Chapter 1

Business Information Systems in Your Career
INTERNET PENETRATION BY REGION

REGIONAL PENETRATION FIGURES, COMPARING INTERNET USERS TO TOTAL POPULATION

GLOBAL AVERAGE: 53%

NORTHERN EUROPE: 94%
EASTERN EUROPE: 74%
NORTHERN AMERICA: 88%
THE CARIBBEAN: 48%
CENTRAL AMERICA: 61%
SOUTH AMERICA: 68%
SOUTHERN AFRICA: 49%
WESTERN AFRICA: 39%
MIDDLE EAST AFRICA: 12%
EASTERN AFRICA: 27%
SOUTHERN ASIA: 65%
WESTERN ASIA: 36%
SOUTHEAST ASIA: 58%
EASTERN ASIA: 57%
CENTRAL ASIA: 50%
OCEANIA: 69%

SOURCES: INTERNETWORLDSSTATS; ITU; EUROSTAT; INTERNETLIVESTATS; CIA WORLD FACTBOOK; MIDEASTMEDIA.ORG; FACEBOOK; GOVERNMENT OFFICIALS; REGULATORY AUTHORITIES; REPUTABLE MEDIA. NOTE: PENETRATION FIGURES ARE FOR TOTAL POPULATION, REGARDLESS OF AGE.
### DAILY TIME SPENT ON SOCIAL MEDIA

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Across the globe, **16-24s are devoting the most time per day to social media - a significant 3 hours 1 minute, on average.** The importance of messaging apps to this demographic is a key reason behind this, as is the centrality of smartphones to their digital lives. But 25-34s are not far behind.

With younger groups being the most enthusiastic about social media, and with the internet populations of fast-growth markets tending to be younger than most mature markets, we have clear context for why the top-line figures for daily time spent on social media differ so significantly between markets (from a high of 4 hours 11 minutes in the Philippines to much lower figures of c.1 hour in countries such as South Korea and Germany).

If we examine the habits of 16-24s in isolation, we see many mature markets posting high numbers – with this age group in the UK and Portugal spending more than 3 hours on social media daily. But the effects aren’t down to age alone. Even among 16-24s, certain markets in Asia and Latin America stand out for their occupation with social media. Particularly notable are the Philippines, Indonesia, Malaysia, Brazil and Colombia.

**Digital consumers average 8.5 social media accounts, but multi-networking seems to be approaching its peak**
E-COMMERCE DETAIL: CONSUMER GOODS

An overview of the e-commerce market for consumer goods, with values in United States dollars.

- **Total number of people purchasing consumer goods via e-commerce**: 1.77 billion
  - Year-on-year change: +8%

- **Penetration of consumer goods e-commerce (total population)**: 23%

- **Value of the consumer goods e-commerce market (total annual sales revenue)**: $1.474 trillion
  - Year-on-year change: +16%

- **Average annual revenue per user of consumer goods e-commerce (ARPU)**: $833
  - Year-on-year change: +7%

*Source: Statista Digital Market Outlook, E-commerce Industry, Accessed January 2018. Notes: Figures represent sales of physical goods via digital channels on any device to private end users, and do not include digital media, digital services such as travel or software, B2B products and services, resale of used goods, or sales between private persons (P2P commerce). Penetration figure represents percentage of total population, regardless of age.*
E-COMMERCE PENETRATION

PERCENTAGE OF THE POPULATION WHO BOUGHT SOMETHING ONLINE VIA ANY DEVICE IN THE PAST MONTH [SURVEY-BASED]

SOURCE: GLOBALWEBINDEX, Q2 & Q3 2017.
SHARE OF WEB TRAFFIC BY DEVICE

JAN
2018

BASED ON EACH DEVICE’S SHARE OF ALL WEB PAGES SERVED TO WEB BROWSERS

LAPTOPS & DESKTOPS

MOBILE PHONES

TABLET DEVICES

OTHER DEVICES

43%
52%
4%
0.14%

YEAR-ON-YEAR CHANGE:
-3%
+4%
-13%
+17%

Figure 1.1: Information Technology Capital Investment
Information is often aggregated data that has meaning such as average age, youngest and oldest customer, and a histogram of customer ages.
Globalization Challenges and Opportunities: A Flattened World

• Internet and global communications have greatly reduced economic and cultural advantages of developed countries.
  – Drastic reduction of costs of operating and transacting on global scale
  – Competition for jobs, markets, resources, ideas
  – Dependence on imports and exports
  – Requires new understandings of skills, markets, opportunities
Business Drivers of Information Systems

- Businesses invest in IT to achieve six important business objectives.
  1. Operational excellence
  2. New products, services, and business models
  3. Customer and supplier intimacy
  4. Improved decision making
  5. Competitive advantage
  6. Survival
Operational Excellence

• Improved efficiency results in higher profits.
• Information systems and technologies help improve efficiency and productivity.
New Products, Services, and Business Models

- Information systems and technologies enable firms to create new products, services, and business models.
- Business model: how a company produces, delivers, and sells its products and services.
Customer and Supplier Intimacy

• Customers who are served well become repeat customers who purchase more.

• Close relationships with suppliers result in lower costs.
Improved Decision Making

• If managers rely on forecasts, best guesses, and luck, they will misallocate employees, services, and inventory.

• Real-time data improves ability of managers to make decisions.

• Verizon: Web-based digital dashboard to update managers with real-time data on customer complaints, network performance, and line outages
Competitive Advantage

• Often results from achieving previous business objectives

• Advantages over competitors:
  – Charging less for superior products, better performance, and better response to suppliers and customers
Survival

- Businesses may need to invest in information systems out of necessity; simply the cost of doing business.
- Keeping up with competitors
- Federal and state regulations and reporting requirements
What is an Information System? (1 of 2)

• **Information technology (IT)** consists of all the hardware and software that a firm needs to use in order to achieve its business objectives.

• Information system: interrelated components that manage information to:
  – Support decision making and control
  – Help with analysis, visualization, and product creation

• Data: streams of raw facts

• Information: data shaped into meaningful, useful form
What is an Information System? (2 of 2)

- Activities in an information system that produce information:
  - Input
  - Processing
  - Output
  - Feedback

- Sharp distinction between computer or computer program versus information system
**Figure 1.1 Data and Information**

Data
- A “given,” or fact; a number, a statement, or a picture
- Represents something in the real world
- The raw materials in the production of information

Information
- Data that have meaning within a context
- Data in relationships
- Data after manipulation
What is a System?

- System; component, interaction, goal – input, process, output
  - A set of elements or components that work together and interact to accomplish goals
  - A combination of components working together
    - a computer system includes both hardware and software.
  - An organization or methodology
Figure 1.2 Functions of an Information System
The Role of People and Organizations

• Information systems literacy
  – Includes behavioral and technical approach

• Computer literacy
  – Focuses mostly on knowledge of IT

• Management information systems (MIS)
  – Focuses on broader information systems literacy
  – Issues surrounding development, use, impact of information systems used by managers and employees
Figure 1.3 Information Systems are More Than Computers
• Organizations
  – Coordinate work through structured hierarchy and business processes
  – Business processes: related tasks and behaviors for accomplishing work
    ▪ Examples: fulfilling an order, hiring an employee
    ▪ May be informal or include formal rules
  – Culture embedded in information systems
    ▪ Example: UPS’s concern with placing service to customer first
Dimensions of Information Systems (2 of 3)

• People
  – Information systems require skilled people to build, maintain, and use them.
  – Employee attitudes affect ability to use systems productively.
  – Role of managers:
    ▪ Perceive business challenges
    ▪ Set organizational strategy
    ▪ Allocate human and financial resources
    ▪ Creative work: new products, services
Dimensions of Information Systems (3 of 3)

• Technology
  – IT Infrastructure: Foundation or platform that information systems are built on
    ▪ Computer hardware
    ▪ Computer software
    ▪ Data management technology
    ▪ Networking and telecommunications technology
      – Internet and Web, extranets, intranets
      – Voice, video communications
The Problem-Solving Approach

• Few business problems are simple or straightforward.
• Most business problems involve a number of major factors that can fall into three main categories:
  – Organization
  – Technology
  – People
A Model of the Problem-Solving Approach (1 of 7)

• Problem solving: four-step process

1. Problem identification
2. Solution design
3. Choice
4. Implementation
A Model of the Problem-Solving Approach (2 of 7)

- Problem identification includes:
  - Agreement that problem exists
  - Definition of problem
  - Causes of problem
  - What can be done given resources of firm
A Model of the Problem-Solving Approach (3 of 7)

• Typical organizational problems
  – Outdated business processes
  – Unsupportive culture and attitudes
  – Political in-fighting
  – Turbulent business environment, change
  – Complexity of task
  – Inadequate resources
A Model of the Problem-Solving Approach (4 of 7)

• Typical technology problems
  – Insufficient or aging hardware
  – Outdated software
  – Inadequate database capacity
  – Insufficient telecommunications capacity
  – Incompatibility of old systems with new technology
  – Rapid technological change
A Model of the Problem-Solving Approach (5 of 7)

• Typical people problems
  – Lack of employee training
  – Difficulties of evaluating performance
  – Legal and regulatory compliance
  – Work environment, ergonomics
  – Poor or indecisive management
  – Lack of employee support and participation
A Model of the Problem-Solving Approach (6 of 7)

• Solution design
  – Often many possible solutions
  – Consider as many as possible to understand range of solutions

• Solution Evaluation and Choice
  – Factors include
    ▪ Cost
    ▪ Feasibility given resources and skills
    ▪ Length of time needed to implement solution
A Model of the Problem-Solving Approach (7 of 7)

• Implementation
  – Building or purchasing solution
  – Testing solution, employee training
  – Change management
  – Measurement of outcomes
  – Feedback, evaluation of solution

• Problem solving is a continuous process, not a single event
  – Sometimes chosen solution doesn’t work or needs adjustment
Figure 1.4 Problem Solving is a Continuous Four-Step Process

- Problem identification
- Solution design
- Solution evaluation and choice
- Implementation

Feedback
The Role of Critical Thinking in Problem Solving (1 of 2)

• Without critical thinking, easy to jump to conclusions, misjudge a problem, and waste resources

• Critical thinking:
  – Sustained suspension of judgment with an awareness of multiple perspectives and alternatives
  – Ability to collect and analyze data that might help understand the nature of the problem; a “data driven” approach
The Role of Critical Thinking in Problem Solving (2 of 2)

• Four elements of critical thinking:
  1. Maintaining doubt and suspending judgment
  2. Being aware of different perspectives
     ▪ Including technology, organization, and people perspectives
  3. Testing alternatives and letting experience guide
  4. Being aware of organizational and personal limitations
The Connections Among Business Objectives, Problems, and Solutions

- When firms cannot achieve business objectives these objectives become challenges.
- Information systems often present solutions, partially or fully, to these challenges.
It Isn’t Just Technology: A Business Perspective on Information Systems (1 of 3)

• Information system is instrument for creating value
• Investments in information technology will result in superior returns
  – Productivity increases
  – Revenue increases
  – Superior long-term strategic positioning
It Isn’t Just Technology: A Business Perspective on Information Systems (2 of 3)

• Business information value chain
  – Raw data acquired and transformed through stages that add value to that information
  – Value of information system determined in part by extent to which it leads to better decisions, greater efficiency, and higher profits

• Business perspective
  – Calls attention to organizational and managerial nature of information systems
It Isn’t Just Technology: A Business Perspective on Information Systems (3 of 3)

• Investing in information technology does not guarantee good returns

• There is considerable variation in the returns firms receive from systems investments

• Factors
  – Adopting the right business model
  – Investing in complementary assets (organizational and management capital)
Figure 1.7: The Business Information Value Chain

Figure 1.8: Variation in Returns on Information Technology

Quadrant 1 represents firms that invest much less in IT but still receive strong returns.

Quadrant 2 represents firms that invest a great deal in IT and receive a great deal in returns.

Quadrant 3 represents firms that invest much less in IT and receive poor returns.

Quadrant 4 represents firms that invest a great deal in IT but receive poor returns.
Complementary Assets: Organizational Capital and the Right Business Model (1 of 2)

- Assets required to derive value from a primary investment
- Firms supporting technology investments with investment in complementary assets receive superior returns
- Example: Invest in technology and the people to make it work properly
Complementary Assets: Organizational Capital and the Right Business Model (2 of 2)

• Complementary assets
  – Examples of organizational assets
    ▪ Appropriate business model
    ▪ Efficient business processes
  – Examples of managerial assets
    ▪ Incentives for management innovation
    ▪ Teamwork and collaborative work environments
  – Examples of social assets
    ▪ The Internet and telecommunications infrastructure
    ▪ Technology standards
Figure 1.9: Contemporary Approaches to Information Systems
Technical Approach

• Emphasizes mathematically based models
• Computer science, management science, operations research
Behavioral Approach

• Behavioral issues (strategic business integration, implementation, etc.)
• Psychology, economics, sociology
Approach of This Text: Sociotechnical Systems (1 of 2)

• Management information systems
  – Combines computer science, management science, operations research, and practical orientation with behavioral issues

• Four main actors
  – Suppliers of hardware and software
  – Business firms
  – Managers and employees
  – Firm’s environment (legal, social, cultural context)
Approach of This Text: Sociotechnical Systems (2 of 2)

• Sociotechnical view
  – Optimal organizational performance achieved by jointly optimizing both social and technical systems used in production
  – Helps avoid purely technological approach