Roots of E-Business

Michael B. Spring
Department of Information Science and
Telecommunications
University of Pittsburgh
spring@imap.pitt.edu
http://www.sis.pitt.edu/~spring

Overview

- Perspectives and Definition
- Driving forces
  - Roots
  - Key forces
  - Peripheral forces
- Electronic business transactions
- The current technologies
  - The Internet and World Wide Web
  - Client server systems
  - Smart software

1

Perspectives on E-Business

- E-Business is a new and evolving field
- It may be examined from a variety of perspectives
  - Business: efficient business management
  - Technology: transformed and new processes
  - Economic: new markets and mechanisms
  - Cultural: new behaviors and expectations

Electronic Commerce
Kalakota and Whinston

- The delivery of information and services by electronic means
- The application of technology to business transactions and workflow
- Tools to cut the cost of, and improve the quality of, services
- The buying and selling of products and information on the internet
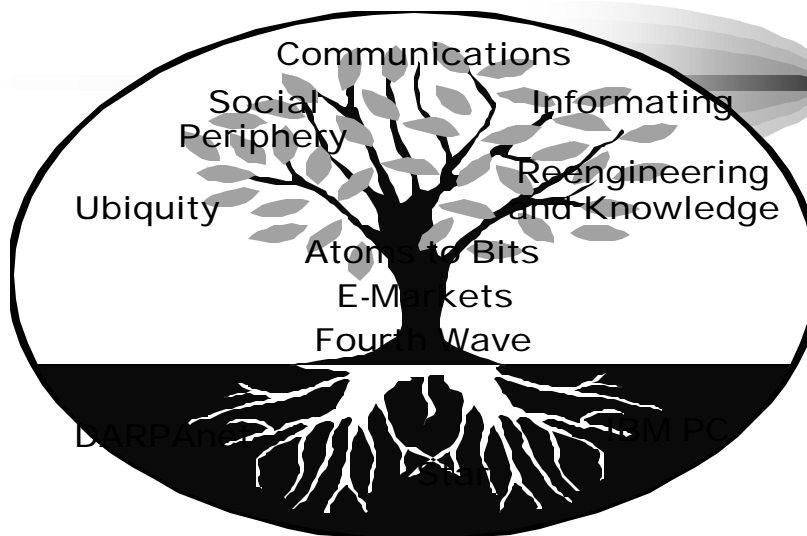
Electronic Business

- A business where selected business processes are transformed using computer and network technologies.
- The targets of opportunity are:
  - New channels for products
  - New efficiencies in product and workflow management
  - New capabilities in customer and document management
  - New opportunities for organizational structuring -- process reengineering and knowledge management.

E-Business Roots, Trunk, & Branches

Communications
Social
Periphery
Informating
Reengineering
Ubiquity
and Knowledge
Atoms to Bits
E-Markets
Fourth Wave
DARPAnet
SM PC

Roots of E-Business

- Darpanet
  - Unix/Sockets, IP, TCP, and FTP
- The Xerox Star
  - Ethernet, GUI (Mouse, Icons & Windows), Laser printer
- The IBM PC
  - Commodity computing

Trunk of E-Business

- Atoms versus Bits
  - The economics of bits
- E-markets
  - Immediacy and Scalability
  - Disintermediation
- Fourth Wave
  - Upside down processes

Branches

- Information and Informating
- Reengineering and Knowledge
- Calculation and Communication
- Social Periphery and Social Capital
- Ubiquitous Computing and Idiot Savants

A Conceptual Framework "Informating"

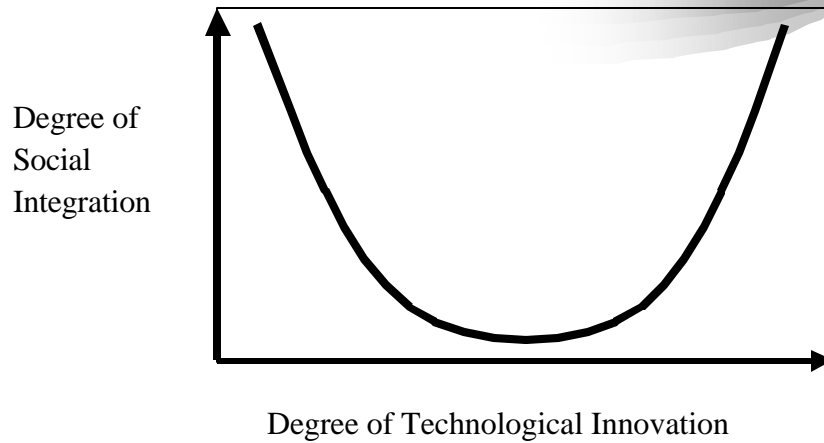**In the Age of the Smart Machine**

Shoshanna Zuboff

- Power technology and work – automation
- Computer technology and work – information
- Learning from Fredrick Taylor
- Blauner's U-curve of technology integration

Blauner's Hypothesis

Degree of
Social
Integration

Degree of Technological Innovation

A Conceptual Framework
Reengineering & Knowledge

- Business Process Reengineering
  - Focus on core processes
  - Utilize IT to eliminate routing delays
  - Triage cases to automate the process
    - Turn typical cases over to logic
    - Provide access to needed information for complex cases
  - Retrain practitioners to handle exceptions
- Knowledge Management
  - Lateral information may be lost in the process
  - KM involves discovering what an organization knows

A Conceptual Framework
Beyond Calculation

- The origin of computing focused on their ability to perform repetitive calculation
- Increasingly computers are being used for communication and connection
- The next 50 years of computing will focus on enhanced communications capability and agents
- Moore's law and the PC of 2044 – 2^{64}

A Conceptual Framework
Computing on the Periphery

- Much of what transpires in the workplace involves social interaction
- With core processes complete, we are looking to accommodate the need for social information in the process
- Organizations must pay attention to:
  - Physical capital
  - Intellectual capital
  - Social capital

A Conceptual Framework
Ubiquitous Computing

- Information appliances are devices capable of communicating over a network
- The Negroponte flop
- Sensors, virtual machines, and micro actuators are creating the potential for ad hoc networks
  - Cars will recognize neighborhoods
  - Doors will recognize authorized inhabitants
  - Classrooms will recognize teachers

E-Business
Evolving Technologies

- E-Business is not new. It is the evolutionary and revolutionary culmination of a century of technological innovation.
  - The telephone, telegraph, and telex added a first order change in the speed of transactions and the immediacy of management
  - The optical copier and laser printer added a first order change in the cost and ease of information sharing
  - The fax, email, online calendaring, fileservers, shared document spaces, and intranets extended this change
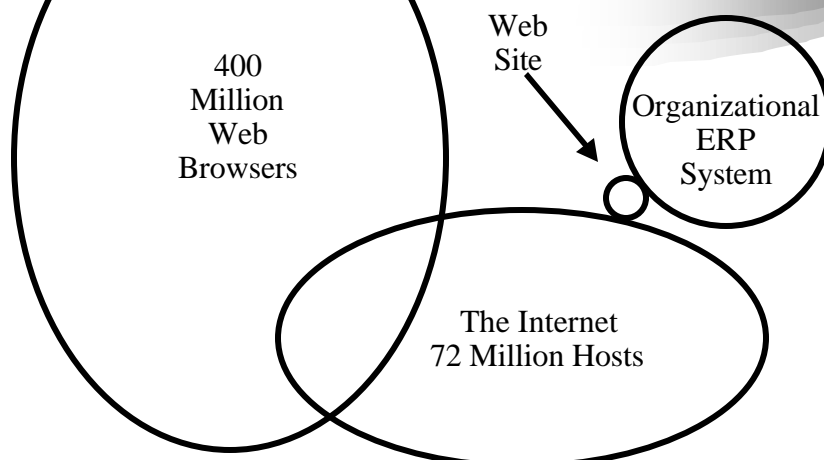
E-Business Transaction Evolution

- Mail Order
- Phone and fax orders with COD
- Phone, fax, and e-mail orders using credit cards
  Fax and e-mail promotions
- Web enabled transactions
  - Product information
  - Inventory information
  - Online orders
  - Order tracking
  - Customer service

Relative Importance of Components

400
Million
Web
Browsers

Web
Site

Organizational
ERP
System

The Internet
72 Million Hosts

Web Technology

Javascript Vbscript HTML CSS XML Applet plugin capable browser

http request

http response

Server analyzes request and gets page or runs program

Pages for delivery

Programs that produce pages

Java Application	←————————→	Java Application
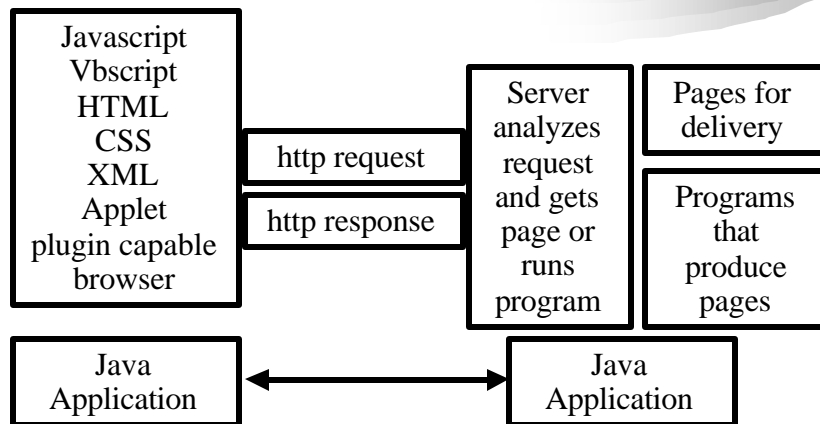
E-BusinessTechnology: Today

- Business at the current time is driven by three key developments in technology
  - The Internet – which allows for a global marketplace.
  - Browsers – which provide an understood application program that make the global marketplace accessible
  - Client server systems – which allow programs of increased the flexibility and scalability.
  - "Intelligent" software – which increasingly include complex business rules that help level the playing field for businesses.

The Internet

- The Internet is simply an interconnected network of networks defined in large part by standards:
  - Local Area Network(LAN), Network Interface Card(NIC), and Medium Access Control(MAC) address standards allow messages to move from machine to machine on a simple network.
  - Internet Protocol(IP) and Domain Name Service (DNS) standards allow messages to be passed between networks connected by routers.
  - The Transmission Control Protocol standard provides a means to insure the integrity of messages that are sent.

The Internet (Continued)

- Once the networks were connected and people agreed to use that singular network, application protocols could be developed:
  - The Simple Mail Transfer Protocol (SMTP) and subsequently POP, POP3, IMAP, MIME, etc. allows mail to be exchanged
  - The File Transfer Protocol (FTP) allows file exchange
  - The HyperText Transfer Protocol (HTTP) coupled with the HTML standard and the Universal Resource Locator (URL) standard allowed the development of the World Wide Web.

Client Server Systems

- Mainframe computing was the initial model:
  - Batch jobs
  - Systems optimized for efficient transaction processing
- Time-shared computing allowed easy access to the computing device at the cost of efficiency
- Distributing computing (of which client server is one form) divides the task among a number of machines:
  - Modular software components
  - Distributed data
  - Mainframe efficiency and time sharing convenience

September 28, 2001   *Roots of E-Business*   *23*

Smart Software

- Historically, software has been concerned with processing data stores
- Programs were designed to do simple tasks
  - Payroll checks
  - Inventory reports
- Data Base Management Systems (DBMS) were developed to help manage the data stores
- Programs, freed from managing the data, began to incorporate rules of increased complexity.
  - Rules could be defined without rewriting code

September 28, 2001   *Roots of E-Business*   *24*