Outline For Today

- Class Announcements
- Student Presentations
- IT History (Hand out from last time)
- Systems Concepts (O’Brien Ch1)

Class announcements

- Class webpage
  http://www.soe.ucsc.edu/classes/ism050/Spring05/

- Full presentation schedule will be put on webpage tonight
  September 27:

- September 29:

For next time

- Project Preferences
- Assignment 1: Resume and Cover letter

- Read:
  - Capital Budgeting Handout (on website)
  - Chapter 2 - Section I of O’Brien (reader pp 69-77)

STUDENT PRESENTATIONS

Where are we, and how did we get here?

- Let’s survey the history of IT over the past few decades!

The History of IT from 1960-2000
Today's Student Talks!

IT Mgmt from 1960-2000

- The author (Nolan) breaks down history into 3 eras
  - Data Processing Era
  - Micro Era
  - Network Era
- A logical division, but not universal
  - Messerschmitt divides into 4 phases
    - Centralized, Time shared, de-centralized, networked

The Data Processing Era (1960-1980)

- By 1960 economy dominated by large, multi-divisional, hierarchical businesses
  - Corporate Office
  - Divisional operating units in different markets
  - Example: GE
    - Corporate office in Connecticut
    - Lighting in Cleveland
    - Locomotives in Erie
    - Power Systems in Schenectady
  - Within each division many "functional departments"
    - Accounting
    - Finance
    - Engineering
    - Etc..

The Data Processing (DP) Era (1960-1980)

- Needed to keep track of massive amounts of data for
  - Payroll
  - Payments to customers and suppliers,
  - etc.

The Data Processing (DP) Era (1960-1980)

- Meanwhile computers were developed for scientific and defense purposes
- These large companies purchased mainframe computers
  - to manage the data processing.
  - They were slow, enormous, and expensive, by today's standards.
  - But, they did make it possible to process the enormous volume of data, and transactions in a huge corporation
DP Era (1960-1980)
- Commercial computing evolved...
  - 1954 -- IBM 650 dominates commercial market
    - Leased for $3,250 per month (over $22,000 per month in today's dollars!)

IBM 360
- 1964 - IBM 360,
  - Interoperable peripheral and computer family
  - Great improvement over previous generation
  - A massive development effort by IBM
  - Ensured IBM's dominance in the 60s and 70s

Data Processing Era (1960-1980)
- "You never got fired for buying IBM."
  - Average market share of 68% in the 70s.
- Meanwhile
  - Digital introduces the mini-computer (1960s)
  - UNIX operating system developed (1969)
  - Bob Metcalfe invents Ethernet (1973)

DP Era (1960-1980)
- Technology Evolution
  - First - Stand Alone Mainframes
  - Next - Dumb terminals attached to mainframe
  - ("Time-Shared" Phase in Messerschmitt's terminology)

Data Processing Era (1960-1980)
- The information resource manager was known as the Data Processing (DP) manager:
  - Charged with supporting the business
  - Not with changing how the business was run

DP Era (1960-1980)
- IS evolved from supporting lower functions to higher level functions
  - Low: Inventory, Purchasing, Scheduling
  - Medium: Productions Operations Management
  - High: Corporate wide planning
**DP Era (1960-1980) -- Annual Budgeting**
- Budgeting was an important function made easier by computers
- Accounting of:
  - Revenues, Expenditures, Assets, Liabilities
  - Generate Profit and Loss Statement
- Before computers:
  - Was difficult to do once a year
- After computers:
  - Could “close the books” more often
  - Could breakdown profits and losses to each level of the corporate hierarchy

**Capital Budgeting**
- Analyze return and risk of expenditures intended to generate revenue over multiple accounting periods
- Examples: New building, or factory
- Before computer:
  - Calculations could become complicated
- After computer:
  - Very easy
- Consequence: Every level of the organization could be held accountable for their ROI

**Budgeting**
Better budgeting and resulting accountability lead to consistent earnings growth.

**Build up to Micro Era**
- 1974 - Xerox PARC develops first computer with a mouse. They don’t commercialize it!
- 1974 - Altair PC for hobbyists
- 1975 - Bill Gates and Paul Allen Found Microsoft

- 1981 - IBM introduces its PC!
  - Intel develops CPU
  - Microsoft develops operating system
- IBM PCs were rapidly adopted by the commercial market.

- PCs threatened the DP manager
  - Easier to manage one central mainframe than a PC on every employees desktop!
  - Data not centralized.
    - The numbers on my PC are right, the ones on your PC are wrong!
  - Security Risks.
- DP managers put restrictions on PCs
- Users defied them!

Users wanted the convenience of word processing, CAD, etc...

Vendors marketed direct to the users instead of the DP managers.

Example: Spreadsheets

Spreadsheet Example

- VisiCalc (1979)
  - First Spreadsheet
  - For Apple II computer
- Lotus 1-2-3 (1983)
  - Mimicked VisiCalc
  - For IBM PC
- Excel (1985)
  - Microsoft
  - Surpassed Lotus when Windows took off.

Management realized the importance of bringing order to the chaos

- Coined the term Chief Information Officer (CIO) in the 80s

Beginning of Internet

- 1969 - ARPANET linked scientists
- 1977 - TCP/IP used to link networks to ARPANET
- 1984 - the term Internet comes into use
- 1985 - NSF takes over management of Internet Backbone
- 1990 - WWW (Tim Berners-Lee at CERN)
- 1991 - HTML
- 1993 - Mosaic Browser (Marc Andreessen and Eric Bina)

The Network Era (1995 - ?)

- After chaos of Micro Era, organizations converged on Client Server networked architectures
  - Client PC allowed user to have direct access to her own computer
  - Server housed organizational data
- Because of Success of Internet technologies...
  - UNIX, HTML, TCP/IP
- IT managers used these technologies for internal networks - "intranets"
The Network Era (1995 - ?) - Internet Phenomenon

- Internet built on open standards
  - Different than control-oriented development philosophy
  - Benefits: Scalable, Extensible, ...
- Lots of vendors selling Interoperable equipment
  - More decisions to make than the DP manager of the 1960s!
  - Many companies started and flourished.

Cisco

- 1984 Founded by Leonard Bosack and Sandra Lerner (Stanford IT Staff)
- Developed a Router
  - A device to forward data packets from one network to another
- By 1998, Cisco had a market value of $100 billion!

Netscape

- Founded by Marc Andreessen and Jim Clark
- Browser based on Original Mosaic
- IPO in 1995
  - First day went from $28 -> $75!
  - The company’s revenues doubled every quarter in 1995!
- Excitement triggered the dot-com boom.
  - Hundreds of companies started, most didn’t survive...

The network era

- The network era permitted new ways of doing business
  - Employees could check on their benefits with a web browser
  - Customers could "self-serve" themselves
    - In 1998, 70% of Cisco’s $800 million of service revenue was provided over Internet, by allowing customers to access their intranet.
  - Wal-Mart used point of sale data to drive supplier replenishment (CRP)

The network era

- Amazon sold books with minimal inventories.
- Levi Strauss used geo-demographic database to match supply and demand in each store
- ...and many more examples!

Information Resource Management

- Strategic realization
  - Information is the resource to be managed not just data.
  - Need to get information into the hands of workers, so workers can be more productive.
**Result: Organizational Performance Improvement**

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| Source: Standard & Poor's Composite. Market value ranks 1 - 10, based on calendar years and values.

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**The Network Era (1995 - ?) - Internet Phenomenon**

- For IT manager -- Enormous challenge to manage networks of thousands of computers!

**The Network Era (1995 - ?) - Internet Phenomenon**

- "The Technology leader of Tomorrow must be a business leader with all of the management skills of any other senior executive…"

The CIO has gone from being a corporate god in the 1980s to the chief blame taker in the 1990s when IT initiatives often have failed to deliver their promised productivity gains.1

1Sifonis and Goldberg, "Changing Role of the CIO," Information Week, March 24 1997

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**What is a Business?**

An organization that provides a product and/or a service that satisfies a need for which people are willing to pay money.

Makes money if revenues exceed costs.

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**The Network Era (1995 - ?) - Internet Phenomenon**

- In 1996 the CIO turnover rate was 17.7%.

1DeLoitte and Touche

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**Why Does a Company Need to Make a Profit?**

- Invest in new product development.
- Invest in facilities and equipment.
- Invest in operational improvements.
- Expand by acquiring another company.
- Invest in employees (training and salary increases)
- To justify borrowing money.
- To pay stockholders a dividend.
Recall: What is a System?

System Definition: A group of interrelated components working toward the attainment of a common goal by accepting inputs and producing outputs in an organized transformation process
- Input
- Processing
- Output
- Feedback
- Control

Business as a system

A business is an organizational system where economic resources (input) are transformed by various organizational processes (processing) into goods and services (output).

A Business is a System

Helps to remember and to tie together:
- Some business basics while remembering the importance of making a profit.
- The understanding of business functions.
- The appreciation for the importance of business processes.

Business as a system

A business is an organizational system where economic resources (input) are transformed by various organizational processes (processing) into goods and services (output).

Information systems provide information (feedback) on the operations of the system to management for the direction and maintenance of the system as it exchanges inputs and outputs within its environment.

Important Things to Understand

Two terms:
1) business functions
2) business processes

Will be frequently used throughout this course.

It would be a good idea to make absolutely sure that you know what they are.

Business Functions

Function: A group of people with related skills (specialized) seems to be a good starting point in understanding functions but this is a fairly loose definition.
### Business Functions

- Examples
  - Design
  - Engineering
  - Sales
  - Finance
  - Marketing
  - Etc...

### What prompts the creation and justification of business functions?

- Specialization
- Size
- Efficiency
- More cost effective

### Business Processes

What is a business process?

- A designed **succession of actions** to the accomplish of some result in a business.

Example
- Order Fulfillment

### A Business Process

<table>
<thead>
<tr>
<th>Business Functions</th>
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<tbody>
<tr>
<td>Customer</td>
</tr>
<tr>
<td>Sales</td>
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<tr>
<td>Finance</td>
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<tr>
<td>Inventory Control</td>
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<tr>
<td>Warehousing</td>
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</tbody>
</table>

- Order
- Enter Order
- Credit Check
- Check Stock
- Print Packing List
- Print Invoice
- Find Goods
- Ship
- Tell Mfg. to make order

### Cross Functional Process

- A business process that crosses over multiple functions

- Are all business processes cross functional?

### A business process within a function

**Example: Channel Selection Process within Marketing function**

- Find sales by channel
- Data for similar products
- Conduct Focus Group Studies
- Mine Demographic data
- Combine information
- Make decision

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Information System Roles

- Competitive Advantage
  - Support of Strategies for Competitive Advantage
- Effectiveness
  - Support of Business Decision Making
- Efficiency
  - Support of Business Processes and Operations

Information System Categories

- Transaction Processing Systems
  - Record and Process data resulting from business transactions
  - Example: Credit card transaction processing
  - 2 types
    - Real-time
    - Batch-Processing

- Process Control Systems
  - Monitor and control physical processes
  - Example:

- Decision Support Systems

- Information System Categories

Preview for Next time

- Capital Budgeting Review
- Strategic IT
- Porter Model
- Porter Strategies