Activities in the Life Cycle of Teams

<table>
<thead>
<tr>
<th>Phase</th>
<th>Preparation</th>
<th>Launch</th>
<th>Performance Management</th>
<th>Team Development</th>
<th>Disbanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Activities</td>
<td>Mission statement</td>
<td>Kick off meetings</td>
<td>Leadership</td>
<td>Assessment of needs/deficits</td>
<td>Recognition of achievements</td>
</tr>
<tr>
<td></td>
<td>Personal selection</td>
<td>Getting acquainted</td>
<td>Communication</td>
<td>Individual and team training</td>
<td>Reintegration of team members</td>
</tr>
<tr>
<td></td>
<td>Task design</td>
<td>Goal clarification</td>
<td>Conflict resolution</td>
<td>Evaluation of training effects</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technology selection and rollout</td>
<td>Norm development</td>
<td>Task accomplishment</td>
<td>Trust building</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Motivation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Norm enforcement</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>and shaping</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig. 4-5 Drivers of Remote Work and Virtual Teams

<table>
<thead>
<tr>
<th>Driver</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Shift to knowledge-based work</td>
<td>Decouples work from any particular place</td>
</tr>
<tr>
<td>2. Changing demographics and lifestyle preferences</td>
<td>Workers desire geographic and time-shifting flexibility</td>
</tr>
<tr>
<td>3. New technologies with enhanced bandwidth</td>
<td>Remotely-performed work is practical and cost-effective</td>
</tr>
<tr>
<td>4. Web ubiquity</td>
<td>Can stay connected 24/7</td>
</tr>
<tr>
<td>5. “Green/Energy” concerns</td>
<td>Reduced commuting costs; real estate energy consumption; travel costs</td>
</tr>
</tbody>
</table>

Fig. 4-6: Some advantages and disadvantages of remote work

<table>
<thead>
<tr>
<th>Advantages of Remote Work</th>
<th>Potential Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced stress; better ability to meet schedules; less distraction at work</td>
<td>Increased stress; Harder to separate work from home life</td>
</tr>
<tr>
<td>Higher morale and lower absenteeism</td>
<td>Harder to evaluate performance</td>
</tr>
<tr>
<td>Geographic flexibility</td>
<td>Employee may become disconnected from company culture</td>
</tr>
<tr>
<td>Higher personal productivity</td>
<td>Telecommuters are more easily replaced by offshore workers</td>
</tr>
<tr>
<td>Housebound individuals can join the workforce</td>
<td>Not suitable for all jobs or employees</td>
</tr>
<tr>
<td>Informal Dress</td>
<td>Security might be more difficult</td>
</tr>
</tbody>
</table>
VIRTUAL TEAMS

Virtual Teams

- Virtual Teams: geographically and/or organizationally dispersed coworkers
  - Assembled using telecommunications and IT
  - Aim is to accomplish an organizational task
  - Often must be evaluated using outcome controls
- Why are they growing in popularity?
  - Information explosion: some specialists are far away
  - Enhanced bandwidths/fast connections to outsiders
  - Technology is available to assist collaboration
  - Less difficult to get relevant stakeholders together

Figure 4.7 Comparison of challenges facing virtual and traditional teams

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Virtual Teams (VT)</th>
<th>Traditional Teams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications</td>
<td>Multiple zones can lead to increased inefficiency and communication difficulties.</td>
<td>Teams are located in same time zone, scheduling is less difficult.</td>
</tr>
<tr>
<td></td>
<td>Communication dynamics (e.g., non-verbal) are altered.</td>
<td>Teams may use richer communication media including face-to-face discussions.</td>
</tr>
<tr>
<td>Technology</td>
<td>Need for proficiency across wide range of technologies</td>
<td>Support for face-to-face interaction without replacing it.</td>
</tr>
<tr>
<td></td>
<td>Automatic creation of electronic repository to build organizational memory</td>
<td>Electronic communication skills not needed by team members.</td>
</tr>
<tr>
<td></td>
<td>Need for ability to align group structure and technology with the task environment</td>
<td>Skills and task-technology fit is less critical.</td>
</tr>
<tr>
<td>Team Diversity</td>
<td>Members represent different organizations and/or cultures:</td>
<td>More homogeneous members</td>
</tr>
<tr>
<td></td>
<td>Harder to establish a group identity.</td>
<td>Easier group identity</td>
</tr>
<tr>
<td></td>
<td>Require better communication skills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>More difficult to build trust, norms and shared meanings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>More likely to have different perceptions about time and deadlines.</td>
<td></td>
</tr>
</tbody>
</table>

Managerial Issues In Telecommuting and Mobile Work

- Planning, business and support tasks must be redesigned to support mobile and remote workers
- Training should be offered so all workers can understand the new work environment
- Employees selected for telecommuting jobs must be self-starters

Managing the Challenges

- **Communications** challenges
  - Policies and practices must support the work arrangements
  - Must prepare differently for meetings
  - Slides and other electronic material must be shared beforehand
  - Soft-spoken people are difficult to hear; managers must repeat key messages
  - Frequent communications are helpful (hard to “overcommunicate”)

- **Technology** challenges
  - Provide technology and support to remote workers
  - Use high quality web conferencing applications
  - Clarify time zones for scheduling
  - Information should be available for everyone (cloud storage can help)
  - Policies and norms about use of the technology can be important

Managing the Challenges (cont.)

- **Diversity** challenges
  - Concept of time differs throughout the world
    - Anglo-American cultures view time as a continuum (deadlines are important; many prefer not to multitask)
    - Indian cultures have a cyclical view of time (deadlines are less potent; many prefer to multitask)
  - Team diversity might need nurturing:
    - Communications differences
    - Trust building
    - Group identity formation
Virtual Organizations

- A structure that makes it possible for individuals to work for an organization and live anywhere.
- The Internet and corporate intranets create the opportunity for individuals to work from anywhere they can access a computer.
- The structure of a virtual organization is networked.
- Forms are electronic, tech. support through a web interface
- Business processes are also usually through the Web
- Success in a virtual organization is the amount of collaboration that takes place between individuals

Virtual Companies (Portable Computing)

A Virtual Company is an Organization composed of several Business Partners that Uses Information Technology to Link/Share People, Assets, Ideas, Costs, and Resources for the purpose of producing a product or service.

Virtual Companies are Adaptable and Opportunity-Exploiting Organizations Providing World-Class Excellence in Their Competencies and Technologies.

Characteristics of Virtual Companies

- Borderless
- Opportunism
- Trust-Based
- Excellence
- Adaptability
- Technology

Gaining Acceptance For IT-induced Change

- Many changes might be a major concern for employees
- Changes might be resisted if they are viewed as negative impacts
- Several types of resistance:
  - Denying that the system is up and running
  - Sabotage by distorting or otherwise altering inputs
  - Believing and/or spreading the word that the new system will not change the status quo
  - Refusing to use the new system (if voluntary)
they believe the system will change if:

- systems that change the basis of competition to a company’s disadvantage
- systems that lower entry barriers
- systems that bring on litigation or regulation
- systems that increase customer’s or suppliers’ power to the detriment of the innovator
- systems that pose an immediate threat to large, established competitors
- inadequate understanding of buying dynamics across market segments
- cultural lag and perceived transfer of power
Summary

• Technology has played a major role in transforming the way work is done.
• Virtual organizations permit workers to work from anywhere.
• Communication and collaboration is becoming increasingly important in today’s work.
• IT affects work by creating new work, and more.
• Hiring and supervising employees is being driven more and more by technology.
• Companies must support and encourage telecommuting to attract and retain employees.
• Virtual teams are becoming more common.