Managing and Using Information Systems: A Strategic Approach – Fifth Edition

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Information Systems and The Design Of Work

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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 it.
- Discuss how managers need to manage virtual teams and the challenges this creates.
- Understand how attitudes impact technology acceptance in organizations.

Real World Example

- Best Buy, the leading U.S. retailer in electronics, completely transformed its view of the ordinary workday.
- Known for killer hours and herd-riding bosses, it ushered in a new approach to work: Results-Only Work Environment (ROWE).
- Brainchild of two passionate employees who thought that Best Buy managers were mired in analog-age inertia and did not recognize that employees could use technology to perform work from a variety of places.
- ROWE is a program that allows limitless flexibility when it comes to work hours.
- Employees can choose where and when they will do their work as long as project goals are satisfied.
- Employee decisions about working hours and location are framed by 13 guideposts—the most surprising of which is “every meeting is optional.”

Real World Example (Cont.)

- Best Buy claims that productivity soared 41% between 2005 and 2007 on ROWE teams, and voluntary turnover plummeted 90%.
- This helped Best Buy save $16 million each year.
- Other companies (IBM and AT&T) have adopted similar strategies.
- The nature of work is changing before our eyes, and information technology is supporting, if not propelling, the changes.

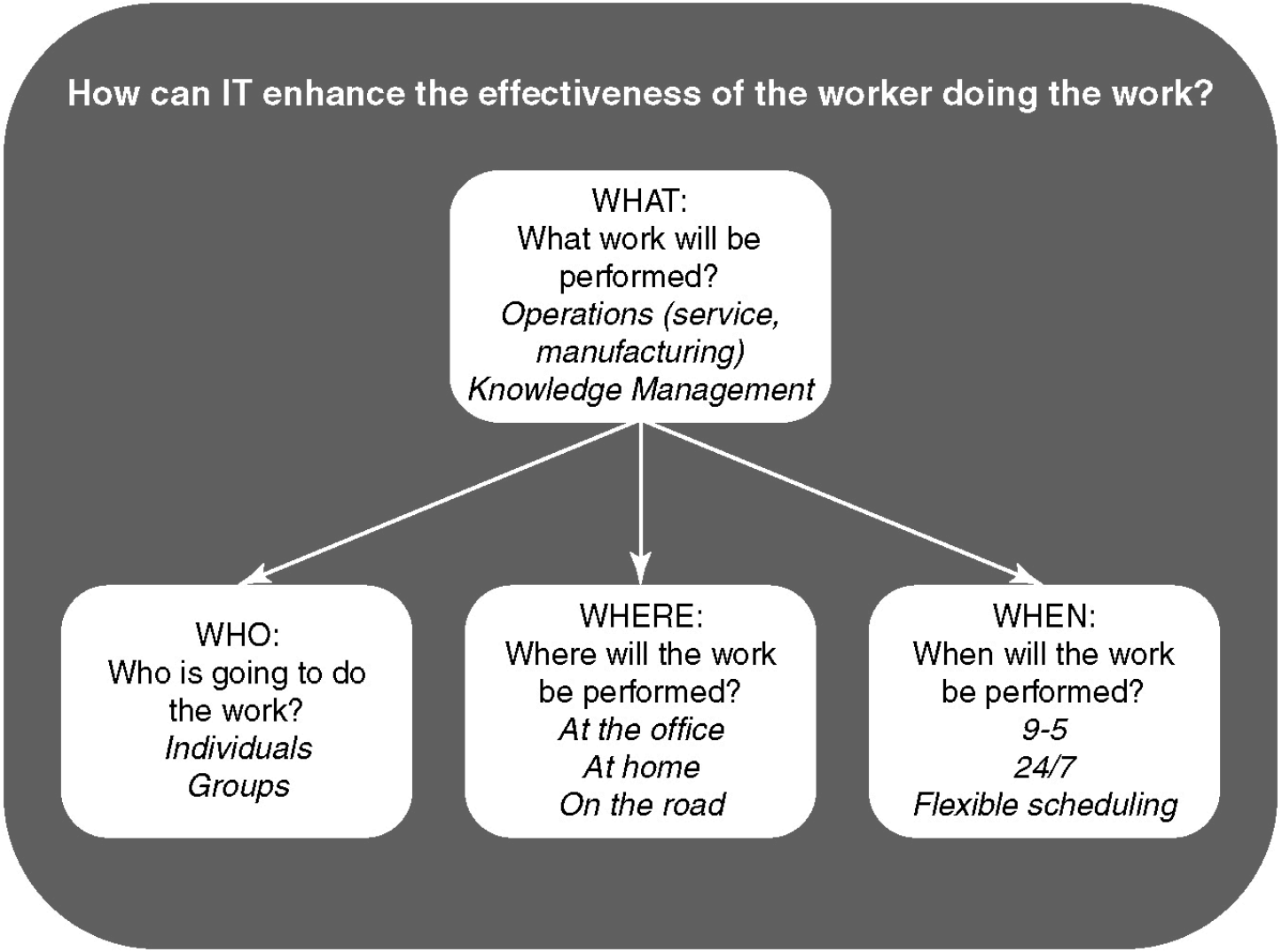
Work Design Framework

- Technology has now brought the approach to work full circle.
- Time and place of work are increasingly blending with other aspects of living.
- Employees can work at home via cyberspace and at times that accommodate home-life and leisure activities.
- Increasingly, places are being constructed in cyberspace using Web 2.0 tools that encourage **collaboration**.

IS Effect on How the Work is Done

- What work will be performed?
  - An assessment of specific desired outcomes, inputs, and the transformation needed to turn inputs into outcomes.
- Who is going to do the work?
  - Work can be automated.
  - If a person is going to do the work, what skills are needed?
- Where will the work be performed?
  - Does the work need to be performed locally at a company office?
- When will the work be performed?
- How can IT increase the effectiveness of the workers doing the work?
  - How can IT support collaboration?

Figure 4.1 Framework for work design.



How IT Supports Communication

- Digital natives introduced the use of social networking and blogs into the workplace.
- Major technologies have affected communications in today's work environment (Figure 4.2).
- IT includes technologies such as:
  - E-mail, intranets, instant messaging, VoIP, video teleconferencing, unified communications, RSS, virtual private networks, and file transfer.
- Collaboration is key in many work processes.

IT Supports Collaboration

- Thomas Friedman, the author of the popular ***The World is Flat*** and other books, argues that **collaboration** is the way that small companies can "act big" and flourish in today's flat world.
- The key to success is for such companies "to take advantage of all the new tools for collaboration to reach farther, faster, wider, and deeper."
- Collaboration tools include (Figure 4.2):
  - Social networking sites, virtual worlds, web logs (blogs), wikis, and groupware.

IT Alters Employee Life

- The three ways in which new IT alters employee life:
  - Creating new types of work.
  - Enabling new ways to do traditional work.
  - Supporting new ways to manage talent.
- IT often leads to the creation of new jobs or redefines existing ones.
- Positions in IT include:
  - Programmers, analysts, IT managers, hardware assemblers, website designers, software sales personnel, social media specialists, and IT consultants.
- The Bureau of Labor Statistics places the number of IT workers at 4.1 million.

Creating New Types of Work

- IT has created many new jobs and redefined existing ones.
- New types of jobs:
  - Knowledge managers - manage the firm's knowledge systems (Chapter 11).
  - Community managers - manage the firm's online communities.
  - Communications managers - manage the use of communication technologies for the business.
- IS departments also employ:
  - Systems analysts, database administrators, network administrators, and network security advisors.
- Every department in every business has someone who "knows the computer" as part of his or her job.

New Ways to Do Traditional Work

- Many traditional jobs are now done by computers (i.e., using spell check instead of an editor).
- The introduction of IT into an organization can greatly change the day-to-day tasks performed by the employees.
- Data entry workflow is faster.
  - Data is captured directly when it is entered by the user via:
    - web-based entry.
    - GPS signal.
    - RFID code.
- The Internet enables changes in many types of work.
- The cost and time required to access information has plummeted, increasing personal productivity and giving workers new tools.

Changing Communication Patterns

- Cell phones and other portable communication devices have changed our **communication environment**.
  - Talking on the cell phone, texting, and using apps to search for information.
- Applications (apps) such as Skype, Twitter, and Sina Weibo (Chinese Twitter) have changed how people communicate.
- IT is changing the **communication patterns** of workers.
- Some workers do not need to communicate with their co-workers for the bulk of the workday.
- Some workers need access to up-to-date information and communications between co-workers, customers, and suppliers.

Changing Collaboration

- Teams work more fluidly despite an increasing workload.
- Teams have learned to collaborate by continually structuring and re-structuring their work.
- IT helps make work more team-oriented and collaborative via:
  - Blogs, virtual worlds, wikis, social networking, and video teleconferencing.
- Workers can more easily share information with their teammates.
- The Internet greatly enhances collaboration—especially through e-mail, instant messaging, and Web 2.0 technologies.

Real World Example

- VeriFone, a leading manufacturer of credit verification systems, is well-known for its virtual organization.
- Founded in 1981 by an entrepreneur who hated bureaucracy.
- By 1990, it was the leading company for transaction automation with products and services used in more than 80 countries.
- Limited presence at corporate headquarters, and employees are placed close to their customers, limiting travel.
- At the heart of the company culture is constant and reliable sharing of information.

Changing the Ways to Connect

- New technologies enable people to be always connected.
- The boundaries between work and play are being blurred, and people often struggle with work-life balance.
- Technology at home differs from that at work:
  - Home: People use social media tools on tablets, laptops, and smart-phones.
  - Work: Computers have limited Internet connectivity.
- CIOs have the ability to drastically improve productivity by making directories of knowledge-holders available through newer social media tools.
- IS can greatly change day-to-day tasks, which in turn change the skills needed by workers.

New Challenges in Managing People

- New challenges in how workers are **supervised**, **evaluated**, **compensated**, and **hired**.
- Managing a global workforce (Figure 4.3):
  - Working in isolation from direct supervision.
  - Increasingly **working in teams**.
- One solution is to use electronic employee monitoring systems, automating supervision.
  - Tracks activities such as the number of calls processed, e-mail messages sent, or time spent surfing the web.

Figure 4.3 Changes to supervision, evaluation, compensation, and hiring.

	Traditional Approach: Subjective Observation	Newer Approach: Objective Assessment
Supervision	Personal and informal. Manager is usually present or relies on others to ensure that employee is present and productive.	Electronic or assessed by deliverable. As long as the employee is producing value, he does not need formal supervisions.
Evaluation	Focus is on process through direct observation. Manager sees how employee performed at work. Subjective (personal) factors are very important.	Focus is on output by deliverable (e.g., produce a report by a certain date) or by target (e.g., meet a sales quota). As long as deliverables are produced and/or targets are achieved, the employee is meeting performance expectations adequately. Subjective factors may be less important and harder to gauge.
Compensation and Rewards	Often individually-based.	Often team-based or contractually spelled out.
Hiring	Personal with little reliance on computers. Often more reliance on clerical skills.	Often electronic with recruiting websites and electronic testing. More information-based work that requires a higher level of IT skills.

IT Has Changed Hiring

1. Workers must know how to use the technology for their job or be trainable.
   - Hiring procedures incorporate activities that determine the skills of applicants.
2. IT utilization affects the array of non-technical skills needed in an organization.
   - IT-savvy companies can eliminate clerical capabilities from their hiring practices and focus resources on more targeted skills.
3. IT has become an essential part of the hiring process (online job postings, online applications, etc.).
   - Social networking also involves informal introductions and casual conversations in cyberspace.
   - Virtual interviews can be arranged to reduce recruiting costs.

IT Has Changed Hiring (Cont.)

4. Companies increasingly realize that hiring is changing.
   - Recruiting efforts reflect the new approaches people are using to look for jobs.
   - Tech-savvy job applicants are now using business-oriented social networks, jobs, online job search engines, and a new Facebook app.

- The design of the work needed by an organization is a function of:
  - the skill mix required for the firm's work processes.
  - the flow of those processes themselves.
- Employees who cannot keep pace are increasingly unemployable.

Telecommuting and Mobile Work

- The terms **telecommuting and mobile worker** are often used to describe flexible work arrangements.
- **Telecommuting** (or teleworking) - work arrangements with employers that allow employees to work from home, at a customer site, or from other convenient locations instead of the corporate office.
- Telecommuting is derived from combining "telecommunications" with "commuting."
  - Workers use telecommunications instead of commuting to the office.
- **Mobile workers**:
  - work from wherever they are.
  - utilize technology necessary to access coworkers, company computers, intranets, and other information sources.

Factors Driving Telecommuting and Mobile Work

- Telecommuting has been around since the 1970s but has gained popularity since the late 1990s.
- In 2008, according to World at Work, more than 17.2 million Americans and 33.7 million people worldwide telecommute.
- American telecommuters are expected to increase by 29 million telecommuters, or 43% of the workforce, by 2016 as more work is performed from remote locations.
- Table 4.4 describes the factors driving telecommuting and virtual teams.

Figure 4.4 Driving factors of telecommuting and virtual teams.

Driver	Effect
Shift to knowledge-based work	Eliminates requirement that certain work be performed in a specific place.
Changing demographics and lifestyle preferences	Provides workers with geographic- and time-shifting flexibility.
New technologies with enhanced bandwidth	Makes remotely performed work practical and cost-effective.
Reliance on web	Provides workers with the ability to stay connected to co-workers and customers, even on a 24/7 basis.
Energy concerns	Reduces the cost of commuting for telecommuters and reduces energy costs associated with real estate for companies.

The Growth of Telecommuting

1. Work is increasingly knowledge-based. Employees can create, assimilate, and distribute knowledge at home as effectively as they can at an office.
2. Telecommuting enables workers to shift their work to accommodate their lifestyles (e.g., parents, disability).
   - Telecommuting enables geographic flexibility.
3. New technologies used by telecommuters are becoming better and cheaper (e.g., price of PC and "back office" applications).
4. The increasing reliance on web-based technologies by all generations (particularly Generation Y and Millennials).

The Growth of Telecommuting (Cont.)

5. A mounting emphasis on conserving energy.
   - As the cost of gasoline continues to skyrocket, employees are looking for ways to save money.
   - Companies can also experience lower energy costs from telecommuting.
     - Energy is no longer needed to heat or cool these office spaces.
   - Companies seek to comply with the Clean Air Act and to be praised for their "green computing" practices. At the same time, they are reaping considerable cost savings.

Disadvantages of Telecommuting – Managers Position

- More difficult for managers to evaluate and compensate performance.
  - Many telecommuting tasks do not produce well-defined deliverables or results, or managerial controls typically prove inadequate.
  - Managers must rely heavily on the telecommuter's self-discipline.
- Managers may feel they are losing control over their employees.
- Some telecommuting employees abuse their privileges.
- Managers accustomed to traditional work models may strongly resist telecommuting.

Disadvantages of Telecommuting – Telecommuters Position

- Telecommuters must:
  - Exert a high level of self-discipline to ensure they get the work done.
  - Avoid distractions (e.g., personal phone calls, visitors, and inconvenient family disruptions).
- A flexible work situation makes it difficult to separate work from personal life.
- May end up working more hours than the standard nine-to-five worker.
- Working remotely can disconnect telecommuters from their company's culture and make them feel isolated.
- Another risk is offshoring and outsourcing of software development and computer services enabled by the same technologies.

Figure 4.5 Advantages and disadvantages of telecommuting.

Employee Advantages of Telecommuting	Potential Problems
Reduced stress due to increased ability to meet schedules, heightened morale, and lower absenteeism	Harder to evaluate performance, increased stress from inability to separate work from home life
Geographic flexibility	Employee may become disconnected from company culture
Higher personal productivity	Telecommuters are more easily replaced by electronic immigrants
Housebound individuals can join the workforce	Not suitable for all jobs or employees

Managerial Issues in Remote Work

- Planning, business, and support tasks must be redesigned to support remote workers.
- Training should be offered so all workers can understand the new work environment.
- Managers must find new ways to evaluate and supervise those employees without seeing them every day in the office.
  - Work to coordinate schedules and ensure adequate communication among all workers.
  - Establish policies about using different technologies to support communications.
  - Help the organization adapt by building business processes to support remote workers.

Security Issues in Remote Work

- "BYOD" (Bring Your Own Device) - remote workers have their own computers in the location where they work.
- Remote workers pose a threat to office workers:
  - Once an infected computer is connected to the network, perimeter security technology is unable protect all the other workers on the network.
- It is impossible for organizations to make remote workers totally secure.
- Managers need to get more involved:
  - Assessing the areas and severity of risk.
  - Taking appropriate steps via policies, education, and technology.

Virtual Teams

- Two or more people who:
  1. Work together interdependently with mutual accountability for achieving common goals.
  2. Do not work in the same place and/or at the same time.
  3. Use electronic communication technology to communicate, coordinate their activities, and complete their team's tasks.
- Virtual team members may be in different locations, organizations, time zones, or time shifts.
- Virtual teams are thought to have a life cycle (Figure 4.6).

Figure 4.6 Key activities in the life cycle of virtual teams.

Phase	Preparation	Launch	Performance Management	Team Development	Disbanding
Key Activities	Mission statement Personnel selection Task design Rewards system Technology selection and installment	Kick-off meetings Getting acquainted Goal clarification Norm development	Leadership Communication Conflict resolution Task accomplishment Motivation Knowledge management Norm enforcement and shaping	Assessment of needs/ deficits Individual and/or team training Evaluation of training effects Trust building	Recognition of achievements Re-integration of team members

Factors Driving Use of Virtual Teams

- The same drivers for telecommuting can be applied to virtual teams.
- Virtual teams offer advantages in terms of expanding the knowledge base through team membership.
- Managers can draw team members with needed skills or expertise from around the globe without large travel expenses.
- Virtual teams can benefit from following the sun.
  - Teams in different parts of the world can cooperate to get work done faster due to time zone differences.

Disadvantages and Challenges of Virtual Teams

- Different time zones.
- Security is harder to ensure.
- Considerable number of challenges that could turn into disadvantages (Figure 4.7).
- Electronic communications may not allow the person to convey nuances that are possible with face-to-face conversation.
- Trust may be slower to form.
- Diversity of team members (languages, nations, cultures, etc.).

Figure 4.7 Comparison of challenges facing virtual and traditional teams.

Challenges	Virtual Teams	Traditional Teams
Communications	Multiple zones can lead to greater efficiency and communication difficulties. Communication dynamics (e.g., non-verbal) are altered.	Teams are located in same time zone. Scheduling is less difficult. Teams may use richer communication media.
Technology	Team members must have proficiency across a wide range of technologies. Technology offers an electronic repository. Work group effectiveness may be more dependent on alignment of the group and technologies used.	Technology is not critical, and tools are not essential for communications. Electronic repositories are not typically used. Task technology fit may not be as critical.
Team Diversity	Members typically come from different organizations and/or cultures which makes it: -Harder to establish a group identity. -Necessary to have better communication skills. -More difficult to build trust, norms, etc.	Because members are more homogeneous, group identity is easier to form. Because of commonalities, communications are easier to complete successfully.

Managerial Issues in Virtual Teams

- Require different styles and types of management, particularly with management control activities.
- Observation is less likely to occur.
- Performance is more likely to be based on output.
- Providing feedback is important.
- Compensation should be based heavily on the team's performance.
- Align reward systems with the accomplishment of desired team goals.
- Policies about the selection, evaluation, and compensation of virtual team members may need to be enacted.

Communication Challenges

- Managers must learn to keep the lines of communication open to allow team members to get their work done.
- Frequent communication is essential to success.
- Need appropriate technological support (i.e., video teleconferencing, interactive groupware, etc.).
- Face-to-face meetings are the heartbeat of successful global virtual teams.
- Well-managed synchronous meetings using video teleconferencing—or possibly in a virtual world—can activate the heartbeat.

Technology Challenges

- All team members must have the same or compatible technologies at their locations.
- Managers must ensure that remote workers have seamless telephone transfers to the home office, desktop support, network connectivity, and security support.
- Policies and norms (unwritten rules) must be established.
- Diversity challenges – different cultures have different perceptions of time and task importance.
- Providing the appropriate technologies for each culture is key.

Gaining Acceptance for IT-Induced Change

- Employees may resist the changes if they view them as negatively affecting them.
  - If they do not fully understand or are not prepared, they may resist in several ways:
    - denying that the system is up and running.
    - sabotaging the system by distorting or altering inputs.
    - convincing themselves and others that the new system will not change the status quo.
    - refusing to use the new system when its usage is voluntary.

Managing Change

- To avoid resistance behavior, John Kotter builds upon Lewin's change model of unfreezing, changing, and refreezing.
- Kotter recommends eight specific steps in bringing about change (Figure 4.8).
- Managers should:
  - keep the eight steps in mind as they introduce change into their workplaces.
  - inform workers why the change is being made prior to the change happening.
  - follow the change with reinforcement behaviors.
  - reward employees who have successfully adopted new desired behaviors.

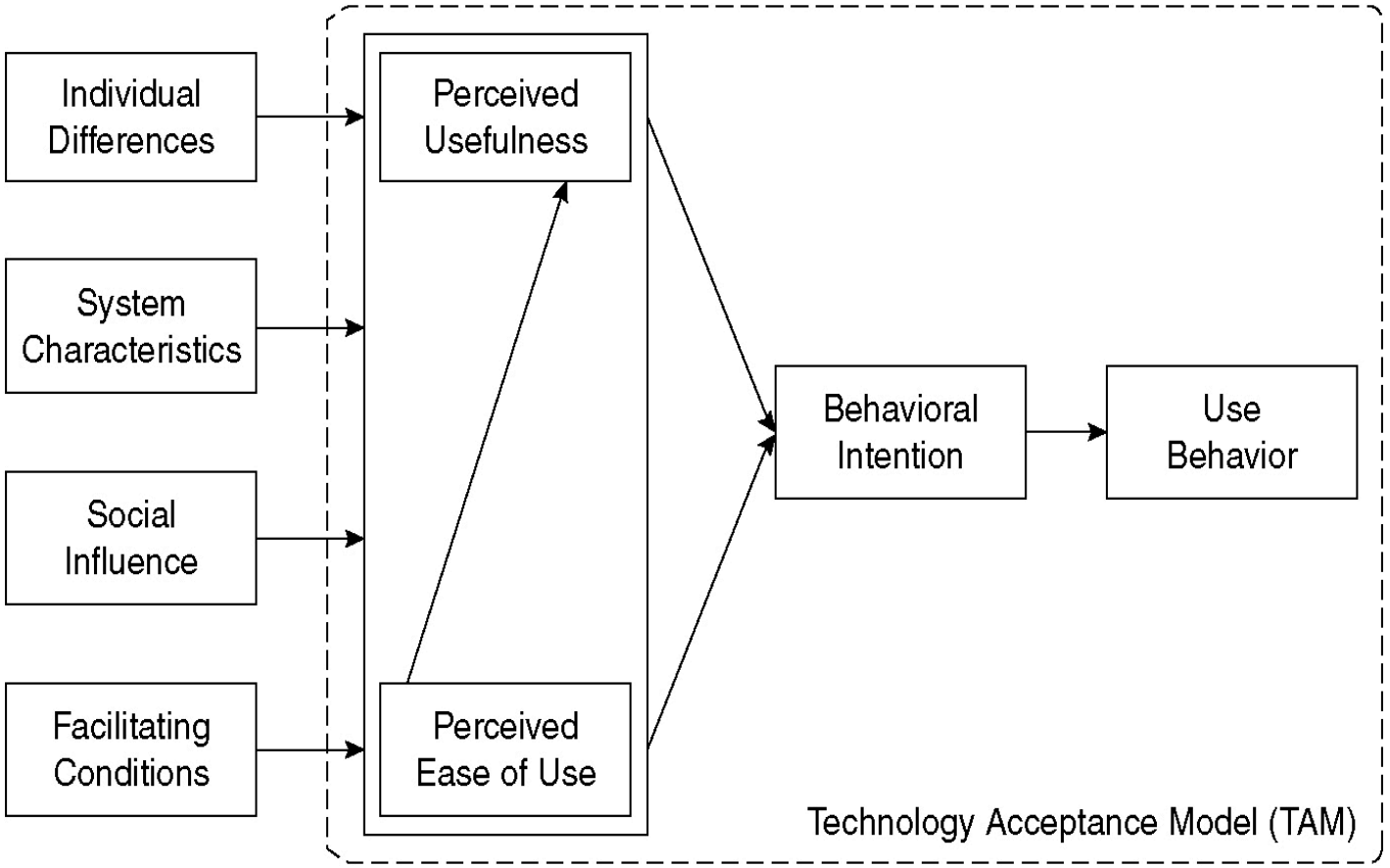
Figure 4.8 Stages and steps in change management.

Lewin's Stage	Unfreezing	Changing	Refreezing
Definition	*Creating motivation to change*	*Providing stakeholders with new information, systems, products, or services*	*Reinforcing change by integrating stakeholder's changed behaviors and attitudes into new operations resulting from change*
Kotter's Steps	**1.** Establish a sense of urgency: Create a compelling reason why change is needed. **2.** Create the guiding coalition: Select a team with enough expertise and power to lead the change. **3.** Develop a vision and strategy: Use the vision and strategic plan to guide the change process. **4.** Communicate the change vision: Devise and implement a communication strategy to consistently convey the vision.	**5.** Empower broad-based action: Encourage risk-taking and creative problem solving to overcome barriers to change. **6.** Generate short-term wins: Celebrate short-term improvements and reward contributions to change effort. **7.** Consolidate gains and produce more change: Use credibility from short-term wins to promote more change so that change cascades throughout the organization.	**8.** Anchor new approaches in the culture: Reinforce change by highlighting areas where new behaviors and processes are linked to success.

Technology Acceptance Model and Its Variants

- The Technology Acceptance Model (TAM) was developed by Fred Davis and his colleagues (Figure 4.9).
- TAM suggests that managers cannot get employees to use a system until they want to use it.
- Managers may need to employ unfreezing tactics to change employee attitudes about the system.
- Employee attitudes may change if:
  - they believe the system will allow them to do more or better work for the same amount of effort (perceived usefulness).
  - they believe the system is easy to use (perceived ease of use).

Figure 4.9 Simplified technology acceptance model 3 (TAM3).



Source: Viswanath Venkatest and Hilol Bala, "Technology Acceptance Model 3 and a Research Agenda on Interventions," Decision Sciences (2008), 39(2), 276.

Chapter 4 - Key Terms

E-mail (p. 105) - means of transmitting messages over communication networks.

File transfer (p. 106) - means of transferring a copy of a file from one computer to another on the Internet.

Groupware (p. 106) - software that enables group members to work together on a project, even from remote locations, by supporting group decision making, information processing, and simultaneous file access. Calendars, documents, e-mail messages, databases, decision-making tools, and meetings are popular applications.

Chapter 4 - Key Terms (Cont.)

Instant messaging (IM) (p. 105) - Internet protocol (IP)-based application that provides real-time text-based communication between people using a variety of different device types, including computer-to-computer and mobile devices.

Intranet (p. 105) - network that looks and acts like the Internet but is comprised of information used exclusively within a company and is unavailable to the general public via the Internet.

Mobile worker (p. 116) - workers who work from wherever they are.

Offshoring (p. 120) - foreign outsourcing.

Chapter 4 - Key Terms (Cont.)

RSS (Web feed) (p. 106) - structured file format for porting data from one platform or information system to another.

Social networking site (p. 106) - web-based service that allows its members to create a public profile with their interests and expertise, post text and pictures and all manner of data, list other users with whom they share a connection, and view and communicate openly or privately with their list of connections and those made by others within the system.

Chapter 4 - Key Terms (Cont.)

Telecommuting (p. 116) - work arrangements with employers that allow employees to work from home, at a customer site, or from other convenient locations instead of coming into the corporate office.

Unified communications (p. 105) - suite of products that provides a consistent, unified user interface and user experience across multiple devices and media types.

Video teleconference (p. 105) - set of interactive telecommunication technologies that simultaneously allow two or more locations to interact via two-way video and audio transmissions.

Chapter 4 - Key Terms (Cont.)

Virtual teams (p. 122) - two or more people who work together interdependently with mutual accountability for achieving common goals, do not work in the same place and/or at the same time, and must use electronic communication technology to communicate, coordinate their activities, and complete their team's tasks.

Virtual private network (VPN) (p. 105) - network that primarily uses public telecommunication infrastructure, such as the Internet, to provide remote offices or traveling users access to a central organizational network.

Chapter 4 - Key Terms (Cont.)

Virtual world (p. 106) - electronic environment that visually mimics complex three-dimensional physical spaces where people can interact with each other and with virtual objects and where people are represented by animated characters called avatars.

Voice over Internet Protocol (VoIP) (p. 105) - method for taking analog audio signals (i.e., those used in phone calls) and turning them into digital data that can be transmitted over the Internet.

Web logs (blogs) (p. 106) - online journals that link together into a very large network of information sharing.

Chapter 4 - Key Terms (Cont.)

Wiki (p. 106) - software that allows users to work collaboratively to create, edit, and link web pages easily. Wikis are especially good for supporting multimedia content, keeping track of multiple revisions of a document, and collaborating on writing a document.

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