Chapter 4
E-Commerce, Digital Markets, Digital Goods

Lecture 8
TIM 50  Autumn 2012

Tuesday   October 23,2012
Announcement

1. HW#2 due Tuesday, OCT 23

2. The business preference proposal and DB assignment 1 is due on Thursday, 10/25.
   As TIM50Class eCommons now works, Students should submit business proposal and DB assignment 1 on eCommons.
   For details refer do class webpage.

3. The Mid-Term review will be on 10/25, Thursday
4. The grades for every assignment will be given in eCommons.
5. It's important to check webpage to get the latest information and assignments.
Review

e-Business, Digital Markets

1. Ubiquity
2. Global reach
3. Universal standards
4. Interactivity
5. Richness
6. Interactivity
7. Information density
8. Personalization/Customization:
9. Social technology

Digital, Physical

Goods, Services

e-Commerce

e-Business Systems

IT Systems

P, Cont.P., MP, E-tailer, ComContr,...
A, S, Sub., F/Fr., T, A


Mobile Commerce
Lo, Banking, W/I, Entertn’t

Mobile Commerce

Digital payment

Connection

Security

Emergency Measure

e-Business Models

e-Revenue Models

e-Business Entrants

New Digital Busi; Sys, Tech, Inf.
Portal Site?

New Directions

Tech development
Abuse of Sys, Tech.
Case Study

IT Business  Dot Com

Alibaba. Com

Extracted from  Alibaba.com  Presentations
Empowering SMEs Worldwide: The Alibaba Story

Arthur Chang
Vice President in Global Sales
Alibaba.com

IV INSME Association General Assembly

2nd July 2008
Who is Alibaba.com?

Alibaba.com®
Global Trade Starts Here™

**Awards/Accolades**
- Recipient of *Forbes Magazine* "Best of the Web" for B2B websites 6 years in a row!
- *Harvard Business School* Case Study A & B

**Key Facts**
- Established in 1999
- Offices locations: Hangzhou, China (HQ), Hong Kong, Europe (Geneva), USA (Silicon Valley), major cities in China
- 2005 Revenue: approx $100mm+
- Y-on-Y Growth: 100%
- 2012 Revenue: 60Mil./1Q
- # of Employees: 3,000+

- #17 in World
- World’s Top-Ranked Import and Export Site
- World’s Top International Business and Trade Site

*Entrepreneur Magazine: “Top Website for Entrepreneurs”*
Current Web Portal. 2012

Welcome to Alibaba.com, Join Free | Sign In

Welcome to Alibaba.com
A global marketplace for online sourcing and shopping

Categories
- Agriculture
- Apparel
- Automobiles & Motorcycles
- Beauty & Personal Care
- Chemicals
- Computer
- Construction & Real Estate
- Consumer Electronics
- Electrical Equipment
- Energy
- Fashion Accessories

Sourcing
- Over 2 Million Supplier Storefronts
- Safe and Simple Trade Solutions
- Easily Access Verified Suppliers

Buy
- Buy Online Instantly
- Order by Single Item or Lot
- Millions of items at Wholesale Prices

Customized Sourcing
Use 5 minutes to fill out a Buying Request and receive up to 10 quotes
- Genuine, verified and complaint-free suppliers
- Prompt service with quotes in as little as 48 hours
- Use 5 minutes and receive up to 10 quotes

Learn more

Source: High Quality Foods from India, Japan, Thailand and more!
- Fresh Vegetables
- Delicious Beverages
- Seafood

Source now
Background

- Founder of Alibaba – Jack Ma
- Launched China’s first commercial website
- Prepared 1st website in China – MOFTEC
Alibaba’s Vision

- **Marketplace**
  - To Make It Easy To Do Business Anywhere
  - 让天下没有难做的生意
  - 商人都要用阿里巴巴

- **Community**
  - To Be an Essential Partner to All Businesspeople

- **Long Term Vision**
  - To Build a Company that Lasts “102 Years”
  - 建立一家持续发展 “102年” 的公司
Global Network at Your Fingertips

A truly global network for importers and exporters of raw materials, component parts and finished goods

Manufacturers
Trading agents

Manufacturers
Trading agents
Retail shops

Export e-marketplace
Global Buyers

Import e-marketplace
Global Suppliers
SME: Small and Medium-Sized Enterprises

World's No. 1 Online B2B Marketplace for International & Domestic Trade

Alibaba.com represents a phenomenon which is changing the way SMEs around the world conduct business.

**Sellers**
- Typically SMEs
- Ten to a few thousand employees
- 5,000+ product categories in 30+ industries

**International Marketplace**
- 4.4 million registered users *(1)*

**China Marketplace**
- 23.2 million registered users *(1)*

**Buyers**
- Across more than 200 countries
- Companies of all sizes
- Diverse end markets

Note:
Alibaba.com International

Key Information
- World’s largest business-to-business marketplace for global trade
- A world of business opportunities for buyers and sellers
- 2.3 million members (SMEs)
- 200+ countries and territories
- 32 categories

Daily Web Statistics*
- 5 million PVs
- 3,000 new members
- 550,000 unique visitors
- 1300 new companies listed
- 3,800+ new products listed

* Company estimate based on average for month of July 2006
SME: Small and Medium Sized Enterprises

IPO: Initial Public Offering
A Hangzhou Teahouse

- A marketplace provides the "cups, tea and scenic surroundings" to facilitate match-making between buyers and sellers
- Customers bring the products and ideas
- User generated content:
  For members, by members, of members

"Attract the shrimps (sic.) and the whales will come."

Jack Ma
CEO Alibaba.com
E-Marketplaces: Circa 2000 approach

TPN: Trading Partner Network

Source: California Management Review
Product categories: 32

Other 22 Categories: 37%
- Automobile
- Chemicals
- Construction & Real Estate
- Electronic Components & Supplies
- Energy
- Environment
- Excess Inventory
- Furniture & Furnishings
- Health & Beauty
- Home Appliances
- Home Supplies
- Lights & Lighting
- Luggage, Bags & Cases
- Office Supplies
- Packaging & Paper
- Printing & Publishing
- Security & Protection
- Sports & Entertainment
- Telecommunications
- Timepieces, Jewelry & Eyewear
- Toys
- Transportation

Top 10 Categories
- Apparel & Fashion 7%
- Textile & Leather 6%
- Computer Hardware & Software 6%
- Minerals, metals & Materials 5%
- Food & Beverage 5%
- Business Service 9%
- Electrical Equipment & Supplies 7%
- Industrial Supplies 6%
- Agriculture 8%
- Electrical Equipments 7%
How online marketplaces can help

- E-Marketplaces can offer a platform to address buyers’ key considerations:

  - Breadth and Depth
  - Trust and Credibility
  - Quality of Service
  - Lowest Cost
A request for quotation (RFQ) is a standard business process whose purpose is to invite suppliers into a bidding process to bid on specific products or services.

**Average sourcing cycle: 3.3 – 4.2 months**

- 52% of time spent searching for/identifying appropriate suppliers
- 18% of time spent on RFQ development/RFQ response
- 20% of time spent on screening/sorting proposals
- 10% of time spent on contract negotiations

**Traditional Sources of Supplier Information**

<table>
<thead>
<tr>
<th>Source</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referral (colleagues, associates)</td>
<td>Industry associations</td>
</tr>
<tr>
<td>Trade shows</td>
<td>Trade directories</td>
</tr>
<tr>
<td>Industry magazines, trade journals</td>
<td>Existing suppliers</td>
</tr>
</tbody>
</table>

*Source: The Aberdeen Group*
Sourcing Today

Buyers rate the importance of different sourcing resources

<table>
<thead>
<tr>
<th>Resource</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alibaba.com</td>
<td>1.51</td>
</tr>
<tr>
<td>Existing Supplier</td>
<td>1.75</td>
</tr>
<tr>
<td>Internet (search, surf, etc)</td>
<td>2.19</td>
</tr>
<tr>
<td>Referral (associate, colleague)</td>
<td>2.38</td>
</tr>
<tr>
<td>Other Trading Sites</td>
<td>2.53</td>
</tr>
<tr>
<td>Trade Shows</td>
<td>2.62</td>
</tr>
<tr>
<td>Trade/Buying Agent</td>
<td>2.78</td>
</tr>
<tr>
<td>Industry Magazine</td>
<td>3.03</td>
</tr>
<tr>
<td>Industry Association</td>
<td>3.16</td>
</tr>
<tr>
<td>Trade Directory</td>
<td>3.3</td>
</tr>
<tr>
<td>Other sourcing/trade media</td>
<td>3.58</td>
</tr>
</tbody>
</table>

- A survey of Alibaba.com users reflects the shift to e-sourcing has already occurred among some buyer segments.
- Traditional media, while still used, is diminishing in importance as the internet becomes the tool of choice.
- This trend is likely to continue as e-marketplaces grow in sophistication and functionalities.

1 = highest importance
4 = lowest importance

Source: Synovate Research
E-Marketplaces: The Alibaba Approach

P2P + Match.com + Romantic Restaurants =

B2B + Alibaba.com + Tradeshows =
Where Are the Alibaba Buyers?

All Over the World – A Global Marketplace

- Canada: 2%
- United States: 21%
- Europe: 18%
- India: 7%
- China: 4%
- Hong Kong: 4%
- S.E. Asia: 5%
- Singapore & Malaysia: 4%
- Australia: 3%
- Other: 27%
The business model of Alibaba is very simple.

It is to help sellers meet buyers. More specifically, it provides an Internet based business-to-business (B2B) platform where sellers(suppliers / manufactures) can meet buyers (outsourcers / wholesalers) on a global scale.

The company offers two platforms, one in Chinese for Chinese businesses, and another in English for the other international customers.

Customers are both the sellers and the buyers, who are able to post “storefronts” to advertise their products or needs.

Alibaba offers several services. By June of 2007, Alibaba had over 19.8 million registered users, with 16.6 within its Chinese market place. 219,098 of these 19.8 users where paying members.
As stated by Alibaba, the workflow includes:

1. Suppliers and buyers post their listings, matching the inputs from the company’s strategic perspective.

2. Listings are searched, contacts are made, and information is exchanged between the suppliers and buyers. This will often include product specifications and capabilities.

This corresponds to the information manipulation the company’s servers and software use to generate the value for the customers.

3. Customers then negotiate with each other, which is the “outbound” part of the workflow.

4. All of the communications for suppliers and buyers is enabled through tools within Alibaba’s software. Why??
Traditional Value Chain Model

Support Activities:
- Firm Infrastructure
- Human Resource
- Technology
- Procurement

Primary Activities:
- Inbound
- Operations
- Outbound
- Marketing & Sales
- Customer Service

Value & Margin

What They did
New Alibaba Value Chain Model

Support Activities
- Firm Infrastructure
- Human Resource
- Procurement

Technology
- Operations
  - Gathering information
  - Organizing information
  - Selecting information
  - Synthesizing information
  - Distributing information

Outbound to "customers"

Inputs from "customers"

Marketing & Sales

Customer Service

Change

Primary Activities

Value & Margin
Environments of Value Chain Model

Technology

- Operations
  - Gathering information
  - Organizing information
  - Selecting information
  - Synthesizing information
  - Distributing information

Outbound to customers

Finalize negotiation, place orders, arrange delivery, and payment

Suppliers and buyers negotiate transaction terms.

Suppliers and buyers make trade enquiries and exchange information.

Search listings for potential suppliers or buyers.

Suppliers post product and service listings

Buyers post listings to buy.

Inputs from “customers.”

Margin

Value
Virtual marketplace Structures

Traditional Value Chain Model and Portal Site

Inbound
Operations
Outbound
Marketing & Sales
Customer Service

Primary Activities

Alibaba.com for Buyers

Alibaba.com for Sellers

Margin
Value
Case analysis . . .

- Alibaba.com corporation
  - China’s leading E-commerce Company

- Focused on various Business Models
  - B 2 B
  - B 2 C
  - C 2 C

- Captured Market Share of 69.04 %
MODEL OF STRATEGY EXECUTION

- Corporate Strategy
- Corporate Structure
- Business Strategy
- Business Structure
- Incentive and Control
Strategy - What is strategy?

Johnson and Scholes define strategy as follows:

"Strategy is the **direction** and **scope** of an organization over the **long-term**: achieves **advantage** for the which organization through its configuration of **resources** within a challenging **environment**, to meet the needs of **markets** and to fulfil **stakeholder** expectations".

* What resources (skills, assets, finance, relationships, technical competence, facilities) are required in order to be able to compete? (resources)?
* What external, environmental factors affect the businesses' ability to compete? (environment)?
* What are the values and expectations of those who have power in and around the business? (stakeholders)
## Corporate level Strategy

<table>
<thead>
<tr>
<th>Key components</th>
<th>Major Decision or Issue</th>
</tr>
</thead>
</table>
| Portfolio Analysis              | * Right mix of business  
                                    * Cash generators and cash users,  
                                    * Positioning the company for growth  
                                    * Stable returns vs. risk taking and high returns  
                                    * Eliminating ‘deadwood’. |
| Diversification                 | * Analysis of industry attractiveness  
                                    * Return on invested capital.  
                                    * Integration of acquisitions. |
| Resource allocation to business | * Internal vs. external source of investment capital.  
                                    * Performance expectations of different business.  
## Business Strategy

| The Arts of War (Sun tzo): Know Enemy and Know yourself |

<table>
<thead>
<tr>
<th>Key Issues</th>
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</thead>
<tbody>
<tr>
<td><strong>Industry Analysis</strong></td>
</tr>
<tr>
<td><em>Size/Concentration of Industry</em></td>
</tr>
<tr>
<td><em>Number of Strategic Group (Market Segmentation) within the Industry.</em></td>
</tr>
<tr>
<td><em>Power of Buyer or Customer.</em></td>
</tr>
<tr>
<td><em>Power of Suppliers to Industry.</em></td>
</tr>
<tr>
<td><em>Number of Substitute of Products.</em></td>
</tr>
<tr>
<td><em>Rivalry within the Industry.</em></td>
</tr>
<tr>
<td><strong>Competitor Analysis</strong></td>
</tr>
<tr>
<td><em>Competitors Resource and Capabilities.</em></td>
</tr>
<tr>
<td><em>Competitors Size and Market Power.</em></td>
</tr>
<tr>
<td><em>Competitors Strategies.</em></td>
</tr>
<tr>
<td><em>Competitors previous Defensive and Offensive move</em></td>
</tr>
<tr>
<td><strong>Resource and Capabilities</strong></td>
</tr>
<tr>
<td><em>Our own Resource, Tangible and Intangible.</em></td>
</tr>
<tr>
<td><em>Our Competitive Capabilities.</em></td>
</tr>
<tr>
<td><em>Existence of Core Competency.</em></td>
</tr>
</tbody>
</table>
Vision

- To Last 102 Years
- To be one of the world’s top 10 Internet Sites
- To be essential partner for all business people

Truth and Fundamental Nature;
Back to the Basics
## Mission

To make it easy to do business anywhere.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Customer First</strong></td>
<td>The interests of our community of users and paying members must be our first priority.</td>
</tr>
<tr>
<td><strong>Team work</strong></td>
<td>We expect our employees to collaborate as a team. We encourage input from our employees in the decision-making process, and expect every employee to commit to the team's objectives.</td>
</tr>
<tr>
<td><strong>Embrace Change</strong></td>
<td>We operate in a fast-evolving industry. We ask our employees to maintain flexibility, continue to innovate and adapt to new business conditions and practice.</td>
</tr>
<tr>
<td><strong>Passion</strong></td>
<td>Our employees are encouraged to act with passion whether it is serving customers or developing new services and products.</td>
</tr>
<tr>
<td><strong>Commitment</strong></td>
<td>Our employees have a dedicated focus and commitment to understanding and delivering on the needs of Chinese and global SMEs.</td>
</tr>
</tbody>
</table>
History of Innovations and transformations

PHASE 1
1999 TO DOTCOM BUBBLE
Case Analysis ..

- Raised money from Venture Capitalist
- Platform for Trade – B2B
- 2 lac members at the end of year
- Attracted other companies into e-Commerce
- Stood hard in dotcom bubble
Objectives

- Gather Work Force
- Build Customer Base
- Establish Brand Name
Marketing

- Customization
- Segmentation and Targeting
- Delivering Customer Value
- Free Services

Alibaba China was launched in 1999 was a website in Chinese language serving domestic B2B trade in China.

Alibaba International was an English website which connected to a number of Chinese SME’s. It had around 2.5 million registered users around 200 countries in 2007.
Operational

- Service Design
- Buyers and Sellers
- SME focused
Finance

- Debt Fund Raising
  - Venture Capitalist
  - Soft Bank
Human Resources

- Autocratic Leadership
- Corporate Culture
- Building Trust factor
  - Appointment of Softbank CEO
  - Appointment of Chairman, Goldman Sachs
Leadership

- “Jack Test”
- Influential

“We cannot create beautiful power points, but we know how to listen to our customers”
PHASE II
2000 TO 2003
Case Description

- Dotcom Crash
  - Advertising Revenue
  - Bankruptcy
  - Mergers
- Early 2001 – Alibaba offered Alibabies
- Late 2001 – created a Community “China Suppliers”
- Set a “Trustpass Membership”

Free/fermium revenue Model
Objective

- Withstand Dotcom Burst
- Consolidate Firms Position
- Image Building
- Retain Employees
Marketing

- “Back to Coast”
- Additional services of Registered Members
- Taobao was launched in May 2003, China’s most popular C2C trading site.
Finance

- Revenue Model
  - Selling of Advertising Space
  - Charging of Membership
Human Resources

- Retention of Employees in tough Times
- Appointment of GE’s CEO
Operations

- Back to China
- Back to Central
- Association with Motorola
Leadership

- Conservative
- Motivating
- Down to Earth

“Let's make one Dollar Profit for the whole year. We spend US$ 5 Million, We should make at least one back”
PHASE III
2003 TO 2007
Case Description

- Entry into C2C and B2C
- Winning over eBay
- Yahoo! China Acquisition
Objectives

- Expansion within China
- Global Presence
- Better Revenue Model
Marketing

- Consumer Research
- Aggressive Promotions
- Positioning Strategy
- Diversification
Financial

- Debt Leverage Concept
- Merger and Acquisition
- Expansion of revenue Model
- Expansion of Enterprise, Investments
Leadership

- Determined
- Aggressive
- Adaptability

“The world is changing so fast that you don’t know what each other is thinking about, you do not even know what you are thinking yourselves. How do you know who are your Competitors.”
Diversification
Financial Structure
Understanding of Local Markets

Brand ambiguity – Yahoo! China
Under Positioning
Dilution of Management

IPO
Untapped Market Segment

Google and Baidu
New Entrants

SWOT
Summary 1

- Need Identification
- Segmentation and Targeting
- Delivering Value through Customization
- Leadership
- Financial Venture Capitalist
- Corporate Culture
Summary 2

- Service Design
- Diversification
- Globalization
- Competitive Strategies
- Financial Expansion - IPO
Current Strategies

- Part of HKSE composite Index
- Ali-ADvance – Bidding Site
- Use of 3G Networks
- Advisory Services
  - Marketing Solutions
  - Organizational Development
- New Competitors
  - Youa – Baidu’s C 2 C website
  - Kaixin001 – Social Networking Site
Porters generic Model

Differentiation

Comprehensive Cost Leadership

Concentration on Focal Points
Portfolio Analysis

- Diversification
  - Alibaba China
  - Alibaba International
  - Taobao
  - Alipay
  - Alisoft
  - Alimama

- Merger and Acquisition
  - Yahoo! China
Ansoff Matrix

<table>
<thead>
<tr>
<th>Existing Product</th>
<th>New Product</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Existing Market</strong></td>
<td><strong>New Market</strong></td>
</tr>
<tr>
<td>Market Penetration</td>
<td>Product Development</td>
</tr>
<tr>
<td>Market Development</td>
<td>Diversification</td>
</tr>
</tbody>
</table>
Types of Membership at Alibaba.com

- Free Membership: They were offered basic services free of cost.
- Trust Pass membership: It was a paid service where the member had to pay US$299 and would be verified by a third Party credit reporting agency.
- Gold Supplier: This was primarily for export oriented suppliers. The suppliers were classified into 27 industries which enabled the buyers to locate the companies easily.
New Business Proposal

- Vision for the future as per Jack Ma: "My vision is to build e-commerce ecosystem that allows consumers and businesses to do all aspects of business online"
- Development of New Browser
- Added Features
  - Built-in Yahoo! China Search Engine
  - Local Language
  - Light, Hence Faster
- Revenue Model – Pop-Up Ad Blocks
- Aggressive Promotion
- Targeting College and Young Working Class
ISSUES FOR DISCUSSION

- Critically analyze the factors that led to Alibaba sustaining its leadership position in the Chinese e-commerce market.

- Critically examine the Alibaba's business model. Do you think it is sustainable? After having captured the Chinese e-commerce market, what steps should Alibaba take to expand globally further.
Action Proposal with Partners

Partnership Building

Alibaba offers:
- International Free Membership for all partners’ SME members to promote them worldwide
- Promote partner organization worldwide through banner, link, and etc.
- Provide tools such as search bar, trade alerts and etc. on partner website
- Content exchange about SME related subjects such as innovation etc.
- Joint event, etc to educate e-commerce, SME innovation and etc.
- Discounted paid membership with value added service for partner’s SME members

Partners offers:
- Promote Alibaba locally through banner, link, and etc.
- Content exchange about SME related subjects such as innovation etc.
- Joint event, etc to educate e-commerce, SME innovation and etc.

To achieve the win-win results and long term partnership
New Book: TIM 050
By Musacchio

Chapter: Information technology

IT INFRASTRUCTURE AND EMERGING TECHNOLOGIES

pp. 1 to pp. 26.
IT Infrastructure

IT infrastructure:
Set of physical devices and software required to operate enterprise
Set of firm wide services including:
  - Computing platforms providing computing services
  - Telecommunications services
  - Data management services
  - Application software services
  - Physical facilities management services
  - IT management, standards, education, research and development services

“Service platform” perspective more accurate view of value of investments
The services a firm is capable of providing to its customers, suppliers, and employees are a direct function of its IT infrastructure. Ideally, this infrastructure should support the firm’s business and information systems strategy. New information technologies have a powerful impact on business and IT strategies, as well as the services that can be provided to customers.
Illustrated here are the typical computing configurations characterizing each of the five eras of IT infrastructure evolution.
Illustrated here are the typical computing configurations characterizing each of the five eras of IT infrastructure evolution.
Evolution of IT infrastructure

General-purpose mainframe & minicomputer era: 1959 to present
  1958 IBM first mainframes introduced
  1965 Less expensive DEC minicomputers introduced

Personal computer era: 1981 to present
  1981 Introduction of IBM PC
  Proliferation in 80s, 90s resulted in growth of personal software

Client/server era: 1983 to present
  Desktop clients networked to servers, with processing work split between clients and servers
  Network may be two-tiered or multitiered (N-tiered)
  Various types of servers (network, application, Web)
Evolution of IT infrastructure (cont.)

Enterprise computing era: 1992 to present
Move toward integrating disparate networks, applications using Internet standards and enterprise applications

Cloud Computing: 2000 to present
Refers to a model of computing where firms and individuals obtain computing power and software applications over the Internet or other network
Fastest growing form of computing
A MULTITIERED CLIENT/SERVER NETWORK (N-TIER)
Technology drivers of infrastructure evolution

Moore’s law and microprocessing power
  Computing power doubles every 18 months
Nanotechnology:
  Shrinks size of transistors to size comparable to size of a virus

Law of Mass Digital Storage
  The amount of data being stored each year doubles
Packing over 2 billion transistors into a tiny microprocessor has exponentially increased processing power. Processing power has increased to over 500,000 MIPS (millions of instructions per second).
Packing more transistors into less space has driven down transistor cost dramatically as well as the cost of the products in which they are used.
Since the first magnetic storage device was used in 1955, the cost of storing a kilobyte of data has fallen exponentially, doubling the amount of digital storage for each dollar expended every 15 months, on average.
Technology drivers of infrastructure evolution (cont.)

Metcalfe’s Law and network economics

Value or power of a network grows exponentially as a function of the number of network members

As network members increase, more people want to use it (demand for network access increases)
Technology drivers of infrastructure evolution (cont.)

Declining communication costs and the Internet
An estimated 1.5 billion people worldwide have Internet access

As communication costs fall toward a very small number and approach 0, utilization of communication and computing facilities explodes
One reason for the growth in the Internet population is the rapid decline in Internet connection and overall communication costs. The cost per kilobit of Internet access has fallen exponentially since 1995. Digital subscriber line (DSL) and cable modems now deliver a kilobit of communication for a retail price of around 2 cents.
Technology drivers of infrastructure evolution (cont.)

Standards and network effects

Technology standards:
Specifications that establish the compatibility of products and the ability to communicate in a network

Unleash powerful economies of scale and result in price declines as manufacturers focus on the products built to a single standard
IT Infrastructure has 7 main components

1. Computer hardware platforms
2. Operating system platforms
3. Networking/telecommunications platforms
4. Internet platforms
5. Enterprise software applications
6. Data management and storage
7. Consulting system integration services

** Computer: 1,2
Communication:3,4
Business S/W: 5,6,7
There are seven major components that must be coordinated to provide the firm with a coherent IT infrastructure. Listed here are major technologies and suppliers for each component.
Computer hardware platforms

Client machines
  Desktop PCs, mobile devices – PDAs, laptops

Servers
  Blade servers: ultrathin computers stored in racks

Mainframes:
  IBM mainframe equivalent to thousands of blade servers

Top chip producers: AMD, Intel, IBM

Top firms: IBM, HP, Dell, Sun Microsystems
Operating system platforms

Operating systems

Server level: 75% run Windows; 25% run Unix or Linux

Client level:
90% run Microsoft Windows (XP, 2000, CE, etc.)
Handheld device OS’s (Android, iPhone OS)
Cloud computing OS’s (Google’s Chrome OS)

Enterprise software applications

Enterprise application providers: SAP and Oracle
Middleware providers: BEA
NEW TO THE TOUCH

What problems does multitouch technology solve? What are the advantages and disadvantages of a multitouch interface? How useful is it? Explain.

Describe three business applications that would benefit from a multitouch interface.

What management, organization, and technology issues must be addressed if you or your business was considering systems and computers with multitouch interfaces?
Data management and storage

Database software:
   IBM (DB2), Oracle, Microsoft (SQL Server),
   Sybase (Adaptive Server Enterprise),
   MySQL

Physical data storage:
   EMC Corp (large-scale systems), Seagate,
   Maxtor, Western Digital

Storage area networks (SANs):
   Connect multiple storage devices on
   dedicated network
Networking/telecommunications platforms

Telecommunication services
  Telecommunications, cable, telephone company charges for voice lines and Internet access
  AT&T, Verizon

Network operating systems:
  Windows Server, Novell, Linux, Unix

Network hardware providers:
  Cisco, Alcatel-Lucent, Nortel, Juniper Networks
Internet platforms

Hardware, software, management services to support company Web sites, (including Web hosting services) intranets, extranets

Internet hardware server market: Dell, HP/Compaq, IBM

Web development tools/suites: Microsoft (FrontPage, .NET) IBM (WebSphere) Sun (Java), independent software developers: Adobe, RealMedia
Consulting and system integration services

Even large firms do not have resources for a full range of support for new, complex infrastructure

Software integration: ensuring new infrastructure works with legacy systems

Legacy systems: older TPS created for mainframes that would be too costly to replace or redesign

Accenture, IBM Global Services, EDS, Infosys, Wipro
The emerging mobile digital platform

**Cell phones, smartphones** (BlackBerry, iPhone)
  Have assumed data transmission, Web surfing, e-mail and IM duties

**Netbooks:**
  Small, low-cost lightweight notebooks optimized for wireless communication and core computing tasks

**Tablets** (iPad)

**Networked e-readers** (Kindle)
Grid computing
Connects geographically remote computers into a single network to combine processing power and create virtual supercomputer
Provides cost savings, speed, agility

Virtualization
Allows single physical resource to act as multiple resources (i.e., run multiple instances of OS)
Reduces hardware and power expenditures
Facilitates hardware centralization
Cloud computing

On-demand (utility) computing services obtained over network
- Infrastructure as a service
- Platform as a service
- Software as a service

Cloud can be public or private

Allows companies to minimize IT investments

Drawbacks: Concerns of security, reliability
Green computing
  Practices and technologies for manufacturing, using, disposing of computing and networking hardware
Autonomic computing
  Industry-wide effort to develop systems that can configure, heal themselves when broken, and protect themselves from outside intruders
  Similar to self-updating antivirus software; Apple and Microsoft both use automatic updates
High performance, power-saving processors
  Multi-core processors
IS GREEN COMPUTING GOOD FOR BUSINESS?

What business and social problems does data center power consumption cause?
What solutions are available for these problems? Which are environment-friendly?
What are the business benefits and costs of these solutions?
Should all firms move toward green computing? Why or why not?
Contemporary Software Platform Trends

Linux and open-source software

Open-source software: Produced by community of programmers, free and modifiable by user
Linux: Open-source software OS

Software for the Web

Java:
Object-oriented programming language
Operating system, processor-independent

Ajax
Asynchronous JavaScript and XML
Allows client and server to exchange small pieces of data without requiring the page to be reloaded
Web Services

Software components that exchange information using Web standards and languages

XML: Extensible Markup Language
  More powerful and flexible than HTML
  Tagging allows computers to process data automatically

SOAP: Simple Object Access Protocol
  Rules for structuring messages enabling applications to pass data and instructions

WSDL: Web Services Description Language
  Framework for describing Web service and capabilities

UDDI: Universal Description, Discovery, and Integration Directory for locating Web services
SOA: Service-oriented architecture

Set of self-contained services that communicate with each other to create a working software application. Software developers reuse these services in other combinations to assemble other applications as needed.

Example: an “invoice service” to serve whole firm for calculating and sending printed invoices.

Dollar Rent A Car

Uses Web services to link online booking system with Southwest Airlines’ Web site.
Dollar Rent A Car uses Web services to provide a standard intermediate layer of software to “talk” to other companies’ information systems. Dollar Rent A Car can use this set of Web services to link to other companies’ information systems without having to build a separate link to each firm’s systems.
Software outsourcing and cloud services

Three external sources for software:

1. Software packages and enterprise software
2. Software outsourcing (domestic or offshore)

   Domestic:
   Primarily for middleware, integration services, software support

   Offshore:
   Primarily for lower level maintenance, data entry, call centers, although outsourcing for new-program development is increasing
Three external sources for software (cont.)

3. Cloud-based software services
   Software as a service (SaaS)
   Accessed with Web browser over Internet
   Ranges from free or low-cost services for individuals to business and enterprise software
   Users pay on subscription or per-transaction
   E.g. Salesforce.com
   Service Level Agreements (SLAs): formal agreement with service providers
In 2010, U.S. firms will spend over $265 billion on software. About 40 percent of that ($106 billion) will originate outside the firm, either from enterprise software vendors selling firmwide applications or individual application service providers leasing or selling software modules. Another 10 percent ($10 billion) will be provided by SaaS vendors as an online cloud-based service.
Software outsourcing and cloud services (cont.)

Mashups
  Combinations of two or more online applications, such as combining mapping software (Google Maps) with local content

Apps
  Small pieces of software that run on the Internet, on your computer, or on your cell phone
    iPhone, BlackBerry, Android
  Generally delivered over the Internet
Dealing with platform and infrastructure change

As firms shrink or grow, IT needs to be flexible and scalable

**Scalability:**

*Ability to expand to serve larger numbers of users*

For mobile computing and cloud computing

New policies and procedures for managing these new platforms

Contractual agreements with firms running clouds and distributing software required
Management and governance

Who controls IT infrastructure?
How should IT department be organized?
  Centralized
    Central IT department makes decisions
  Decentralized
    Business unit IT departments make own decisions
How are costs allocated between divisions, departments?
Making wise infrastructure investments

Amount to spend on IT is complex question

Rent vs. buy, outsourcing

Total cost of ownership (TCO) model

Analyzes direct and indirect costs

Hardware, software account for only about 20% of TCO

Other costs: Installation, training, support, maintenance, infrastructure, downtime, space and energy

TCO can be reduced through use of cloud services, greater centralization and standardization of hardware and software resources
Competitive forces model for IT infrastructure investment

1. Market demand for firm’s services
2. Firm’s business strategy
3. Firm’s IT strategy, infrastructure, and cost
4. Information technology assessment
5. Competitor firm services
6. Competitor firm IT infrastructure investments
There are six factors you can use to answer the question, “How much should our firm spend on IT infrastructure?”